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Trial Transcript, Vol. 76, Afternoon Session

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File 183
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case # 4993

File # 183

4434

IN THE DISTRICT COURT FOR THE FIFTH JUDICIAL DISTRICT

WASHAKIE COUNTY, STATE OF WYOMING

IN RE:	)
	)
THE GENERAL ADJUDICATION OF ALL RIGHTS TO USE WATER IN THE BIG HORN RIVER SYSTEM AND ALL OTHER SOURCES, STATE OF WYOMING.	) Civil No. 4993
	) FILED 6/23 1981
	) Margaret V. Hampton CLERK
	) DEPUTY

VOLUME 76

Afternoon Session

Thursday, June 4, 1981

ORIGINAL

THE SPECIAL MASTER: Okay, we are in session. You may examine, Mr. White.

MR. WHITE: Thank you, Your Honor.

Q. (By Mr. White) Mr. Vogel, I direct your attention to what has been admitted as U. S. Exhibit C-284. As I recall your testimony earlier, this is a graph which you cut off at the righthand side, but actually you had originally run farther to the right, is that correct?

A. Yeah, that's correct.

Q. And you said that it continued on in the downward direction, or decreasing direction to the right?

A. I believe that was the case.

Q. Was it essentially a linear reduction, in other words, it just kept going in the same general straight line?

A. I can't recall. Quite frankly, I can't remember if it was a straight line or if it had a slight curve to it. I can't recall right offhand.

Q. I direct your attention to what has been marked for identification as Plantiff's Exhibit FISH-284 --

THE SPECIAL MASTER: FISH what?

MR. WHITE: 284.

THE SPECIAL MASTER: Thank you.

Q. (By Mr. White) And ask you whether or not that is a copy, at least the lefthand side portion of that, of

U. S. Exhibit C-284, with the graph portion of it extended to the right?

A. Yes, I believe that's correct.

MR. WHITE: I apologize to the Court for the quality of the image, but it is the best we could do off of a solid rather than an acetate original.

Q. (By Mr. White) Do you have the data with you from which you could reconstruct the curve that extends to the right?

A. Yes.

Q. Would you get it out, please?

MR. SACHSE: Your Honor, we object to this unless there is some showing of a very direct relevance. We've had, as I see, almost a full day of cross-examination of this witness, and there has to be some measure of trying to get to the end of it, and the witness has testified as to the graph curves that he has made, and if the State's interested in presenting graphs to go further, they can do so through their own witnesses.

THE SPECIAL MASTER: Well, I am inclined to want to sustain the objection, but I'm going to -- I'm going to overrule it for the time being.

MR. WHITE: Thank you, Your Honor.

THE SPECIAL MASTER: And see how far we get on

this, on what relevance the statistical -- after the last flow figure on each of these charts and, if you show that then, the questions would be appropriate, and if not, then they should be overruled.

MR. WHITE: Thank you. If, after I go through one, you will see.

THE SPECIAL MASTER: All right.

What page in your report is that one you're working on, Mr. White?

MR. MEMBRINO: I believe that's 32, Your Honor.

THE SPECIAL MASTER: Thank you.

* * * * *

THE WITNESS: Okay, this is the data.

Q (By Mr. White) After reviewing that data, are you able to approximate what that curve looked like when you originally ran it?

A No, I just simply said I have the data from which I can reconstruct the curve.

THE SPECIAL MASTER: Can you show us with a line, if Mr. White would permit it?

MR. WHITE: That would be fine, Your Honor.

THE SPECIAL MASTER: How long the data would show it would take.

THE WITNESS: Your Honor, I can briefly --

THE SPECIAL MASTER: You did it on direct, you made an observation that it would come downward on direct.

THE WITNESS: See, basically what happened when I ran it out to a higher flow, it went down on a downward direction. Tnere was no portion of the adult life history stage that was higher than what this portion of the graph was, so it didn't make much sense to run it out to such a wide range of flow. I just restricted to this portion of the graph. I had to run it through the computer again to get a new graph to print it all the way out to here.

Q (By Mr. White) So you're unable to indicate what the line looked like in general?

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A Like I said before, I am confident there was no point on the adult curve that was higher than this point here, the best I can remember (indicating). But as far as, you know, what kind of slope it was here and there, I can't remember.

THE SPECIAL MASTER: Are you confident there was no point that would be lower than 200 feet?

THE WITNESS: Pardon?

THE SPECIAL MASTER: Are you confident there was no point that would be lower than the point of origin?

THE WITNESS: No, sir. This is the statistical limit I could extrapolate below my calibration flow. This is as far as the model permitted me to estimate.

THE SPECIAL MASTER: But on the other side, would it fall back again to as low as the beginning?

THE WITNESS: As low, at this point?

THE SPECIAL MASTER: Yes.

THE WITNESS: Yes. I can't remember if it reached that point on past it. It's quite possible it could have.

THE SPECIAL MASTER: Well, that answers your question, Mr. White.

Q (By Mr. White) Mr. Vogel, as I recall, you selected a flow recommendation of 500 c.f.s. during May. That was your optimum flow for this particular reach?

A Yes, that's correct.

Q So that would have been about here on your curve?

(Indicating.

A Yes.

Q And that would have meant that you had a habitat area of about 64,000 square feet; is that correct?

A For adult rainbow trout.

Q Yeah. Turning to Page 30 of your report, isn't it true that the one in ten-year flow, against which you worked, the natural flow, is that what that's called, the recurrence interval low flows which you got from Mr. Keene, was 1,131 c.f.s.?

A That's correct.

Q So on Exhibit FISH-284, that would mean that your adult line would be intersected where I am drawing a red circle or where I have my pointer?

THE SPECIAL MASTER: Why don't you make it an X.

MR. WHITE: Okay, I will, Your Honor.

THE WITNESS: Yes, that's about right.

Q (By Mr. White) Put a red X there. Isn't it true that at that flow the habitat would be about 5.1 or roughly 51,000 square feet?

A Yes. For adult rainbow trout.

Q And if it's your one in five-year flow, if this curve

continued on in the same general direction or same general slope for roughly an inch or so, the one in five-year flow was 1,393 c.f.s.?

A Right.

Q And where I have my red marker pointed now, is that roughly where the one in five-year flow would come out if the curve continued in the same general slope?

A Yes.

Q I'll put a red square there.

In your one in five-year flow, wouldn't the habitat be about 45,000 square feet?

A Yes.

Q I'll put another red X (sic) there. In your one in two-year flow, it's 2,005 c.f.s.; is that correct?

A Right.

Q So that would be somewhere along this vertical line in the graph?

A Yes.

Q I'll just draw a red line along that.

Do you know where -- Well, you've indicated you can't tell for sure where your adult rainbow trout line would intersect the vertical red line; is that correct?

A Yes, that's correct.

* * * * *

Q If your adult rainbow line continued on in a linear fashion, wouldn't it strike the vertical red line about where my magic marker is pointed now?

MR. SACHSE: Objection, Your Honor.

MR. MEMBRINO: Your Honor, I would object to that. Mr. Vogel has already testified that he could only speculate without doing a computer runoff graph where that line might intersect, so I would object to inviting further speculation.

THE SPECIAL MASTER: I suppose I'll sustain it. Although it isn't going to make all that much difference. Obviously, the weighted usable area on that flow which is already in evidence has got to be somewhere down around there, But I'll sustain the objection simply because that is what the witness said.

MR. WHITE: Okay.

Q. (By Mr. White) With respect -- pardon me, Your Honor.

THE SPECIAL MASTER: But I would say I think we could arrive at a fair and honest figure on the thousand square feet during a flow of that size once every -- during the flow of that speed. That's what you're trying to get at, isn't it, Mr. White?

Q (By Mr. White) Can you do that, Dave?

A. I would say just speculation. It is probably somewhere

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in that --

THE SPECIAL MASTER: All right. Okay. Then we'll forget it.

Q. (By Mr. White) Right in here?

A. Yeah --

THE SPECIAL MASTER: We'll forget about it if it takes speculation.

THE WITNESS: It is just guessing.

Q. (By Mr. White) Isn't it true that the same area of habitat which exists for your one-in ten-year flow is shown by an "X" at eleven hundred and thirty some odd c.f.s. also exists where the curve dips down again at roughly 325 c.f.s.?

A. Yes.

Q. And isn't it true that the same habitat that "X" exists at approximately the one-in-five-year low flow also exists at where the line continues to dip at approximately 440 -- or excuse me --

THE SPECIAL MASTER: 240.

MR. WHITE: Excuse me, 4.4?

A. Yes.

Q. (By Mr. White) Isn't it true that the same habitat could be enjoyed under Mr. Keene's natural flow figures, his low flow figures at the one-in ten-year flow of 1131 c.f.s.

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would also be enjoyed at roughly 340 c.f.s.?

A. Uh-hugh.

Q. And isn't it true that the same habitat that was enjoyed at the one-in five-year flow, roughly three hundred and ninety some odd -- thirteen hundred and ninety some odd c.f.s., would also be enjoyed at roughly 260 c.f.s.?

A. Uh-hugh. Yes..

Q. But your flow recommendation was for 500 c.f.s., is that correct?

A. That's correct.

Q. Isn't it true then -- Well, let me ask one more question: If the rainbow adult line does continue to drop as you go to the right of the graph, wouldn't the c.f.s. at which the same habitat could be enjoyed as your one-in two-year natural flow or low flow also would be enjoyed at some c.f.s. less than 260?

MR. MEMBRINO: Your Honor, I object. We have already discussed --

THE SPECIAL MASTER: Objection is overruled. The precise question is right on. Right on the direct testimony on this.

THE WITNESS: Would -- I want -- I guess I don't understand exactly what you're getting at. I want to

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be sure.

Q. (By Mr. White) So it is only for purposes of illustration. Now, I'm going to ask you --

A. Okay. You're just referring to --

Q. -- If, assume this line continues out in here someplace --

A. Okay.

Q. -- and it hits your one-in-ten-year low flow -- excuse me, one-in-two-year low flow out near the red line at near, say, the 3.0 level for habitat --

A. Yes. I mean, like I said earlier --

THE SPECIAL MASTER: I thought that was 2.05, Mr. White?

MR. WHITE: Well, I'm sorry.

THE SPECIAL MASTER: Are you talking about-the-one-in-ten-year or the one-in-two-year?

MR. WHITE: I'm talking about the one-in-two. I apologize.

THE SPECIAL MASTER: Two thousand five.

MR. WHITE: That's two thousand five, and that's illustrated by the vertical red line.

THE SPECIAL MASTER: All right.

Q. (By Mr. White) Mr. Vogel, if this line does continue to be depressed regardless of whatever the slope is, it is going to hit the one-in-two-year flow at a point

below which it hit the one-in-five-year flow and the one-in-ten-year flow, isn't that correct?

A. I believe that would be correct.

Q. And isn't it similarly true that when you go back to the amount of habitat which would -- the same amount of habitat on the other side of the curve where it starts down again, that would be at a flow of less than the 260 c.f.s.?

A. Yes, that would be likely.

Q. Isn't it true then that the flow of 500 c.f.s. which you have claimed for optimum habitat is far in excess of that habitat which existed, according to Mr. Keene's flow values at natural flow levels, whether they are one-in-two, one in five or one in ten?

A. If I understand your question correctly, you are saying that if flows did naturally occur in those levels I have listed in my report as in a one-in-two, one in five or one-in-ten-year recurrence interval, it would be true that there would be less actual physical habitat for an adult rainbow trout than there would be at 500 -- optimum habitat than there would be at 500 c.f.s.

THE SPECIAL MASTER: How often?

MR. WHITE: Every one-in-two, one-in-five or one-in-ten years.

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THE SPECIAL MASTER: Of course. That's the whole point.

Q. (By Mr. White) Isn't it that right?

A. Right.

Q. Yeah.

A. As I stated earlier, there isn't a linear relationship between increases in flow and increases in fish habitat. For example, we could extend this way on over there to high flows, flood flows. You know, it is just common sense that we are not going to have optimum fish habitat at three times the amount that would occur in an average year. Again, we are talking about optimum habitat conditions for adult rainbow trout only.

THE SPECIAL MASTER: Yes. But the purpose for his reasoning -- the reason for his questions on cross-examination are these: That if a figure between May and October were 410 instead of 500, when you figure that it is not going to affect your difference much in optimum habitat, once every two years, and in even less, once every five and once every ten, aren't you reasonably content to say that the figure 410 or 395 is just as effective and accurate as your 500? That's about what Mr. White is trying to work out.

MR. WHITE: I have another point too, Your Honor,

to make.

Q. (By Mr. White) The other point is: Out of fairness to the witness, so he can respond to both of them, is that if Mr. Keene's flows are right, if these are the natural flows that existed at the time of the reservation, then the natural habitat that existed at the time of the reservation was far less than what Mr. Vogel identified as the optimum habitat, or the flow required to meet the natural habitat would also be far less than the optimum habitat, and it is a significant order of magnitude because when you get to the one-in-five-year low flow habitat, you're down to half the amount of water that has to remain in the stream, as Mr. Vogel testified would be there under optimum conditions.

THE SPECIAL MASTER: What I would like to see is what is the flow, not the virginal flow, but what is the flow as it has been the last twenty-five, thirty or thirty-five years with the irrigation requirements for the historic period, because that's more closely to the truth of the state of nature on the reservation today, and that isn't in evidence.

MR. WHITE: No. I'm just -- I'm forced to work with Mr. Keene's values, Your Honor, and I'm trying to point out that at his values the habitat that the fish

had in 1868 was far less than what Mr. Vogel identified as the optimum habitat.

THE WITNESS: Might I make a point too, Your Honor? Again, we've got to look at the large picture in this whole habitat analysis. I stated previously that this methodology does not address flushing flows. Usually in the months of May and June, early in the peak runoff periods of Wyoming -- or in Wyoming, in these rivers, flushing flows do occur. We did not even address that in the methodology. I believe there's been considerable amount of research done as far as what flows are necessary to remove certain volumes of sediment from the streams and things such as this. I'm not addressing that at all in this habitat. I'm just simply stating that those flows -- say, for example, you have here a 500 c.f.s. would maximize the life habitat for simply brown trout in adult trout life history stages. It is quite possible that we could require a higher flow, and in that sense, we are just being -- we are not addressing them though, we are just being conservative and just limiting ourselves to just the adult life history stages.

Q. (By Mr. White) But, Mr. Vogel, isn't it true that the work done by the alluvial geomorphologists indicated that flushing flows really needed to occur for durations

of no more than three or four days and move the sediment downstream only about a major pool or two?

A. I couldn't answer that. I'm not familiar with that.

Q. You don't know?

A. I do know that as far as the life history of fish though, that flushing flows may be very important at certain times depending on where they spawn. Because if the sediment settles into the interstices of the gravel, into the small spaces of the gravel where the eggs are incubating, it is potentially possible it could suffocate the eggs. The eggs have to have a flow of water coming through them, but we didn't address that in this study.

Q. Isn't it true that you did not know whether or not once, or if, the other federal claims, the comsumptive use claims, should be granted and exercised, whether there would be sufficient water remaining for flushing flows?

THE SPECIAL MASTER: I think he said he didn't consider that.

THE WITNESS: Right.

Again we are saying that we recognize the fact that fish don't necessarily need every drop of water in the stream. You know, we're just trying to limit, we're just trying to identify three physical features to optimize physical habitat: velocity, depth and substrate,

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and we want to do so in a combination of each of them and limited them to just the adult life history stages for both brown trout and rainbow trout such that we can state what we think the optimum habitat will be. For example, out here it's quite possible that these higher flows might inundate more area on the stream. Referring back to a previous exhibit, Exhibit C-283, it's quite possible that those higher flows might actually rise up over some of these areas and inundate more substrate and maybe make this depth more preferable, but the velocities in the area where the fish are living might be so high that they would -- they wouldn't prefer that habitat. So oftentimes, it does occur that fish do prefer lower flows.

* * * * *

Q (By Mr. White) Isn't --

THE SPECIAL MASTER: One thing's clear and this evidence shows it again, is that just because you have a higher velocity or more volume doesn't mean you're improving the fish habitat at all.

THE WITNESS: That's right.

Q (By Mr. White) And isn't it also true, Mr. Vogel, in situations such as that illustrated by FISH-284, that the habitat of the fish under the natural flow conditions established by Mr. Keene was much less than the optimum habitat which you derived?

A It works on both ends of the scale. You know, there's -- it's quite possible more water could damage the fish habitat just as less water may damage the fish habitat.

Q Isn't it true that the same reduction from optimum to, shall we call it natural habitat, would also occur with similar reductions from the flow required for optimum to natural habitat in a number of other reaches for which you have made recommendations in your report?

THE SPECIAL MASTER: Can I hear that question because I got lost?

MR. WHITE: I'll try it again.

THE SPECIAL MASTER: No, let her repeat it, Mr. White, unless you want to strike it.

MR. WHITE: No, that's okay. Everybody lives in fear of what their spoken words look like in print.

(Thereupon the following (question was read back as (follows: "Isn't it true that (the same reduction from (optimum to, shall we call it (natural habitat, would also (occur with similar reductions (from the flow required for (optimum to natural habitat (in a number of other reaches (for which you have made (recommendations in your (report?"

MR. WHITE: You want me to try again, Your Honor?

THE SPECIAL MASTER: You want to try it again?

Q (By Mr. White) Isn't it true that for other reaches in your report, the same type of thing would occur, in that the natural habitat at the various natural flows supplied by Mr. Keene would be less than the optimum habitat which you identified and that the flows to require, or to maintain, flows to maintain the natural habitat would be less than those which are required to maintain the optimum habitat?

A I believe that was the case on only those reaches on the Big Wind River. I think on most of the tributaries --

THE SPECIAL MASTER: But with those volumes, isn't that almost crucial to your case? You see your volumes in the Big Wind are really something, you're talking vogel-cross-white

390 to 500 cubic feet per second, 384 to 500, 250 to 325, 249 to 500, these here, and if you look down in the 1980s and 1577 and 1410's, that's the guts of the claim for fish habitat is the Wind, the Big Wind, the Wind River, more than all the other -- You got about five reaches on that, haven't you, or six, and I'd say they're more important than the other eleven, is that generally a true statement, with the exception of maybe the Canyon?

THE WITNESS: What do you mean the Canyon?

THE SPECIAL MASTER: Forget my question, I'm generalizing now, and I shouldn't do that.

Q (By Mr. White) Isn't it true that that would occur on Reaches 9, 10, 11, 13, 15 -- excuse me --

THE SPECIAL MASTER: Let's take them down, why don't you, Mr. Vogel, and have a look at them while he calls them off.

MR. WHITE: I'm not sure I can give the reach numbers, I've got the pages in the report.

(Brief pause.

Q (By Mr. White) It would be true with respect to Reach 2 as would appear from the graph on Page 28 of Exhibit C-280, Reach 3 would appear from the graph at Page 31 of Exhibit C-280, Reach 4 as would appear from the graph, Pages -- Page 36 and 38 of C-280; Reach 5, Page 42;

Reach 6, Page 46; Reach 7, Page 75, and Reach 16, Page 86.

A Did you say Pages 75 and 76?

Q Seventy-six and 86. And I will agree with you if you say that 86 is a real close question.

THE SPECIAL MASTER: And a real small stream.

THE WITNESS: What about Page 76, do you also say it's a close question there?

Q (By Mr. White) No, because according to my review, it would appear that between the claimed amount and the natural habitat at the one in ten-year flow, there would be a reduction from roughly 208 c.f.s. to 95 or so. Those are just rough approximations.

A I lost you in that last one. Why don't you show me what you're referring to.

Q Tell me the ones where you agree, for starters.

A Okay. I believe the reaches in the Big Wind River.

Q Could you just give us the numbers of those upon which you have agreed?

A The numbers 1, 2, 3, 4, 5 and 6.

THE SPECIAL MASTER: That's what you said.

MR. WHITE: I think, to save time, Your Honor, we'll come back to the others in our case in chief.

Q (By Mr. White) Mr. Vogel, isn't one of the advantages of the Incremental Methodology is that you can predict a

flow required to maintain different levels of habitat, even levels less than the optimum level or optimum amount?

A Please -- I think I understood you, I just want to be sure. Would you please restate that?

Q Isn't it true that one of the strengths of Incremental Methodology is that you can predict flows which are necessary to maintain habitat at less than optimum habitat?

A Well, understand we're not trying to predict flows, we're trying to predict habitat.

Q I understand, but after you predict habitat, then you drop down the graph and get the flow?

A Right.

Q I'm sorry I went around the loop too quickly. But it is right that you can develop less than optimum habitat, and after that less than optimum habitat, you can so identify the flow required?

A Yes. The methodology enables you to predict Incremental changes in habitat with Incremental changes in flow.

Q In fact that was one of the reasons why the methodology was adopted, wasn't it?

A Right.

Q So if one were to determine that instead of optimum habitat in a particular reach he or she wanted to maintain 80 percent of that habitat, it would be possible to

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determine the amount of flow required to maintain that 80 percent of habitat; isn't that correct?

A Eighty percent of what habitat?

Q Optimum.

A Okay. Make sure you understand now that we're trying to predict what the optimum habitat would be for an inflow. Each one of these points on Exhibit 284 represents the optimum habitat that's actually present in the stream at that flow. So each one of those points represents the optimum habitat in terms of velocity, depth and substrate. And this is the point we're trying to maximize, that optimum habitat.

Q In order to maximize the optimum habitat on Exhibit C-284, you picked the top of the adult curve; is that correct?

A Right.

Q And that maximum, optimum habitat would be in this case 600 c.f.s.?

A Right.

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Q And it would be possible to drop off of the roughly 66,000 square feet of weighted useable area of habitat by 80% down to a lesser figure of habitat, come across, intersect the curve and develop the flow required to maintain 80% of the maximum habitat, isn't that correct?

A. Right.

Q. Let's take a look at an example. I hand you what has been marked --

MR. WHITE: It hasn't been marked for identification. Can you give me an exhibit number?

It's been marked for identification as FISH-50 and if I might have a moment, I'll get the others marked for the Court and counsel.

Q (By Mr. White) And I'll ask you whether or not that exhibit contains pages 78 and 79 out of your report, which have been pasted together so that they fall directly in line with page 78 at the top and page 79 at the bottom?

A. Yes, it does.

Q. For this particular reach, as I recall your claim was for a hundred and -- your optimum flow required for the optimum maximum habitat was 110 cfs?

THE SPECIAL MASTER: Maximum: 1400.

Off the record.

(Off the record discussion.

Q. (By Mr. White) A hundred and ten, I believe, on page 77.

A. What was the question?

Q. Isn't it true that your optimum habitat determined for this, or recommended for this reach, was maintained at a flow of 110 cfs, as shown on page 77?

A. Yes. The recommended flows during the months of May, June, July and August were set forth as 110 cfs.

Q. Well, let's just consider those months, then for the following series of questions, and I ask you if it isn't true that with respect to the bottom graph for rainbow trout, the optimum habitat which you identified was roughly 9,200 square feet?

A. For which life history stage?

Q. Adult.

A. Rainbow trout adult?

Q. Yes.

A. Yes, that would be approximately correct.

Q. Isn't it true that if you reduced that by 80% the habitat amount by 80%, that would drop you down to somewhere around 7400 square feet?

A. Repeat -- if it was reduced 80% of 110?

Q. No, reduced by 20%.

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THE SPECIAL MASTER: Two percent, or 20%?

MR. WHITE: Twenty percent, Your Honor. We have an optimum habitat of about 9200 square feet and we would reduce that to 80% of its value, or reduce it by 20%, it would drop it down to about, say, 7400 square feet.

Q (By Mr. White) Is that correct?

A. What is the flow -- What is that flow when it is reduced?

Q. Well, why don't we find out if we have gotten down to that habitat value?

A. Well, the figures I show for that, which would put it in the ball park, are still above 8,000, rather than 7,000.

Q. Would you take -- Reduce 9200 square feet by 20%. Doesn't that get you down in the 7,000 area?

A. Oh, okay. I'm sorry. I thought you were reducing the flow.

Q. No, I'm not reducing the flow. I'm concentrating on the habitat.

A. I'm sorry. I misunderstood what you were saying.

Yes, that would put it in that ball park.

Q. And, isn't it true that at 80% of the optimum habitat, or for 80% of the optimum habitat, the required flow

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would be somewhere around 25 cfs?

A. Okay. Make sure you directly state that. Now you're talking about 80% of the optimum habitat?

Q. Yes sir.

A. That's present at 110 cfs?

Q. That's correct.

A. That doesn't necessarily have to be the optimum habitat, or -- It has not necessarily maximized the total habitat in the stream.

Q. I understand that's the --

A. Because, in this particular example, 110 cfs was the highest limit we could extrapolate our information to. It is quite possible that adult habitat may be increasing beyond that.

Q. But it is just like on Exhibit C-284, it would be beyond the right side of the graph and would be speculation, wouldn't it?

A. Right. That's why I don't want to speculate that it would be below the optimum habitat available for the fish. It is only the optimum habitat present at 110 cfs.

Q. Isn't it true that if you reduced the optimum habitat, which is available at your recommended flow, we've reduced that habitat by 20%, the amount of flow

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required drops from 110 cfs to around 25 cfs?

A. In other words --

Q. In other words, reduction of habitat of 20% reduces the amount of water required to be kept in the stream by about 75%?

A. Yes, that -- Those figures would be pretty close. I might point out this is a very good example to use why the fishery biologist has got to be the final person to make the recommendation here. This, again, is a tool. I have to apply what I actually know, going out and looking at the stream as it actually exists. What I would like to do here, if I may, is draw just kind of a generalized cross-section of what this particular creek looks like, because it is pretty unique.

MR. WHITE: Why don't you lift up that page, where you've got your seven points on, or is that a solid foam board?

(Off the record discussion.

THE WITNESS: May I borrow your marking pen?

MR. WHITE: Yeah. Here you go, Dave.

THE WITNESS: Okay. Dinwoody Creek, I believe, has a unique stream morphology. It doesn't necessarily follow the contours as depicted on Exhibit 283. It's vogel-cross-white

a highly boulder-strewn stream. It's got a tremendous amount of fish habitat, I believe, in essentially a central channel that's coursing through the major portion of the streambed. If I was going to draw just a rough example of what the streambed may look like, this would be the brush on either bank. This would be the edge of the channel. The channel would be down here. Okay, this channel right here, represents -- Or, the entire channel from here to here represents the true streambed. However, there is another channel that courses right through the center of the stream. Okay, this area, especially during low flow months like during the winter, is the area that has water in it. There's no water at that time of the year, like during the winter months, up in this upper level. Okay. As you increase the discharge, it starts -- These are all boulders, by the way, all the way across. As you increase the discharge, it starts to rise up into the area. It starts to inundate this higher terrace of the streambed. I'll depict it as this. When it does that, it is very important to note here, because it inundates a tremendous amount of habitat that's now available for fry and juvenile life history stages.

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THE SPECIAL MASTER: For fry and juvenile what, life history --

THE WITNESS: Stages. Life history stages.

If we refer back again to FISH-50, looking at the brown trout curve on the top, I believe this is exactly why, if you look at both the fry and the juvenile curves, depicted by the circles and the triangles pointed downwards, you can see there is a tremendous juvenile increase in habitat. For this reason, I believe it is why this habitat is drastically increased. However, this habitat does not necessarily have to coincide with the adult habitat. I believe that these higher flows, it is still too shallow for adults to go in there, but it is a tremendous amount of increase for adult -- I mean, excuse me, for fry and juveniles for habitat for brown trout.

Because of this reason, because of actually seeing and stream and the unique nature of it, we use the fry and juvenile life history stages to base our recommendations. So, once again, this methodology is intended to be a tool, something we can actually look at, get some physical habitat features, and apply it to what we actually see in the field, use our knowledge as a fishery biologist, to make our final recommendation.

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THE SPECIAL MASTER: Where would the line for the high water mark be for May or June or July on Dinwoody Creek, higher than the two banks on the left and right, in the brush?

THE WITNESS: No, it would still be lower.

Q (By Mr. White) Mr. Vogel, for that particular reach, isn't it true that you don't know populations of fry and juvenile which occur there?

A That's -- I'm sure they occur there because there's natural occuring salmon there and we have not stocked that stream with brown trout or rainbow trout.

Q Natural occuring what?

A I'm sure that the fry and juvenile would naturally occur because we have population of brown trout and rainbow trout, so they have to be spawned, they have to go through their young stages to become adults. So, in other words, we know that the fry and juvenile would have to occur.

Q Couldn't they occur in some other reach, for example, with the adults migrating in that area?

A No, I don't believe so.

MR. WHITE: Okay. Your Honor, I'd like to take a short break if we might because I'm trying to figure out --

THE SPECIAL MASTER: It's a good time for one. All right, a short break.

(Thereupon a 15-minute recess
(was taken.

THE SPECIAL MASTER: Mr. White, proceed, please. We'll come to order.

Q (By Mr. White) Mr.. Vogel, I direct your attention to what has been admitted as United States Exhibit C-7, and I would like you to assume that this is an exhibit showing aesthetic areas within which the United States have claimed -- has claimed the entire flow of the streams. And with that assumption, ask you whether or not your Reaches, Numbers 16, 8 in their entirety, as well as portions of Reaches 10 and 11, fall within those aesthetic areas?

A What did you say besides 16?

Q All of 16 and 8.

A And 8.

Q And parts of 10 and 11.

THE SPECIAL MASTER: Mr. White, why is 6 omitted?

MR. WHITE: It seems that 6, Your Honor --

THE SPECIAL MASTER: A bit highway going through it or canyon?

MR. WHITE: ... it has a gap running right through it for the river.

* * * * *

A Okay, you said 16, all of 16, all of 8 and parts of 10 and 11?

Q (By Mr. White) Yes, sir.

A Yes, that's true.

Q Did you coordinate your work with Rich Harbour through whom Exhibit C-7 was introduced?

A I did not have any input or any portion of the development of the aesthetics claim.

Q Mr. Vogel, I hand you two documents which have been marked as FISH-280-77-A as well as an unmarked copy of a manual entitled Compilation of Records of Surface Water of the United States Through September 1950 Part 6A, Missouri River Basin Above Sioux City, Iowa, Geological Survey Paper 1309 and I'm going to take away the water supply paper and let your lawyers look at it.

(Brief pause.

Q I give you the water supply paper since you may want to refer to it in answering the next series of questions.

THE SPECIAL MASTER: Wyoming -- Plaintiff's Exhibit 280-77-A?

MR. WHITE: Yes, sir. That's because it relates to information on Page 77 of Exhibit C-280, Mr. Vogel's report.

Q (By Mr. White) Mr. Vogel, have you had a chance to check

to see whether or not the second page of Exhibit FISH 280-77-A contains the information found on, or a copy of the Pages 204 and 205 in the water supply paper?

A Those pages are different. They don't match the same ones.

MR. WHITE: Well, let's look at it to make sure I haven't -- It looks like heads are going to roll.

Hold on just a second.

(Brief pause.

MR. WHITE: Let's come back to that one. I think the next one is right and we'll get it corrected.

I apologize, Mr. Vogel. We got the wrong cover sheet xeroxed there and we'll replace the cover sheet.

THE SPECIAL MASTER: If you tear it off you might not even need it.

MR. WHITE: It has the exhibit number on it, Your Honor. We can change that later. I'm sure I can come to an accomodation with the United States.

THE SPECIAL MASTER: All right.

Q (By Mr. White) Now, I hand you Water Supply Paper, Geological Survey Water Supply Paper 1729, which covers a period October '50 to 1960, and ask you whether or not the pages, the second page of Exhibit 77-A complies and is a copy of Pages 204 and 205 of that water supply paper?

A Yes, I believe they are.

Q Isn't it true that the gauge for Dinwoody Creek near Burris on Page 204 is within the claim reach which appears on Page 77 of your report and which, I believe, is Reach No. 9 or is that 15, 16 --

THE SPECIAL MASTER: Fifteen.

MR. WHITE: Fifteen?

A Yes.

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Q (By Mr. White) Isn't it true that during the year 1955, your recommended flows are greater than the gauged flow for all months save June, July and August?

THE SPECIAL MASTER: Could I hear that question again?

MR. WHITE: Let me try it again.

Q (By Mr. White) Referring to Page 77 of your report, Exhibit C-280, isn't it true that the gauged flows for 1955 are less than your recommended flows for each month save June, July and August?

THE SPECIAL MASTER: You mean the average discharge?

MR. WHITE: Yes, sir. It would be the monthly and yearly mean discharge in c.f.s., Your Honor, the first block-table on Page 204.

(Brief pause.

THE WITNESS: Yes, that's true.

Q (By Mr. White) And up towards the top of Page 204, which is the second page of Exhibit 280 --

THE SPECIAL MASTER: Top page of what?

MR. WHITE: 204, which is the second page of exhibit --

THE SPECIAL MASTER: I see.

MR. WHITE: Exhibit --

THE SPECIAL MASTER: I beg your pardon.

Q (By Mr. White) Exhibit C-280, about a third of the way down, under the headings of streams, do you find the

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notation that there was no flow from May 8th through May 13, 1955 in that reach or at that gauging station?

A Yes, that's true.

Q What happens to or what would happen to fish habitat, if you know, during 1955 except for the months of June, July and August, in that particular reach?

A There would obviously be a very severe reduction of fish habitat. However, I might point out that it does not necessarily mean there would be a total elimination of fish habitat. Dinwoody Creek, as I know it, has numerous places where there's pools, things like that, that could be lethal to the fish if it were during warm parts of the year. However, in May in Wyoming I believe it could have been possible for fish to survive over a period of five days, five or six days.

Q What is meant in your report by M.M.F., which I believe is mean monthly flow?

A It's -- Yes. Mean monthly instantaneous flow in c.f.s.

Q Is that -- Does that mean that you simply would want an average flow of the amount you recommended, so that it could very significantly from the mean and so long -- from day to day, but at the end of the month if that mean had been accomplished, your recommended flows would have been satisfied?

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A Well, idealy what we want and what I would like to see in this situation is a situation where you don't have an extreme, you would have half the month with twice the mean and half the month with no flow, particularly in those months that may be in say July, August or September. Our whole purpose in that is try to get it within the ballpark of that mean so there wouldn't be extreme fluctuation, if we could possibly avoid it.

Q Well, for Reach 15, that's on Page 77 of your report, you have a recommended mean monthly instantaneously flow of 15 c.f.s. for January. In using your definition, wouldn't that be satisfied if during half the days of the month -- if there were only even numbered days in January -- but during half the days in January you had zero flow and half the days of the month you have 30 c.f.s.?

A To come up with an average of 15?

Q Yes.

A Yes.

THE SPECIAL MASTER: You think that would be satisfactory?

THE WITNESS: Oh, I thought he said isn't it possible.

MR. WHITE: No, I didn't ask him if it was satisfactory. I asked him wouldn't he arrive at his recommended mean monthly flow using that illustration. He didn't say it

was satisfactory.

THE SPECIAL MASTER: I see.

THE WITNESS: Again we're trying to, the situation we would like to have occur is not something like that.

THE SPECIAL MASTER: You want the fluctuations.

THE WITNESS: Well, we don't want to have extreme situations. In other words, if a fishery biologist comes up to a person who's managing the water and the person managing the water says, What's your flow recommendation, if we just give him a figure of 100 c.f.s. for a mean, you know, it's quite possible that half the month they could have twice that amount of water and twice that amount -- or excuse me --

THE SPECIAL MASTER: Half.

THE WITNESS: We could have half that, at zero flow, so we may not accomplish anything. So our objective is to try to prevent those extremes from happening.

Q (By Mr. White) What sort of fluctuations would be acceptable or would be -- would be acceptable to you and still be satisfactory on either side of that mean monthly flow? Let's stick with the example of 15 in January so we have something to talk about.

A Well, it would depend on a site specific basis, it would depend on the time of year, depend on the temperature of

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the air, depend on whether there had been serious reductions previously to that. There's a tremendous amount of factor that would be involved.

Q Well, assuming that the -- I'd like you to assume that the Master would order that this reach was entitled to 15 c.f.s., M.M.F. during January and that the State was to administer that particular right, how would that administration be done? What sort of fluctuations would be acceptable?

A That would be -- myself, I would say that would be up to the fishery management, biologist managing that system at that particular time. It would be up to their judgment.

THE SPECIAL MASTER: What works are there upstream of the gauge that would -- that could be used to affect the levels of the river, of the stream?

THE WITNESS: As I understand, Dinwoody Lakes does have a little bit of a manmade structure there.

THE SPECIAL MASTER: But you see your figures from Page 77 are for flows in the creek below Dinwoody Lakes, and I can't tell from Page 204 of this exhibit where this gauging station is located, where it is. I got the elevation, it's 6196, and I guess from that we can tell whether it's downstream of the lake or upstream of the lake

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if we know the elevation of the lake.

Q (By Mr. White) Well, isn't the very large Dinwoody Canal located upstream of that gauge?

A I believe it was, the best I can remember. I don't know if Dinwoody Canal is very large, but there is an irrigation canal in Dinwoody Creek.

THE SPECIAL MASTER: Diversions above the station for irrigating of about 1,700 acres below the station has occurred since 1936. You have a natural regulation by Dinwoody Lake and other small lakes.

What is the date of this publication, do you know, or the latest --

MR. WHITE: Dave's got it on his --

THE WITNESS: It says --

MR. WHITE: -- stand.

THE WITNESS: Looks like it was printed in 1964.

Q (By Mr. White) Well, let's get back to the question.

THE SPECIAL MASTER: You say you are happy if I were to order 15 c.f.s. for the month of January in this stream?

THE WITNESS: Yes.

THE SPECIAL MASTER: Even though I know that on some given years, like three out of every eight years that you're not going to have that much of a flow?

THE WITNESS: No. Remember, Your Honor, that if there was a naturally occurring flow lower --

THE SPECIAL MASTER: You accept that?

THE WITNESS: We would accept that.

Q (By Mr. White) Isn't it true that the Dinwoody Canal is upstream of the gauge and your 15 c.f.s. -- and let's assume that it's diverting during January, which may not be appropriate, but sometimes there are diversions in the winter -- wouldn't you expect that the Dinwoody Canal diversions would be curtailed in order to meet the 15 c.f.s.?

A To meet the 15 c.f.s. mean?

Q Yes.

A Yes. Like you say, if it was occurring during the winter time, yes.

Q But under your definition of mean monthly flow, instantaneous flow, the State Engineer could regulate that canal just to deliver 30 c.f.s. for half the days of the month and zero c.f.s. for the remainder, isn't that true?

MR. SACHSE: Objection. He's made that clear that he stated in a mean, but the desirable thing is to keep it close to the middle and not nave it all at one time.

MR. WHITE: The problem is, Your Honor, the

United States seeks for you to enter a decree, which, it's possible, that the State Engineer, and it's certain that someone's going to have to administer it. And it occurs to me that it might be appropriate to inquire as to the administration of that decree from the very person upon who the claims -- or very person upon whose testimony the claims are based. It seems it would appear that there is a very large question mark in how these flows would be administered if they were granted, especially since they are greater than the gauged flows. I think it's a fair question to ask this witness, what sort of upstream administration is necessary to preserve the types of flow he finds necessary for the purposes that he's testified, what sort of variations would be acceptable, for example.

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THE SPECIAL MASTER: Well, all right. Answer this much of the question: What sort of variation would be acceptable under an order, say, of 15 cubic feet per second in a given stream, in the month of January?

THE WITNESS: I believe the question --

THE SPECIAL MASTER: What latitude would you allow a State Engineer administering that water to do?

THE WITNESS: That would take more work on my part. Quite frankly, Your Honor, I would have to do some more work on an analysis to come up with my recommendation.

THE SPECIAL MASTER: One thing for certain is you would not approve a 30 cubic foot flow for 15 days consecutively and then no water for 15 days?

THE WITNESS: That's correct.

THE SPECIAL MASTER: All right. That, I think, states the understanding of it.

MR. WHITE: Well, let's leave gauging flow and go on to another area, then. If you would like, Your Honor, we can continue with this gauging flow analysis, but I'm trying to cut it off --

THE SPECIAL MASTER: No, I appreciate it if we could crack it up today.

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MR. WHITE: Well, we -- I told Mr. Echohawk that I would get only to areas that I would identify to him tomorrow, so he would be free to go to a meeting.

THE SPECIAL MASTER: All right.

MR. WHITE: And I'm trying to meet that obligation. If you want to go on through the gauges, we can go on for some time, but --

THE SPECIAL MASTER: No, I prefer to go along the lines you have.

MR. SACHSE: Could I inquire at this time, is there any possibility if we stay an hour late this evening, Mr. White could finish his cross-examination today.

MR. WHITE: I think it is unlikely. We can stay until 7:30 or 8:00, and I might be able to get it done. I'm going to take a day and a half, roughly, and perhaps a smidgen more.

THE SPECIAL MASTER: Well, I frankly would rather adjourn at five, than go to 7:30 or 8:00, and still not be sure if we're going to have tomorrow.

MR. WHITE: Perhaps during the next break --

THE SPECIAL MASTER: If you have to go until eight o'clock tonight, you're not going to catch a plane out of here, anyhow.

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MR. SACHSE: No. That's all right.

MR. WHITE: During the break I could explain to Harry the areas I'm going to get into tomorrow, and he may not want to be here tomorrow.

MR. SACHSE: No, I'll be here.

MR. WHITE: In fact, I'll do it right now.

(Brief pause, followed by an (off the record discussion.

THE SPECIAL MASTER: Do you anticipate, Mr. White, and, Mr. Membrino, that this decree should speak to every stream of the Statement of Claims and to every month of the flow in that stream, somewhat in the fashion of answering every one of the, not reaches, but rivers, in the Statement of Claims from page 5 through page 9?

MR. MEMBRINO: Yes, Your Honor. As amended.

THE SPECIAL MASTER: And, Mr. White, what is your answer to that question?

MR. WHITE: Yes. If the State Engineer has to administer it, Your Honor, we would like an administer-able decree.

THE SPECIAL MASTER: Stream by stream, foot by foot?

MR. WHITE: Yes sir.

MR. MEMBRINO: As the instantaneous stream flow, it is important in this situation.

THE SPECIAL MASTER: Okay. You haven't added to my joy this afternoon, but I understand you.

I'll have you submit what you feel is the --

MR. MEMBRINO: Of course, we are not assuming the State Engineer is going to be the one ending up administering this water.

MR. WHITE: I was assuming that, Your Honor. I wasn't suggesting that that was the case, it is just that I have a certain tenderness for the State Engineer.

THE SPECIAL MASTER: I was just wondering whether, given these flows, if they are vested in the Indians and shall be free from any control whatsoever, then the flows, regarding the minimum flows for fisheries and so on, have to be administered by him. His people work up there and they handle the gates --

MR. SACHSE: Federal people do on Federal projects.

THE SPECIAL MASTER: Oh boy!

MR. SACHSE: And have since 1905, without interruption.

THE SPECIAL MASTER: Well, when we get to that, vogel-cross-white

we'll have that discussion, too.

MR. WHITE: You think you have a Donnybrook so far, Your Honor, wait until you see that one.

THE SPECIAL MASTER: Go ahead, Mr. White.

Q (By Mr. White) I guess what you're saying, Mr. Vogel, -- I'm sorry, Your Honor.

THE SPECIAL MASTER: Go ahead. Go ahead.

Q (By Mr. White) Mr. Vogel, is what you're saying, that ideally you would like to have a continuous flow of 15 cfs during that particular January?

A. No.

Q. Or any January?

A. Not necessarily. I would -- I'm just saying that I would like it, maybe, to be as close as possible to 15 cfs.

Q. If you've got 15 cfs 24 hours a day throughout the entire month, that would be nice, is that right?

A. Yes, I guess it would be nice.

Q. Okay. Now, the next question, the next area: Referring to US Exhibit C-281, what would happen to habitat in Reach No. 5, if during the April through November period it had a flow of 325 cfs, rather than your recommended flow of 500 cfs?

THE SPECIAL MASTER: Had a flow of what?

MR. WHITE: 325 rather than --

THE SPECIAL MASTER: 325, instead of 500?

MR. WHITE: Yes sir.

THE SPECIAL MASTER: All right.

MR. WHITE: That's on page 40.

A. Which months were you referring to?

Q. (By Mr. White) April through November.

THE SPECIAL MASTER: April through November?

MR. WHITE: Yes sir.

A. Which habitat are you referring to; brown trout, rainbow trout?

Q. Let's talk about rainbow adult.

A. Rainbow adult?

Q. Yes sir.

A. There would be a reduction in adult rainbow trout weighted useable area.

Q. By roughly 20%, would that be?

A. That's pretty close. I figured roughly 17.

Q. Okay.

THE SPECIAL MASTER: Yeah, but that 17% would be a reduction of -- Well, I guess it is 70% of 60,000 square feet, right? Sixty-two or 3,000, down to about -- What was the figure, 300 and how many?

MR. WHITE: 325, Your Honor.

vogel-cross-white

Q. (By Mr. White) Are we close enough for discussion?

A. Sure.

Q. Isn't it true that the recommended flow on Reach No. 4, which dumps into Reach No. 5, is 325 cfs?

A. Yes.

Q. Where's the other 175 cfs going to come from?

A. That's not really up to me to determine.

THE SPECIAL MASTER: Yeah, but if your work poses a mathematical impossibility, how can we possibly give any compliance to it?

THE WITNESS: Well, Your Honor, what I'm trying to say is, it is possible it could come from several sources: just hypothetically, it could come from accretions of flow from the Little Wind River. It is possible there might be return flows coming in from Lander upstream, from there, things such as this.

THE SPECIAL MASTER: The City of Riverton?

THE WITNESS: You know, I didn't -- Anywhere in that area that returns to stream number five.

THE SPECIAL MASTER: The Popo Agie?

Q. (By Mr. White) But, isn't it true in the Little Wind River, in the area you have not suggested, the imposition of instream flow and, therefore, there are no controls over the amount of water which would be injected

into that system by the Little Wind? The only assurance that you have is the 325 from Stretch No. 4?

A. I don't understand what you mean by there's no controls.

Q. Let me ask you to assume that there are headgates on the Little Wind, which divert the water and let me further ask you to assume that they serve Lander, which the Master might assign an 1868 priority date to. How are you going to ensure that water passes those headgates to make up the 175 cfs deficit?

MR. MEMBRINO: Your Honor, I object to the question. It is not Mr. Vogel's responsibility to make those assurances.

THE SPECIAL MASTER: Well, they might not be, but if he can throw some light on the burdens -- I'm going to overrule the objection, Mr. Membrino. He may answer, if he's able to.

THE WITNESS: Okay. All right. I would say, Your Honor, that those flows could be supplied down this particular stretch of the Little Wind River to meet the 500 cfs goal.

Q. (By Mr. White) Let me ask you about Reaches 13 and 14. In Reach No. 14, you have an optimum flow from May through August of 172 cfs, yet in Reach No. 13, which dumps into 14, you have a flow of only 77 cfs. In

In other words, you have well over a 50% reduction in the amount of inflow that you need to satisfy that instream flow.

MR. MEMBRINO: Your Honor, I must object, again, to the question, for the same reason and the fact that Mr. Vogel is only making recommended flows. The fact that 77 cfs may flow by one point does not mean that there's not other water in the stream. His figures for -- His recommended flows are not the water supply and he's being asked to speculate about --

THE SPECIAL MASTER: I appreciate that, and he's not asked to speculate, or I would sustain you, Mr. Membrino. But, I believe the questions tend to put the test of reality onto the product of his work, and I would like to hear an attempt of this answer, if he's able to. Now, if he isn't, he says that is just not a part of my work, fine and dandy. But, I think he's entitled to a chance to try to tell us how we are to administer what he recommends, even if it could be done.

THE WITNESS: Quite frankly, Your Honor, that is correct. It is not part of my assignment to establish those flows. I would just assume that those flows would come in from other tributaries, such as the

middle fork of the Popo Agie, but I, myself, did not undertake that portion of the study.

THE SPECIAL MASTER: Well, if I were to tell you, on the middle fork of the Popo Agie, there are probably 15,000 acres of land of Indians, and a few non-Indians, that require irrigation and have, for the last 75 years, does that add an element of value to your determinations, regarding optimum fish habitat downstream, as a practical, real matter?

THE WITNESS: I didn't address that in my study.

THE SPECIAL MASTER: Okay.

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THE SPECIAL MASTER: Okay.

Q (By Mr. White) Mr. Vogel, I direct your attention to another area, and that is the confluence of Reaches 10 and 11 that dump into Reach No. 12. Isn't it true that 10 and 11, when you combine their optimum flow during the month of May, June and July, result in 190 c.f.s. being discharged into Reach No. 12 for which you have an optimum flow of only 75 c.f.s.?

THE SPECIAL MASTER: There we got no problem.

MR. WHITE: Well, let me go on, Your Honor.

THE SPECIAL MASTER: All right.

Q (By Mr. White) Isn't it true that if you increase the flow in Reach No. 12 from 75 c.f.s. to 190 c.f.s., there's absolutely no way to tell the effect on the fish habitat because you blow off the right side of your curve?

A First of all --

THE SPECIAL MASTER: Well, that's very descriptive, you almost sound like an Italian opera. I see your point. Well, answer his question.

THE WITNESS: Well --

THE SPECIAL MASTER: With the dramatics included.

Q (By Mr. White) You can stand up, Dave, it makes it a lot easier; pace back and forth.

THE SPECIAL MASTER: If it has an adverse effect on

maximum habitat it will have, will it not, if it's that much more?

THE WITNESS: First of all, Your Honor, understand that my task, my assignment was to approach this, not as a systems analysist, not to try to make sure this stream and this stream and those flows match that stream where they converge, it's simply a reach by reach basis to maximize the habitat in those particular reaches.

THE SPECIAL MASTER: We appreciate that, but your testimony can be of no benefit to anybody and no realistic practical value to anybody, and you wouldn't want it to be that, unless we can integrate it into one unit, the Reservation and water on that Reservation.

MR. MEMBRINO: And I suggest that there will be witnesses for the United States who will do that. I just -- I think it's inappropriate for us to be asking Mr. Vogel to speculate about a systems operation --

THE SPECIAL MASTER: Well, one or two more objections and I'll end up sustaining them. I don't think Mr. Wnite --

MR. WHITE: Your Honor --

MR. MEMBRINO: I'll make them right away if you'd like.

THE SPECIAL MASTER: I'm getting a little silly. Shall we take a break for ten minutes?

MR. WHITE: I'd like to ask one question, if I might,

since Mr. Membrino raised the point. I'd like to ask whether or not the systems analysis, which the United States will put on, will include the instream flow recommendation, since the depositions and persons involved, he indicated that they would not. Is the plan now to include them?

MR. MEMBRINO: That's still in preparation. We're certainly going to be reconciling and comparing our work.

THE SPECIAL MASTER: Let's take a short break, gentlemen.

(Thereupon a ten-minute recess
(was taken.

THE SPECIAL MASTER: Let's come to order. During several times today we've had discussions, both off the record and on, regarding settlement, and I think it is appropriate, regarding settlement, and the possibility of key dams being built in the higher elevations to capture spring runoff for the benefit of all concerned, and I think it's appropriate to state on the record that if the United States of America, through the office of the Attorney General -- of the United States Department of Justice, rather, and the Tribes, through Counsel, and the State of Wyoming, with approval of the Attorney General, were to agree that exploratory discussions were in order regarding appropriations of money of the United States

toward the construction of said dams and that the settlement -- and that monies being appropriated were, or at least approval of key committees toward those appropriations would speed a settlement of this lawsuit, I want all three of you to know that I would be pleased to make that effort. And I believe it could meet with the success in this administration. I think this administration would welcome an opportunity to engage in quasi-public construction in the West for purposes of settling this new, difficult question in America of integrating the reserved water right with long established State rights of water administration. And I wouldn't even approach the matter of the private sector taking part in it unless the three of you felt there would be an area there where that could be approached. And the difficulty there is who do you approach in the private sector there. There is 15 or 20 companies that are doing business in the State of Wyoming, and I approach the three or four I think would be interested, someone else has their own companies who they feel are left out, so that would be a difficult field, that I would not approach that element of it yet.

But I would certainly have no hesitancy to go to the Appropriations Committee and the House and the Senate as Special Master in this lawsuit with probably one representative from each of you three to show that this

could be one of the best directions for federal expenditures in America.

MR. WHITE: Your Honor, on behalf of the State, I think the concept is one which we certainly and whole-heartedly support in concept. The details are difficult sometimes to deal with. And I would suggest while we are thinking about this, that perhaps we could quit half an hour early this afternoon, say around 4:30, and at least the four of us, three counsel and the Master, sit down and talk about what the details might be, because I know that if I went to the Attorney General with the general concept, he would say that sounds great, but what's exactly going to be done. And so I would like to ask the concurrence of the other counsel to have a private meeting in chambers with the Master during the latter part of this afternoon to discuss what the details might be, because I'm confident if I were to go back to the Attorney General with a reasonably thrashed out discussion, he would be willing to take some action fairly quickly. He might suggest that one or two things be changed, but at least I wouldn't be sent packing for lack of detail.

THE SPECIAL MASTER: That will be done.

Maybe we're premature to this extent: Do you recall a month or two ago when I think the United States, either Tom Echohawk or you might have, Mr. Sachse, said we got

some evidence coming up as to where those dams should be located? Was that Stetson's or was that --

MR. WHITE: It wasn't the State, Your Honor.

MR. MEMBRINO: HKM had done some preliminary work for us.

THE SPECIAL MASTER: And you intend to offer that later on, do you?

MR. MEMBRINO: I'm not sure we do.

MR. WHITE: I don't believe, it wouldn't appear so from the depositions, Your Honor.

THE SPECIAL MASTER: Well, there's evidence that someone mentioned down the road somewhere, either Dr. Mesghinna or Stetson --

MR. SACHSE: I may have mentioned that one of our Bureau of Reclamation reports that came out recently had some mention of possible dam sites in it.

MR. WHITE: I think I could tell the Master without violating any ethical considerations, that I know of a study which has been done on the Reservation which has narrowed the potential dam sites to, I believe ten that have some promise, but I do not know whether that study has progressed beyond that.

THE SPECIAL MASTER: Is it public property, private property?

MR. WHITE: It was financed by the government, Your

Honor, but I do not know at what stage it happens to be right now.

THE SPECIAL MASTER: Right.

MR. WHITE: And I would suggest that it wouldn't be necessary for us to necessarily identify the dam sites before we talked about the details of the kinds of arrangements that you suggest, because I've been assured by people whose opinions I respect that there are storage sites in existence which would be able to deal with the vast amount of storage required. The money's the problem. And I would again suggest that at 4:30 we sit down and put our heads together, and at least try to come up with something.

THE SPECIAL MASTER: Okay. Let's proceed.

MR. WHITE: Would that be all right with you?

MR. SACHSE: I would welcome that.

MR. MEMBRINO: The United States always welcomes an opportunity to discuss settlement.

THE SPECIAL MASTER: All right, proceed.

MR. WHITE: Pardon?

THE SPECIAL MASTER: Proceed with the case, Mr. White. And I thank the three of you.

Q (By Mr. White) Mr. Vogel, isn't it true that stretch No. 4 or Reach No. 4 is over 40 miles long, 40 river miles?

A I believe that would be probably true.

Q And yet you have the same constant flow for that entire 40 miles; isn't that correct?

A Yes.

Q And at that particular line, at the east end of that particular reach, the flow jumps, as it goes across that line, your recommended flow jumps to 500 c.f.s.; is that correct?

A Yes.

Q Wouldn't it be more representative of natural conditions to have a little more of a gradiation between your reaches? In other words, is it a naturally occurring phenomena to have a jump like that when you cross a hypothetical line?

A That hypothetical line you're referring to is the confluence of the Little Wind River.

Q Is there something significantly different about the morphology of this particular river on one side of that line as opposed to the other side of that line?

A I believe, to answer your question, that there was a significant difference in the stream morphology from Reach No. 4 as compared to Reach No. 5.

Q But just on the other side of that line? In theory a line is pretty narrow. Was there a significant vogel-cross-white

difference there?

A I couldn't answer that, I didn't analyze the exact line.

Q Wouldn't it be more representative of natural conditions to have a gradual increase from reach to reach or a gradual decrease from reach to reach?

A Maybe you can give me an example of what you'd be referring to.

Q Instead of having a constant value for 40 miles of stream, wouldn't it be more representative of natural conditions to break that 40 miles of stream into smaller increments with, if you will, assuming your figures are representative of the natural condition, starting at 325, at the west end of the 40-mile segment and through various sub-segments, gradually increasing until you got to the 500?

A It would depend in those natural conditions, though, what the natural accretions of flow may be.

THE SPECIAL MASTER: What the natural accretions of flow might be?

Q (By Mr. White) The accretions and depletions to the stream, as you go through those 40 miles, are going to cause significant fluctuations in flow, aren't they?

A Well, it depends on the volume of accretions.

THE SPECIAL MASTER: Let me interrupt the cross-examination only to add in the same days transcript, and

record this, inclusions to our discussions just now made.

It is the place of the President of the United States and Government of Wyoming to settle this matter, not me. I am the Special Master for the trial of the matter, but I believe it's appropriate to recognize that the President of the United States has other functions, to make the minimum statement of the -- And the Governor has other duties, and if those two have consent and would indicate that the role would be appropriate for me to function with their designees, the Secretary of Interior and the Attorney General, then I would be happy to do so. That's the point I want to make sure. I'm not trying to prempt, to take on anymore work, which is not my role.

MR. WHITE: That was one of the details I thought we ought to work out.

THE SPECIAL MASTER: I want to make that clear now, that I would be, I was volunteering to help, if I may help to get funds, not that I'm looking for more work to do.

All right, back to the reaches, I'm sorry.

* * * * *

Q (By Mr. White) Okay, Mr. Vogel, isn't it true that throughout that 40-mile stretch there are significant variations in accretions and depletions to the stream?

A I couldn't answer that question.

Q You don't know one way or another?

A Well, you're asking me, first of all, if they are significant and you're asking about both depletions and accretions.

Q So you don't know whether or not there are significant depletions and accretions to that stream reach?

THE SPECIAL MASTER: No. 4?

MR. WHITE: No. 4, Your Honor.

A I'll say I don't believe there are a significant amount of accretions of flow. In terms of depletions, I couldn't answer that.

Q (By Mr. White) Let me ask you to assume that there are, and in that event, wouldn't it be more realistic or more representative --

THE SPECIAL MASTER: That there are which, Mr. White, additions or deductions?

MR. WHITE: Depletions. He testified that he didn't believe that there were significant accretions or inflow, and I'm asking him to assume that there are depletions along that stretch of stream.

Q. (By Mr. White) Wouldn't it be more representative of the natural conditions to break that reach into subreaches or substretches of that particular claim reach with varying flows rather than to have a fixed flow for the entire 40 miles?

A. Well, first of all, I would ask you if you were talking about whether the depletions were natural or not.

Q. Okay, let's assume they are.

A. So you're asking whether they should be incrementally increased as you go downstream or incrementally decreased?

Q. Or incrementally fluctuating as to affect the natural depletions of the stream, the effect of the natural depletions to the stream.

A. In my opinion, that particular stretch of stream, it didn't warrant that.

THE SPECIAL MASTER: Certainly, there's no accretions in that stretch of 4 that would match the flow addition of the Little Wind joining down near its termination, is there?

THE WITNESS: I don't understand what you're asking.

THE SPECIAL MASTER: Well, we were talking about trying to adjust the flows in the stretch of all of 4 so that they are not so abruptly -- such a disparity between it and what you asked for in 5. And I was commenting, when

you say you're not familiar with the accretions in it, certainly there's no accretion along the whole stretch of 4 that would match the accretion that you get when you come into the confluence with the Little Wind?

THE WITNESS: That's true. Prior to the time where the river actually meets the confluence of the Little Wind.

Q (By Mr. White) Mr. Vogel, would you please turn to Page 24 of your report, Exhibit 280?

A. Page 24?

Q. Yes, sir.

A. Okay.

Q. Could you explain how those curves were drawn?

THE SPECIAL MASTER: For which? Under what legend?

MR. WHITE: Well, let's call it the adult. We've been working with the adult.

A. The computer drew those.

Q. Isn't it true that the optimum habitat or the flow for the optimum habitat which you selected for the particular reach is 320 c.f.s. which matches the top of the curve and extends above the upper margin of the graph?

A. For adult rainbow trout?

Q. Yes, sir.

A. Yes, the peak of the adult rainbow trout curve was at approximately 320 c.f.s.

Q And if my memory serves me correctly, that's the optimum flow which you -- or the recommended mean monthly flow which you have on Page 22 for April through October for that particular reach, is that correct?

A Yes.

Q Isn't it true that -- Strike that.

Did you make any independent determination as to whether or not the curve should be shaped in such a way that it peaked at 320 c.f.s.?

A I don't understand that question.

Q Well, based on the data which you have, isn't it true that it's just as likely for that curve to peak at, say, 150 c.f.s.?

A I still don't follow your line of questioning.

Q Well, didn't the computer, as opposed to you, plot the values which you derived through another computer for habitat as opposed to discharge or Q?

A I'm sorry, Sandy, I still don't understand the point you're trying to get.

Q Mr. Vogel, I hand you what has been marked for identification as WRIR, Plaintiff's Exhibit WRIR FISH-103-E, and ask you to identify that.

MR. WHITE: I'm sorry, Your Honor, I didn't make an extra copy.

THE SPECIAL MASTER: No problem.

MR. MEMBRINO: Sandy, may I have a look at that?

MR. WHITE: Sure.

Off the record.

(Off-the-record discussion.

Q (By Mr. White) Can you identify that?

A. This is a computer output of flow versus weighted usable area for the life history stages for brown trout and rainbow trout in Reach No. 1 on the Wind River Indian Reservation.

THE SPECIAL MASTER: Prepared by whom, can you tell?

THE WITNESS: It is an output from the computer, but it is the result of my work.

Q. (By Mr. White) Are you able on what's marked in the upper right-hand corner, Program Habitat, Page 3, to locate the values of output for Q versus available habitat areas as percentages of the gross area for rainbow trout?

A. Please repeat that.

Q. There is a series of output by month or for Q versus available habitat area, there is a percentage of the gross area for rainbow trout.

A. Okay. It's -- That's discharge and habitat in a listing, right.

Q. And then on the previous page there is a chart of Q versus

vogel - cross - white

available habitat per 1,000 feet of stream for rainbow trout?

A. Yes.

Q. Isn't it true that none of the values of habitat for adult rainbow trout at any of the discharges shown in that graph extend as high or are shown on that chart, Exhibit 103-E, extend as high as the curve on Page 24 of your exhibit?

A. Yes, that's true. The computer is simply interpolating the points to fit a curve.

Q. Do you know what assumptions were given to the computer when it derived that particular curve?

A. No. No, I couldn't answer that.

Q. Do you know what program, if any, was used in plotting those curves from the values which were received from the computer?

A. In general, I know it is a plotting routine utilized in the plotting machine down at the U.S. Bureau of Reclamation computer system in Denver.

* * * * *

Q (By Mr.White) I hand you what's been marked for identification as Plaintiff's Exhibit FISH-280/24-E.

THE SPECIAL MASTER: Mr. White, are you going to introduce exhibits tonight or tomorrow, probably?

MR. WHITE: Tomorrow.

THE SPECIAL MASTER: Okay, thank you.

Q (By Mr. White) Isn't it true that the output of the computer, as shown on the second page of Exhibit 103, FISH-103-E, that the table entitled, "Q versus the Available Habitat of the Stream", I guess it's the third page, for rainbow trout, are shown by the Xs which have been placed on the curve in Exhibit FISH-280/24-E?

A. Yes, they'd be approximately correct.

Q How do you know that the peak of that curve does not occur to the left rather than to the right of the second X along that curve?

A. Please repeat that.

Q I'm going to circle in red the second X along that curve.

THE SPECIAL MASTER: Is that the X across from 50 or is that the X across from 4 -- which is it -- I'm sorry.

All right, counting the one from the bottom, I see.

THE WITNESS: Are you going to repeat the question?

Q (By Mr. White) How do you know that the peak of that curve should not occur to the left of the second X, which

I've circled in red, rather than to the right of that second X?

A. I believe I would just have to answer that by saying the likelihood is that it would appear to the right. It's a very common practice in my particular field to interpolate points on a curve. In fact, I'll be doing that at the present time, when I work in California, working with salmon, figuring out spawn recruit curves. We simply take a tremendous amount of the data that we've actually collected in the field, plot them on a graph, draw a curve to fit those.

We may not necessarily be fitting them to exactly the point we have there, but we're fitting them to a curve that we're interpolating between those points.

I might point out, also, that in the reach you're referring to, we're also using brown trout, whose curve also peaks at approximately 320 cfs on page 23. So we are not just limiting it to only rainbow trout.

Q. Let me ask you about that curve on page 23. What conventions if you know, did the computer, computer plotting program use to have a peak in the brown trout curve for adults in that area?

A. Again, it's the same thing, it's just simply vogel-cross-white

interpolation of the two points, fitting the curve to the data points.

Q. Are you saying then that how you fit the curve to the data points is a matter of professional judgment, or interpretation, which may vary between fisheries biologists?

A. No. Again, I didn't fit the curve, the computer fitted the curve.

Q. Are you able to describe for us, so that we might find the computer program which you used to fit the curve to the data point?

A. Again, that is going back to what we talked about this morning. It's -- It's accessable in the same way that the prior programs you're referring to.

Q. What command did you -- Did you do your work through the Bureau of Reclamation in Denver again, as well as for the other work you've done?

A. Yes.

Q. Do you know what command you used to call up that program, which plotted the curve to the data points?

(Brief pause.

A. I believe the computer command was Call (Rhap) -- excuse me (Rhabplt) (I equals the name of the permanent file I used, J equals Media).

Q. Are you referring to some notes which we've already informally marked?

A. Yes.

Q. And what is that exhibit number?

A. You have it pencilled in the right-hand corner F-I-S-H hyphen 31.

MR. WHITE: I'd like to inquire of the United States whether it would be possible for us to, our experts to visit the Bureau of Reclamation in Denver, at our expense, call up the program listing for the plotting program as well as the programs which Mr. Vogel used, as part of his earlier analysis?

MR. MEMBRINO: Your Honor, I think we have no objection, with the understanding, one, that the State is going to do it at its expense, and two, that we check with the Bureau of Reclamation just so we know the procedures the State are required to go through, and as long as they're willing to comply with that, that's fine.

THE SPECIAL MASTER: That's what Mr. White wanted to know.

MR. WHITE: I'm advised that it may be possible to go through the instream flow group, since our expert's located in Fort Collins, I would appreciate

it if we could see if that's possible.

MR. MEMBRINO: Sure.

THE SPECIAL MASTER: All right.

MR. MEMBRINO: When would you like to do that?

MR. WHITE: Next week would be a good time, our guys are going to be off.

THE WITNESS: Excuse me, Sandy, have you copied this exhibit yet?

MR. WHITE: No, I haven't. I've been waiting for a chance for you to accompany the people to the xerox machine. When we recess at 4:30, it might be a good time for you to go with someone.

THE SPECIAL MASTER: Were there not two in that group, that and the papers that accompanied it?

MR. WHITE: Yes, sir. I wanted to be sure you're along so you could block out the information which might cause your counsel some cause.

Q (By Mr. White) Okay. Since it's late in the afternoon, let's turn to another area which concerns the facts and data upon which you relied. I'm going to be handing you a series of exhibits which were exhibits from your deposition. I'm going to be discussing with you whether or not -- whether you can identify those, or ask you to identify them and ask

you whether or not you relied on the information contained in there, or if that indicates the analysis which you went through. And in order to save time, rather than asking each question, as I hand you the exhibit and indicate the number, could you indicate what the exhibit is and if you relied on it, or if it demonstrates your analysis.

* * * * *

THE WITNESS: Excuse me, Your Honor, could we go off the record for a minute?

THE SPECIAL MASTER: Yes, indeed, off the record.

(Off-the-record discussion.

THE SPECIAL MASTER: On the record.

I think the record should show that during the break the witness has before him a stack of exhibits 8 inches high or so and will, according to counsel, will look over that this evening as to those exhibits that he -- and the facts and data on which he relied and will have that for you tomorrow morning.

MR. WHITE: Yes, sir.

THE SPECIAL MASTER: Why don't we adjourn now into a little conference with one counsel from each of you and let's see if we can't talk a little more along the settlement thing.

(Proceedings recessed, 4:15 p.m.

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We further certify that we are not agents, attorneys or counsel for any of the parties hereto, nor are we interested in the outcome thereof.

Dated this 4th day of June, 1981.

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