2-13-1975

Record of Proceedings at the Trial, Vol. III

Wayne C. Lenhart
Court Reporter, Spokane, Washington

IN THE DISTRICT COURT OF THE UNITED STATES

FOR THE EASTERN DISTRICT OF WASHINGTON

UNITED STATES OF AMERICA,

Plaintiff,

v

BARBARA J. ANDERSON, et al,

Defendants.

No. 3643

VOLUME III

pgs 401-600

attribute to each part of that. For instance, in this '69 one, I gave that '67 a waiting of one; the '68, which is 15.5, a waiting of two, and the '69, which is in this, in the immediate adjacent areas, a waiting of four. You have to wait its effect.

Q In other words, what you're saying, you would have seven parts going through the system in '69, four of them would be '69 parts, two would be '68, one would be''67, and one would be the other year you mentioned?

A You asked how I got it in '69, I told you that I got, I waited, how I waited each of those. If all that water fell in one spot that took the whole two years, that would be one thing, but it doesn't, it falls, and I have to wait it as it comes down through.

Q Well, what was your rainfall, your precipitation, in 1969?

A My precipitation in '69 was 24.85.

Q Now, what, in '69, how much was lost to man-made withdrawals, have you made a calculation of that?

A I would have to assume that if it's man withdrawal, it would have to be direct, or with a delay of one, I have gone through this before, now, for instance, if it's--

Q You mean, by "direct", you mean direct out of the stream?

A All right, if it's below, in the lower area, it takes

water out, it's direct, immediate, you're taking water out of the ground water. In certain areas in the valley, it would be, maybe, a year delay in the upper end, approaching a two-year delay.

Q Well, what direct--

A Are you speaking Newhouse?

Q Yes.

A Probably up to a year delay.

Q I'm not asking you for the delay, I'm asking you for the amount, how much the flow would have been had it not been for man-made withdrawals?

A All these figures that I have given you are without man-made withdrawals, assuming no man-made withdrawal.

Q And that was your actual flow also?

A No. Those are projected without man-made withdrawals.

Q Well, for a minute I would like to switch gears, now, and go to what the gentleman who's examining you right before I came on was about, and that's about Exhibit No. 3 over there. Now, you have stated that, in looking at Exhibit 31, you have stated that your output at the Springs in a normal year, your projected output, and you assumed 1971 was a normal year, is that correct?

A Yes.

Q You said your projected output at the Springs is 18,700 acre feet a year?

A We're going back in as projected, yes.
Q But you have also said that this 18,000 acre feet per year up in the Upper Chamokane, the only flow you have coming over your, you have a weir up there, right?
A Yes.
Q --Is 700 acre feet a year?
A Yes.
Q And that is cut off by the moraine up there?
A And in part, the 16,300 that you see below there; flood waters.
Q Well, the question I'm asking you is, that I want to ask, is, if that is cut off, if that 8000 acre feet per year is cut off, how do you arrive at the figure 18,700 feet coming out of the springs? I just don't understand the correlation there. In other words, it would seem like there would have to be another 8000 feet of ground water you would have to pick up somewhere?
A As the floods come out of the Upper Chamokane, I'm assuming that we get a benefit from that water. Now, this is in that projected year again, 8000 second feet, 8000 acre feet of that.
Q Come out in the flood season?
A No, I did not say that. It comes out through, and does come down through, and we are able to get that into the ground water. There is a continuous flood, or flow, of

700, that was, that we measured, and that's continuous, and I'm not saying where its source is, probably in one of the other, smaller streams, and then we will also have coming into the prairie itself, falling right on it, 2000 acre feet.

Q Well, you have answered my question.

A Yes, sir.

Q I was just wondering where the other 8000 in the Upper Chamokane came from.

In looking at Exhibit No. 3, have you made an estimate of how much water that makes up your flow down at your USGS gauge; have you made an estimate of how, what the percentage is that comes off of those non-Indian lands?

A No, we have not made any discrimination between--

Q Well, it would be quite a high percentage, would it not, judging from where you say the flow comes from?

A We have made no estimate of that at all, we haven't investigated it.

Q Now, I would like to ask you a couple of questions about your geophysical traverse, and I understand you have gone over this before, but one of the things I would like to know is, let's see, I think that's Exhibit No. 8; could I have the exhibit, please?

A Do you want the traverse, or the other that goes with it?

Q No, that's fine. You did some in what I think you spoke of as "Newhouse lane"?
A Yes.
Q You did some drilling?
A Yes.
Q Now, what was your-- Do you have your test records for those--
A Yes. Drills, or wells. We just barely get the thing under and shoot it, is all. It's a concussion you measure, it isn't drill holes, it ain't drill holes, no, no.
Q When you do that, you don't catch whether the makeup is gravel,clay, or anything about the makeup of the underlying ground, you just catch its density?
A With resistivity, we pick up the variation here in the overburden, the density of it, yes, sir. The report is in here, Shannon & Wilson's report is in here.
Q Well, the question I'm asking is, could you tell from that, at what level you would find a layer of clay, or what?
A Yes, yes, we can, and that was done and labeled on this map.
Q Okay.
A In the first place, we did run surface traverses, and these represent, so then these are related to sea level

datum.

Q Okay, well, for your first six, for your first six holes that you dug, what was the level of clay across all those, at what depth did you run into this layer of clay?

A Of the mixture of clay, sand and gravel, we titled later at the east end, it would be within 10 feet of the surface.

Q At the east end, over on the east side of--

A Yes, and gets deeper, and as we got to the far west end, here, it got down at that point, we were nearly 75 to 100 feet, probably.

Q Is that layer, does the water flow through it back and forth, or is it--

A That is our heavy water-bearing layer.

Q Well, where did you find, the Newhouse is the well I think you're somewhat familiar with, aren't you?

A Yes.

Q He went 85 feet, and then he hit--

A Clay.

Q --very hard clay.

A Yes.

Q What I'm asking about, is that layer of clay, how does that run?

A In all probability, Newhouse would have been, probably,

at, oh, midway, let's see, it would be shown on this thing as probably, not as a clay, but as a tighter layer, you see, you wouldn't segregate the clay specifically, but it would be a tighter layer, and would be in the area of probably 50 feet.

Q Probably what?

A Probably 50 feet, just looking, just glancing at this.

Q Why, he hit it at, maybe I'm not following you, his well log shows he hit it at 85.

A Right, and in this whole, this whole layer, this whole upper layer, that can vary from feet to feet, it can vary at 50, or it can vary at 100 feet, it can be different, we found a differential in the Hill Well, and in a well we drilled almost immediately adjacent to it. It does vary some, it isn't just flat, a flat plane.

Q Okay. The last question I would have is, in your geological, well, if you take a full look at the trough, as you see it, is the materials that make up that trough, is that fairly homogeneous, all the way from the top to the bottom?

A I think the lower part, right underneath the, in the, tighter layers, is comparatively uniform, yes.

Q In the tighter layer?

A Yes, in the tighter layers. The upper layer is not

necessarily uniform because it has been formed by, as the glacier receded, it's been rinsed out, and water traveling all over that place, and we'd find tighter and looser layers all over, but it's generally looser in the upper layer of where the water, the receding glacier did rinse it out.

Q But you generally find your ground water in the tighter type of water, or do you find it up above?

A I find the ground water in all layers; there is ground water in all layers. It is a degree of how it will receive moisture and how it will relinquish moisture.

Q It's not as homogeneous at the top, then, you would say, as it is down?

A There is more clay rinsed out of the top, yes.

MR. TRACY: I have nothing further.

MR. GERMERAAD: Your Honor, I have found out that a witness which was mentioned earlier today, Mr., or Dr. George Maddox, would probably be having exhibits introduced through him, and since the State has not filed any documents with the Court, as far as I know, as the Court directed in its Pretrial Order, plaintiff and plaintiff intervener would certainly like copies of any scientific studies that would be introduced in the next few days. We would like an opportunity to see them, at least.

THE COURT: Well, I think that is a reasonable request.

MR. DUFFORD: Your Honor, I'm aware of no exhibits the State intends to introduce through Dr. Maddox.

THE COURT: But if there are any exhibits not pre-filed, counsel has the right to an opportunity to examine them.

MR. GERMERAAD: I believe I was told there was going to be a flow net; is there or is there not going to be a flow net that Dr. Maddox has made, introduced?

MR. : We will be more than happy to provide you a copy of what--

MR. GERMERAAD: Are you going to?

MR. : Our intention was to have him discuss what he has done.

MR. GERMERAAD: It will be based on something he did do, and you're not going to introduce it into evidence. It's going to come out on Cross-examination the first time, and I think we would be at a distinct disadvantage for having our exhibits filed for almost a month, or more.

MR. DUFFORD: Your Honor, we'll be more than happy to make that available.

MR. GERMERAAD: Thank you.

MR. RUDOLPH: One additional question relating to

that, have any of your two witnesses, Mr. Dufford, written any reports to you, or anyone else? If there are such written reports, we would ask that we be allowed to see those also.

MR. : Certainly. The answer to the question is no.

THE COURT: We will be in recess until 9:30 in the morning.

(Court adjourned for the day.)

Hon. Marshall A. Neill, Judge
Spokane, Washington
Thursday,
March 14, 1974
9:30 A.M.

THE COURT: It may be a little early to determine yet, but I think we ought to give some thought to if this case is not completed by tomorrow evening, whether we want to run Saturday, or carry over to Monday. I suppose it depends a little bit on how it hooks on timing. I'm not adverse to holding a Saturday session, if we can get everybody out and back to their other business for the week. I'll kind of leave that up to counsel; I just throw the thought out for the moment. I suppose it's a little early to tell, and we will see how we develop things today, as to whether we hold a Saturday session, but I would like to finish up this case this week, as far as the testimony is concerned, although we're not going to finish the case this week, if at all possible.

So, I guess we're down to Redirect for Mr. Woodward, correct?

MR. GERMERAAD: Yes. Your Honor, I think Mr. Rudolph talked to most counsel yesterday, and it was my thought that, in light of Mr. Woodward's health, and he had been on for three straight days, we would like, if the Court please, to delay Redirect, perhaps, until

tomorrow afternoon. I did have about 40 questions, I could probably strike several of those to keep it as short as possible. I just told Mr. Woodward to go home and relax and take today off, and I expect him just to rest.

THE COURT: That's all right. I was quite concerned about him yesterday. I really felt his physical condition contributed to some of the problems we had getting some of the answers. Unless there is serious objection from some of the defense counsel, I think it's the proper action to take.

MR. TRACY: No objection.

MR. REKOFKE: We have no objection.

THE COURT: Very good.

MR. GERMERAAD: In that case, your Honor, I would like to call--

THE COURT: Excuse me. Mr. Rudolph?

MR. RUDOLPH: Oh, I was just going to ask, excuse me, Mr. Germeraad, if the record could show, and possibly we should ask Mr. Woodward, when he's here, exactly what it is, he's been on medication, and I think the record should show that, and I can't tell you what it is, but I think it's proper that it be in the record, that it show the status of that medication.

THE COURT: Perhaps when he's back on the stand,

we could ask him.

MR. RUDOLPH: Yes.

MR. GERMERAAD: Your Honor, I would like to call, then, another witness for the United States. This is Mr. Richard J. Navarre.

THE COURT: Proceed.

RICHARD J. NAVARRE,

being first duly sworn, testified on behalf of the plaintiff as follows:

THE CLERK OF THE COURT: Would you please state your full name for the Court, spelling your last name?

A Richard J. Navarre, N-a-v-a-r-r-e.

THE CLERK OF THE COURT: Thank you.

DIRECT EXAMINATION

BY MR. GERMERAAD:

Q Mr. Navarre, would you give us your business address, please?

A 495 Tyee Drive, Tumwater, Washington.

Q And would you spell Tyee for the record?

A T-y-e-e.

Q Mr. Navarre, what is your present employment?

A I'm the assistant program manager of the Northwest Fisheries Program.

Q And the Northwest Fisheries Program is part of what larger organization?

A It's the field office of the United States Fish & Wildlife Service, under the Department of Interior.

Q And what are your responsibilities as Assistant Program Manager of the Northwest Fisheries Program?

A Well, I provide technical assistance to Indian tribes, conduct surveys, supervise the work of others, we work on Indian reservations in the State of Washington, military areas and national parks. We also have a sub-office in Vancouver, Washington, that is working out with Indian tribes in parts of Oregon and Idaho.

Q You said that you provide technical assistance; in what areas do you provide technical assistance?

A Provide technical assistance in fisheries, management and development.

Q In addition to the Spokane Indian Reservation, could you name a few other federal areas under your jurisdiction or supervision?

A Work on the Colville, Quinault, Makah, Lukki, Tulalip, Muckleshoot, and several smaller reservations; military areas which we work on is Fort Lewis, McChord Air Force Base, key port naval stations, McCaw (phonetic) Air Force Radar Station.

Q How about national parks?

A The Olympic and Mt. Rainier National Parks.
Q Would you please give us a short resume of your educational training?
A I attended Michigan State University from 1949 through 1956, with the exception of 21 months at which time I was in the Army. There I received a Bachelor of Science Degree in the field of Fisheries and Wildlife, and I also attended graduate school, where I had about 50 quarter hours of graduate study in the same field.
Q You mentioned Fisheries and Wildlife; did you specialize in one or the other?
A I specialized in the Fishery option, although I took a number of Wildlife courses with it.
Q After Michigan State, where were you first employed?
A That would be January 1st of 1957, I took a job with the New Mexico State Department of Game & Fish, and there I was stationed at Truth or Consequences, New Mexico. I was assistant project leader there, and my duties there were to conduct, make fishery surveys in the Southwestern District of New Mexico.
Q Could you tell us what you mean by "basic fishery survey"?
A At that time, we were inventorying the waters of the State, trying to determine what species of fish were present in the waters, determine what could be done to

improve those fisheries. We would write up reports on the data we collected, making recommendations for improving the fishery.

Q Were you later moved to another region of New Mexico?

A Yes, in October of 1957, I was transferred to Roslyn (phonetic), New Mexico, where I was a project leader of the Southeastern District of New Mexico. There I conducted surveys similar to the types that we were doing in the Southwestern part of the State. Some of the other things I did, I evaluated a fish trap barrier on the Pecos River, evaluated the effectiveness of it in catching fish, and effectiveness of trapping and removal of what fish would have on the game population in that section, the fish population in that section of the stream.

Q What kind of fish were you trying to catch in that trap?

A We were catching carp, suckers and shads, and removing them from the stream, and by removing these competitor species, we had hoped the game fish population would increase.

Q The suckers, and carp, these species, sometimes, are determined trash fish?

A Trash fish, or non-game fish.

Q Later, with the New Mexico Game & Fish Department, did you take on another position?

A Yes, I believe that was in about the late summer or early fall of 1960, I transferred to Santa Fe, New Mexico, and became a Dingell-Johnson coordinator.

Q Could you tell the Court what a Dingell-Johnson coordinator is?

A First, Dingell-Johnson is a Congressional Act which places an excise tax on manufacturers of certain items of sports fishing equipment. The tax so collected is then distributed to the various state game officials on a formula basis, and the states use matching money on these projects so approved.

Q And what was your function, then, as the Dingell-Johnson coordinator of the State of New Mexico?

A I wrote up the plans and specifications and estimates of fishery management, development, or land acquisition programs which the State wanted to accomplish, and I would supervise these programs to completion.

Q In supervising these programs to completion, did you supervise other employees, then, of the State Department?

A Yes, all the management, biologists, were under the program, and, of course, it was my job to review their work and their completion reports.

Q Did you, in drawing up these plans, deal with some broader aspects of the recreational use, other than the

straight fishery program?

A On government projects, of course, if we had proposals for two dam sites, one in one location and one in another, we would have to make evaluations on which particular area would receive the most fishing use so we could determine which one to build; you just have so much money.

Q How long were you in Santa Fe as the Dingell-Johnson coordinator and supervisor of the fishery management, biologists, and fishery development program?

A I was there until March 15th of 1963.

Q Then where were you employed?

A I then was employed by the U. S. Fish & Wildlife Service and station at Springerville, Arizona.

Q And what were your duties at Springerville, Arizona?

A In Springerville, I was working on Indian reservations in Arizona. I probably spent eight percent of my time working the San Carlos Apache Reservation, where I worked with tribal personnel and conducted surveys on the waters on the reservation, made management proposals, made up stocking programs, rehabilitated waters and established a viable sports fishery on that reservation.

Q What other federal areas, other than the San Carlos Apache Reservation, did you do work for?

A There was one more, before completing what I did on

San Carlos, I might mention, I spent a considerable amount of time there walking out drainages, and they were mainly intermittent drainages, looking for dam sites, and once we could locate a dam site, and the engineers could tell us that, yes, this is a dam site, and you could create a lake of so-many acres, and it would be so deep, and we would make an evaluation as to the numbers of people that would be attracted to this area, to help the engineers evaluate if this is a feasible, feasible project.

And the other areas, to your second question, I did some work on the Pappigo Reservation, at Fort McDowell, and the Salt River Reservation, and also on Fort Wachuka Military Base.

Q You talked about how many people would be attracted to various areas; was this attraction simply for fishing, or a broader recreational use?

A Fishing is one, is the main attraction now. We find more people will come fishing to an area if the quality of the fishery is maintained good. We will have more people come to an area if there are adequate campgrounds, good campgrounds. We find out if there is no campgrounds, for example, we get mainly individual fishermen. If there is good campgrounds, generally they bring their families, and so we would get more people

into the area that way.

Q And this would contribute to the economics, then, of the project?

A This would contribute to the economics of the project.

Q Where did you go next with the Fish & Wildlife Service?

A I was transferred to Phoenix, Arizona, and there I had the same area and responsibility as I had in Springerville.

Q The office was simply moved, then?

A The office was simply moved.

Q Later, what did you do with the Fish & Wildlife Service, and where did you go?

A Later I was transferred to Tumwater, Washington.

Q And this was approximately when?

A This was the beginning of September of 1967. There I was transferred, was a project leader, I was working, providing technical assistance in managing and developing fishery resources on Indian reservations in Western Washington, on the national parks, and on the military areas, which I mentioned earlier.

Q Your present position is with the Northwest Fisheries Program; could you tell us how this program came about?

A The Northwest Fisheries Program was established in the spring of 1973. It was established primarily to provide assistance in the field of off-reservation treaty

Indian fishing rights, and provided a great deal of information used in the United States v. Washington court case involving Indian fishing rights. At the same time, the project that I had was incorporated into the Northwestern Fisheries Program. The area expanded to include all of Washington, part of Idaho, and Oregon.

Q Going all the way back to the time of the New Mexico Game Department, the time of the Fish & Wildlife Service in Arizona, and since 1967 up here in the Northwest, have you worked in the area of trout fisheries during this period of time?

A Yes, I did. In fact, about 65 percent of the fishing effort in New Mexico at that time was for trout, and this is where the emphasis was, a great deal of the emphasis was on trout. In Arizona, state-wide, trout provided about 50 percent on the mandates of angling. On the area I was working specifically, in the San Carlos, trout provided about 90 precent of the angling.

Q How about up here in the Northwest, what type of fish--

A In the Northwest, with the tribes, it's primarily salmon, and in the military areas and national parks, it's primarily trout.

Q Mr. Navarre, do you belong to any professional societies?

A Yes, I belong to the American Fishery Society.

Q Have you authored any professional reports or papers?

A Yes, I authored a paper in the transaction of the American Fishery Society. One was titled, I believe this is the correct title, "Application and Detoxification of Toxifene (phonetic) in Clayton Lake, New Mexico". This concerns evaluating Toxifene as a chemical for eradicating undesirable fish population.

Another article I authored was, "A New Stream Habitat Improvement Device in New Mexico". This concerns a description of the stream device we were using, and the merits of it, the structure we called a "trash catcher". They were installed in trout streams and areas where we felt that additional pools were necessary. As water flows over these structures, it digs pools below them.

Q Pools are advantageous at some point in time for trout?

A In certain streams, and certain areas. Pools are, of course, necessary in all streams for trout because they do provide resting areas.

Q How about any other articles that you have authored?

A Well, with New Mexico Game & Fish, I have written numerous articles in the monthly newspaper put out by the New Mexico Fish & Game Department. These related generally to trout fishing forecasts and predictions of the various lakes and streams, our mystic trends, our various project activities that were going on.

When the newspaper ceased being published in New Mexico, the Department started putting out a magazine, and I recall writing an article on the white bass, which appeared in this magazine. This was just concerning the introduction of white bass in several of the State waters, and a little bit about fishing for them.

Q Has your work or programs that you have worked on ever been noted in publications by others?

A Yes, the program that we developed on the San Carlos Reservation was written up by an author of outdoor articles and appeared in a magazine entitled Outdoor Life, which is a national publication. It was simply about the process of developing this fishery and as it related to some of the excitement of catching fish, and this type of thing.

Q Did some of the programs that you worked on, or directed, also appear in the Arizona Republic?

A There was quite a few articles that appeared in the Arizona Republic, which is the major newspaper published out of Phoenix, regarding individual waters on the San Carlos and popular sports and fishing articles concerning them.

Q Could you please tell us about how you came to do your study of Chamokane Creek?

A Well, I was asked to do this study by our program manager, Mr. Jim Heckman (phonetic). This was somewhere last spring, I think in April of '73, and he said he had been contacted by the regional solicitor's office that they needed a study done to Chamokane Creek to determine if the amount of flow necessary to maintain a quality trout fishery in the stream.

Q What did you do first, in setting about your study?

A First I obtained the background information of what was knowing on the stream from our regional office in Portland, and also I believe I obtained some information from the regional solicitor's office. Now, I had found out that a biologist out of our Portland office had conducted a study and wrote a short report in 1970. This was slightly more than a one-page report, and it didn't have very much detail in it. I also learned, in the correspondence that was involved, that the Bureau of Indian Affairs had requested from our regional office assistance in running a study, and they received this late in '71. Our regional office responded we didn't have the funds or manpower to conduct the study, and a letter from the Bureau of Indian Affairs also said, well, they didn't have the money to conduct the study. It wasn't until 1973, when the Northwest Fisheries Program was formed, that funds and manpower did become

available.

Q And after gathering this background information, what was the first step that you took in beginning your study of Chamokane Creek?

A The first step, I came to Spokane and I went to see Mr. Walter Woodward, who I knew was doing some studies and had information on water flows, and such, on the creek, and talked to him to find out what information he might have that would be useful to me.

Q About what date was this?

A This was around July 13, '73.

Q Okay. And what did you then do, on July 13, 1973?

A Mr. Woodward wanted to go out and read his gauge on Chamokane Creek gaging station, so he volunteered for me to follow him out, and he would show me where the creek was, and the gaging station, and so we did, we first went to the Boardman Road crossing, went up the creek to the gauge, gaging station, and to the falls, and next, I believe, we went to Mr. Alex Sherwood's home, the tribal chairman of the tribe, and he wasn't there, so we proceeded on to the tribal office. At the tribal office, I met individually other, or collectively, several members of the Spokane Tribe, including Mr. Sherwood and Mr. McCoy, Mr. Galbraith, Mr. Wynn (phonetic); also that day, I talked to the superintendent,

Mr. Jim Stevens. I informed these tribal people that the Northwest Fisheries Program was recently established, and that we did now at this time have personnel and funds to assist their tribe in the development and management of fisheries on the reservation, if they so desired. I also, at that time, told them that we had a request from the regional solicitor to do this study on Chamokane Creek, and I inquired of the tribe that it was indeed true that they did want this study done; they said, yes, they would like the study done, so we proceeded on with the study.

Q Getting back to the beginning of the day of July 13, you stated that you first came upon the creek at about Boardman Road crossing. Could you now go into detail concerning your findings--

MR. GERMERAAD: And your Honor, I'm going to be asking him about different visits and the work that he did each time--

Q (By Mr. Germeraad) --so could you start at July 13, at Boardman Road crossing, and tell what you found, or, you know, progressing through how you did your study?

A I think one of the first things, of course, I was concerned about, was the flow of the stream. I had understood that the minimum flows that might be expected during the summer would range between 20 CFS and 30 CFS,

and I was concerned at the decrease in this amount of flow would leave exposed areas of the stream, and essentially eliminate these areas from that stream's production; that as part of the stream is exposed, the aquatic insects on which the fish feed could no longer live in these sections, so it would reduce the total food supply. Just looking at the stream bed, I could see that this area of, by reducing the flow from 30 to 20 would not be very large. I probably estimate this on somewhere, maybe, in the neighborhood of a five percent reduction.

One of the other things I became concerned about immediately is when I was at the Boardman Road crossing, at 11:00 a.m., the temperature of the water was already 59 degrees.

Q How did you happen to take the temperature, I mean, is temperature somehow important?

A Temperature is very important to a species of fish like trout, because they're definitely a cold water fish. One of the things, too, that I noticed, is the topography of the area, the hillsides going up from the stream, and this particular valley was oriented in a northeast-to-southwesterly direction. Now, as such, the stream is subject to the maximum amount of flow irridiation during the day. For example, if it had been

oriented in an east-to-west direction, we would have received some stream shading from the topography, the hillside, because of the angle of the sun, on the horizon, the hillsides of the south of the stream would have cast shadows at least part of the day over the surface water and prevent heating from direct solar radiation during those periods.

Q Are there not trees alongside of the creek?

A There are trees, and the trees, of course, do offer some shade.

Q From the Boardman Road crossing, where did you go next?

A Well, since I was following Mr. Woodward, I also happened to have another biologist with me in my car, they drove up the creek to the gauge, and I walked the stream, Boardman Road to the gaging station, and made observations along the way.

Q Did you happen to notice any wildlife while you were walking the banks of the stream?

A Yes, I made notes of the wildlife that I did see between the Boardman Road crossing and the gaging station. I saw eight grouse, a muskrat, a white-tailed deer, two mallards, a maganzer (phonetic), and also noted beaver signs.

Q You were referring to a little paper book in front of you. Would you tell the Court what that is?

A This is my field notebook, in which I kept my field notes.

Q Before we go any farther, I would like to ask, did you eventually come up with a final report on your entire study?

A Yes, I did.

Q I would like to have you-- It's in the brown envelope-- If the bailiff could hand you the red portion?

THE CLERK OF THE COURT: Do you want it marked?

MR. GERMERAAD: What?

THE CLERK OF THE COURT: Do you want it marked?

MR. GERMERAAD: Just give him the red. Yes, I'd like it marked as Plaintiff's Exhibit--

THE CLERK OF THE COURT: 64.

MR. GERMERAAD: 64?

THE CLERK OF THE COURT: Yes.

MR. GERMERAAD: Okay.

(Thereupon, Plaintiff's Exhibit 64 was marked for identification.)

Q (By Mr. Germeraad) Mr. Navarre, the bailiff has just handed you Plaintiff's Exhibit 64; would you please examine that and tell us if that is a copy of your final report?

A Yes.

Q Thank you. I will now go back to your walking up to,

from Boardman Road crossing, to the gaging station. Did you make any additional observations at the gaging station?

A Initial observations-- Additional observations, uh, I think Mr. Woodward took the gauge reading. I also, of course, picked up quite a few rocks in the bed of the stream, to judge what the abundance of food forms, or aquatic insects were, and I found the aquatic insects quite abundant on these stones.

Q Did you make any measurements or anything at the gaging station on that day? If you want, you can refer to the field notes.

A Not on that day, the 13th, no.

Q Okay. When did you next visit the Chamokane Creek?

A My next visit was the next week, on the 17th, and the reason I came back as soon as possible was to establish thermograph stations to record temperatures, since I was concerned about the water temperature, and on that day, I installed a continuous recording thermograph below the Boardman Road bridge. This was set out at 3:45 p.m.

Q Did you make any measurements of the air, or water, temperature, about that same time that day?

A Pardon me, I have a correction; I arrived at the stream at 3:45 p.m.; I put the thermograph in at 4:00 p.m. I

measured the water temperature of the stream at that place where I put the thermograph in, it was 75 degrees farenheit.

Q Did you also take the air temperature at that time?

A I took the air temperature at that time, at 4:00 p.m. It was 94, but I took the air temperature with this pocket thermometer, which is actually designed to measure water temperature. Now, water temperature, you adjust water temperature quite rapidly, in a few minutes, but air temperature, you would have to leave the thermometer out in them a much longer time to record the maximum high, so 94, it may have been a little higher than 94, it may have read 95 or 96.

Q How long did you set out the thermometer to the air?

A As I recall, about five minutes.

Q Did you visit any other locations on the stream--

A Well,--

Q --on the 17th?

A Well, at, right at the Boardman Road bridge, too, I took the water temperature, and this was at 4:30 p.m., this was slightly above where the thermograph station was, but it also was 75 degrees at that point. I also had noticed at this time that I walked the stream section from the Boardman Road bridge down to near the mouth of the stream and where there is a house on the,

house on the left bank, I then went upstream to the gaging station, and there I recorded the water temperature, and it was 73 degrees.

Q Could you also tell us what the flow upstream was at that point in time?

A From the USGS records, I believe that flow was 22 CFS that day.

Q Could you tell us what you did on, is there anything else you want to tell me about July 17th before I go to July 18th?

A I see no further notes here.

Q And what did you do on July 18th?

A July 18th, I went back in the morning, the first thing I did was go back to the station where I'd set out the thermograph the day before, to check to see if it was working properly. From there, I also measured the water temperature at that time, which was 57 degrees, this was at 9:20 a.m., then I went up to the area of the creek just below its confluence with Galbraith Springs, and I installed another thermograph station at that point.

Q Is there a map in your report that indicates the locations of these thermograph reading stations in relationship to the creek?

A Yes, there is. On Page 4, Figure 2, I have a

diagramatic map showing sampling stations. At the lower end, what I called Station 3, this was slightly below the Boardman Road bridge, the Boardman Road is shown on the map. The location of the gaging station, the falls, and another station, Station 2, which I established for other purposes, and Station 1, where I established the thermograph on the 16th, is shown.

MR. GERMERAAD: Could I ask the bailiff--

Q (By Mr. Germeraad) Do you have an extra copy of that report?

A Yes, I do.

MR. GERMERAAD: If I can ask the bailiff to hand it to the Judge, maybe the Judge would find it easier to follow along. I may be having Mr. Navarre making various references to that exhibit, as it might help.

Q (By Mr. Germeraad) During the rest of July 18th, and then into the 19th, what did you do at the Chamokane Creek?

A I walked sections of the stream observing stream pool riffle areas, such as that, and became acquainted with access roads into various points of the stream. I did make some more temperature recordings on the 19th.

Q Could you tell us what you mean by "pool" and "riffle"?

A Well, the pools, primarily, are where the trout get out of the current to establish their areas, which

they defend against other fish. The riffles are the primary areas that produce the food, or aquatic insects. As the aquatic insects become dislodged from riffle areas and drift downstream, the trout, being a drift feeder, nabs them on the way down.

Q Could you describe the physical characteristics? What does a riffle area look like?

A A riffle area is a broad, shallow area where the water goes running faster, and the pool area is, of course, deeper and the water is more quiet.

Q What was the next part of your investigation?

A This covered August 8th, when I made another trip over. This time, I had three assistants, and we sampled the fish population, and took samples of the bottom fauna.

Q Could you please describe for us how you did your fish sampling?

A On the fish sampling, we used electro-fishing techniques. We had a small gasoline motor, small motor, which turns a generator, and the current from there goes through a voltage regulator, where we could regulate the voltage from zero to 700 volts. This is all mounted on a back pack frame. Now, when we first, after coming, feeding through the voltage regulator, the current goes out through electrodes, we place two electrodes in the water, the current passes through the water to the

other electrode, and fish that are caught in between receive an electrical shock, they generally turn on their sides, stiffen out, and we net them, and we can identify them, or measure them, or do whatever we want, and the trout that we captured in Chamokane Creek, we returned these back to the stream alive. They recover in just a couple of minutes and swim off.

Q Are the results of the survey found in a particular place in your report?

A Yes. On Page 21, Table 6. Now, the first place we went to was at Galbraith Springs, because that was the end of the road, and we wanted to go to Station 1, which is another quarter mile walk, or so, maybe a little longer, and when we got to Galbraith Springs, we wanted to test the equipment before taking it to Station 1, so we tested it there at the, below the springs, right below where Mr. Woodward had his weir, and there we found some brook trout. Found the equipment was working okay, so we took it down to Station 1.

Q You said that you found brook trout; did you enumerate them?

A No, we made no attempt to enumerate them.

Q Just the testing?

A This was just a testing.

Q Okay.

A Then we went down to Station 1, and there we sampled an area of the stream. This particular section was mainly a shallow riffle-type section, pools were few, there was a couple of pools at the upper end there, and we got four brown trout, in the three-inch range, and one around nine inches. We got quite a few sculpins. We weren't really interested in the sculpins. The whole purpose of the shocking was the, to determine the locations that we find trout in the various sections of the stream, and to make a relative comparison as to the quantity. This in no means indicates the exact number of the fish in this particular stream, but just the relative quantity.

Q Did you find a rainbow trout at that location?

A We found a rainbow trout, and we also observed two other trout that we turned over but failed to net. There was a lot of sculpins we had let just go by and escape the capture. After that station, we went down to what I call Station 2, which I believe is out four-tenths of a mile above Chamokane Creek Falls. There we shot another section of the stream. There were brown trout there, too, there was four brown trout, ranged in size from seven and a-half to fifteen and a-half inches. There was also sculpins present.

Q What is a sculpin, that's a new one on me.

A Many of the people call them bullheads, but they're really not a true bullhead, or a member of the catfish family; they belong to another family of fish. They're not a sport fish.

At this Station 2, we had deeper, more numerous pools, or the pools covered a larger area of the stream and that's probably the reason we found, one of the reasons we found bigger fish there.

Q What would be the pool-and-riffle ratio at Station 2?

A I believe it was about 50-50, about 50 percent of the area was covered by pools, and 50 percent by riffles.

Q Did you take the temperature of the water at Station 2 on that date?

A Station 2, the 8th of August, was 62 degrees Fahrenheit at 1:45 p.m.

Q Could you go back, and did you also take the temperature of the water at Station 1 that day?

A Yes. At Station 1-- At least I thought I did. Yes, it was 59 degrees, and this was at 11:30 a.m.

Q Okay, could you now talk about the sampling that you did at Station 3?

A Station 3, we sampled there and we found one brown trout, found suckers and sculpins. While my crew was shocking this section, I was taking a bottom sample,

and the first pass-through, they did not turn up any trout. By the time I had finished taking my bottom samples, I said, let's go through it again, so we went through it again and we picked up one brown trout, so I decided, well, we'll try it one more time, and we went through it again, and we didn't find any additional trout, and from there we were going back up to our vehicles, up to Boardman Road, so we continued shocking upstream, trying to find anymore trout, and we probably shocked another 150 feet or so, but we didn't turn any other trout. We did turn up more sculpins and suckers, and so forth.

Q Did you take the temperature of the water at Station 3 on that date?

A At Station 3, 88, 4:30 p.m. It was 70, the lower thermograph station, 3:15 p.m., 70 degrees Fahrenheit.

Q What is the physical characteristic of Station 3; what I mean, is there good pool-and-riffle ratios in that location?

A Yes, it had probably the deepest pool of any section. I'm sure they were deepest, there was more area covered by pools in that section. Probably maybe up to 70 percent, as I recall, were pool areas.

Q Why wouldn't there be more trout in that location, if the physical characteristics of the pool and riffle were

as good as they were?

A Well, after analyzing all the data, the only thing I could conclude, the temperatures were just becoming too warm in this lower end of the creek.

Q On this trip, did you remove the continuous thermograph readings that you had at your various stations?

A I changed the charts.

Q Were there any difficulties with the thermographs?

A Yes, these were new thermographs we had purchased when our new program came into being and we had funds for equipment. We had used this type of thermograph before, and it was, they worked quite well, so we ordered some more new ones, and these were some of the new ones, and I had difficulties with the charts' binding up in the thermographs. On one occasion, the charts ripped apart, on another occasion, a roll of charts would jam up, but this in no means affected the temperature reading, we had a number of good days, and this is why there is a result in my table here, it shows some gaps in the data.

Q And the gaps in the data which you have described, is that in Table 1, which I believe begins at Page 9?

A Table 9, yes-- I mean, Table 1 on Page 9, yes, it shows the gaps.

Q You mentioned that you felt that the temperature had

become excessive and that's why the trout were not found. When temperatures do become excessive, in your professional opinion, where do the fish go then?

A In my opinion, trout go downstream.

Q Why downstream?

A Well, a trout is a cold-blooded animal, and as such, his body temperature is the same, or nearly the same, as the water temperature. Now, as the water temperatures increase, the metabolic rate of that fish increases, his oxygen consumption goes up, his respiratory functions go up, and produces more carbon dioxide in his blood system, which has to be rid of, his heartbeat is faster, his blood circulates faster, his enzyme digesting actions increase, so as the temperatures increase, up to a point, this is fine, I mean, the fish is able to cope with it. In fact, they do best up in a range of 50 to 60 degrees, they do real well. Now, when the temperature continues to rise and gets up to a temperature of 66 degrees Fahrenheit, they cease to feed, and so they draw the limits, they're continually becoming more stressed because of temperature increase, and at a point this stress is so great they can't maintain their positions in the stream.

Q What do you mean by "maintain their positions in the stream"?

A Well, a trout is a territorial-type fish, he selects a territory which he will defend, and he will try to maintain himself in that territory. Now, the bigger fish, of course, have the better territories, because they're the big boys, and they kick other guys out, and so they're in a deeper, more quiet portion of the stream. The little guys, they have to get off into, off along the sides, they're fighting more current all the time, so these little guys are already stressed a little more than the big guys because they're fighting this current, and they will be the first ones to be affected by increased stress. The stress becomes so great they cannot fight this current to maintain their position, so they would generally drift downstream. This, they don't all of a sudden make a mad dash down the stream, but as they become weakened, they drift down and might end up at the next pool, they might try to get in a place where a big guy is, and he's going to chase them out and he's going to get over in a current again, and he might maintain himself in that pool for a day or two, and the next time the temperatures get up there high again, he's again under stress, so gradually, there is a slow drifting down of these little fish, so there is a net loss of the little fish first. Now, as the temperature gets higher, even the big guys will

become stressed and they would eventually end up downstream. They would not stay around until the temperature hit the maximum tolerable level where the fish would automatically die, because they are already in a weakened condition, before dying, so the current carries them down.

So, these movements are subtle, they're not noticed, but the way we notice them is when we go into a stream in the early parts of the year, the lower sections of trout streams, we generally find more fish, we will find various sizes of fish, and then later in the summer, and late summer, we go in and sample these fish populations again, we will find fewer fish, and the fish we do find will be generally larger fish.

Q If the fish, then, let's say, in Chamokane Creek, and the water becomes excessive, would they move down into the Spokane River?

A Would you repeat that question, please?

Q Okay. If the temperature does increase to, into your stress level, and the trout in Chamokane Creek would move downstream, they would move downstream into the Spokane River, is that correct?

A I believe they would end up down in the Spokane River, the little fish first, the ones under the most stress, would end up down there, and when they get down into

the Spokane River, they are in another set of circumstances, they have to compete with the fish that's in there, I believe there's squawfish in there, it's a very predatory species that feeds upon these fish, these fish may continue moving on downstream, if they're in this weakened condition, they would be more subject to predation, and they would be, and they would also be in a weakened condition, they're more subject to disease, the virulenty of the disease goes up quite rapidly when the temperature is above 60 degrees Fahrenheit, and the fish are more susceptible to disease at this time.

Q So if the temperature goes up, basically, you lose a portion of your fish habitat?

A We lose a portion, this can be variable, if they go up high enough, we can lose the entire, all the trout out of that section of the stream, but that section of the stream is lost for that period of the year at, before producing fish.

Q Would it be possible for the fish to come back into the stream if they had once gone down into the Spokane?

A I doubt this very much. I don't think they would ever get back to the stream. I think the predators would surely get them.

Q Why wouldn't the fish go upstream?

A The fish is under stress, he just can't physically muster the energy to fight the currents in the riffle areas.

Q In addition to this weakened condition, if we look at the Chamokane Creek specifically, are there other barriers that would prevent upstream migration?

A Certainly, the falls. If they could go upstream, they could only go to the falls.

MR. GERMERAAD: Your Honor, this would be a good, if we could maybe just take, perhaps, a five-minute break?

THE COURT: All right, the court will be in recess for about five minutes.

(A short recess taken at this time.)

Q (By Mr. Germeraad) Mr. Navarre, you have covered, what I might term anyway, the "short-term effect" of high water temperatures on trout. What would be the long-term effect?

A Well, eventually, in the winter or spring, small fish from upstream areas seeking out new territories will migrate to lower sections of the stream, seeking new habitats.

Q So, there is some natural regeneration, then?

A There is natural recruitment from upstream areas. I think the best example I can give of this is on a stream that I worked in Arizona on the 108-mile section of the stream which formed the boundary between the White Mountain Apache Reservation and the San Carlos Apache Reservation. Now, in the summertime, only the upper 10 or 20 miles of this stream, the temperatures remained suitable for trout. From there on down, in this vast area of 80 miles or so, the trout would disappear. We'll find them there in the springtime, and they were coming out of the lakes and they were spilling over in the winter, and possibly from some of the tributary streams, lakes and ponds on both reservations, and streams coming off the White Mountain Reservation. So, we'd find these in fairly good numbers through this 60- to 70- to 80-mile section. In the summertime they'd be gone, and the next spring, there's fish there again.

Q Would they come back in the same numbers?

A Well, I got no idea. I would suppose the recruitment, upstream recruitment, might be quite variable.

Q We've dealt a little bit on temperatures, and I'd now like to get into a little more definite. What temperatures of water do trout need?

A Well, they have a range of temperature which we call the "limits of tolerance". Its limits of tolerance range

from 32 degrees to about 76, 77 degrees Fahrenheit. Now, beyond that range, they cannot live. Now, within this limit of tolerance, there's a range which we call the "optimum range", where the fish grow best, they do well, and this is from 50 to 60 degrees.

Q Fifty?

A Fifty to sixty degrees.

Q You said that in the 50- to 60-degree optimum, they do well. What do you mean by "they do well"?

A Well, I'm talking about that their food intake is greater than what they're utilizing to sustain themselves, so they're putting on growth and weight.

Q You mentioned the figure 66 degrees. How is this relevant, again?

A Well, 66 degrees is a figure given for when fish seek feeding, or trout seek feeding, and I believe the trout seeks feeding when they're becoming stressed and they just don't have the stamina to dart out in the current and catch their food supply.

Q Is there a maximum temperature for well-being, in your opinion, for a trout fish area?

A Yes. The temperature, one that I recorded in a book, is 68 degrees, and I've taken this from a water-quality criteria, a report put out by the National Technical Advisory Committee of the Secretary of Interior, which

lists 68 degrees for growth of salmonids, and one that I really believe in.

Q I think the Court Reporter wanted the word salmonid.

A Trout belongs to the Family Salmonid.

Q That's spelled s-a-l-m-o-n-i-d-s. And, does that appear at Table 2, Page 13, of your report?

A That's correct.

Q You said that 76 to 77 degrees Fahrenheit was the upper limit of tolerance, did you?

A This is the upper limit of tolerance, but in order for fish to withstand these temperatures, they have to be adjusted, the temperature has to be adjusted slowly. They cannot simply just be dumped, say, from 50-degree water into 76-degree water and still live. They would die then. But, if the temperature is increased gradually, they can tolerate temperatures up to this.

Q If it got higher then, I assume they would die?

A They would die, but before they would die, they would be in such a stress that they would not be able to maintain themselves in this stream, and they would simply drift on down.

Q I think you might have mentioned this earlier, but while we're dwelling on the temperature factor, is disease somehow related to temperature, did you say a little earlier?

A I said the virulity of the disease increases rapidly in fish as the temperature increases from 60 on up, and at the same time, and it's also probably related to the stress that the fish is undergoing, is the reason why this disease increases so rapidly.

Q In your study of Chamokane Creek, did you also do a study of the food source for the fish population?

A Yes, I did. It's on Page 20, Table 5. I took two bottom samples at each of three stations.

Q Could you tell us a little bit about this sampling technique; describe it for the Court, please?

A Well, we use a device known as a "server stream sampler", and a server stream sampler has a frame which is one square foot in size, and this frame sits on the bottom of the stream. Up vertically from this frams is another frame which contains a fine mesh net which then drifts in the current, tails out in back of the sampler. Now, the sample, the aquatic invertebrate on which the fish feed, we pick up each individual rock, and with a little scrub brush, we hold this in front of the net in the current and scrape off all the aquatic insects, and they drift back into the net. After we've done this to each individual rock, we then stir up the fine material within that square frame, so that the other small organisms would drift back into the net. Then, we

remove these from the net, and I place these in bottles of isopropyl alcohol and take them back to my office, where I enumerated them, and I determined their volume through liquid displacement.

Q You talked about picking up the rocks. These rocks that you talked about picking up and scraping are within the one square foot on the bottom?

A Just within the one square foot.

Q In reference to Table 5 on Page 20 of your report, I notice that Sample No. 1, No. 724, insects or whatever, with a volume of .8 ccs, and yet, Sample 2 has only 270, as far as count goes, but 2.0 cubic centimeters. Would you explain the difference for us?

A This would indicate that they were taken in different sections of the stream, that maybe one had more rubble and one had more fine material, but primarily it's the size of the organism. The 724 were primarily of the Order Diptera, which is your flies, your gnats, or the larvae form of these, mosquitos and that type of thing. The 270 were of the larger aquatic insects, of the Order Trichoptera and Plechoptera and your stony fly and hedis (phonetic) fly, and, of course, these displace more volume.

Q Thank you. What are your overall conclusions about the food source in the Chamokane Creek for trout?

A It appears quite good. In fact, when you get up to a volume of two ccs, it indicates a good supply of food organisms. Relatively, there seemed to be a good food supply in every location I sampled.

Q The food source that you're measuring comes off the bottom, and, I believe, earlier, you made certain statements about the surface area of the stream; the surface area of the stream related to food production?

A Yes, it is. The smaller the area covered by water, the smaller the food production is going to be.

Q Did you also study the water chemistry of Chamokane Creek?

A Yes, I did.

Q When did you do this study?

A This was on September 6, 1973.

Q And is there someplace in the report that it talks about your chemical study?

A It's on Page 19, Table 4, gives the results of the study.

Q Could you tell us how you did this study, and, then, the conclusions that you draw from your findings?

A I took samples of the water and analyzed the samples immediately after taking them. The dissolved oxygen levels were real good, probably at or near saturation; the pH hydrogen-ion concentration was within the area that indicates good for fish production; your phenol-

phthalein alkalinity, which is the measure of your hydroxide and carbonates, was void; your methyl orange alkalinity is attributed to the bicarbonates in the stream. You see, the pH is more or less the degree of whether the stream has or alkaline, and its alkalinity tells the quantity of substance that's making it so.

Q Was there anything in your chemical analysis that indicated, in any way, that the water quality was not suitable for a trout feeded?

A None whatsoever; it was very good.

Q Earlier you mentioned that the stream absorbed solar radiation. Is there a relationship between the water temperature of the stream and the amount of flow in the Lower Chamokane?

A I believe there is. I believe, the more water from the springs that are coming down, more cool water coming down, is going to take, increase, take a longer time to heat up. A larger volume does heat up the smaller volume.

Q What is the temperature of the water source in the spring?

A Forty-seven degrees.

Q Did you, in your report, plot any relationship between temperature and stream flow?

A Yes, I did. I plotted the differences, beginning on Page 7, Figure 3. Now, the air temperatures were taken at the Spokane Airport, which I plotted, because they are taken hourly, and we can create a curve out of it. It was the nearest point we could use. There is a curve showing the diurnal variation of the temperature at the upper station and a curve showing the variation at the lower station.

Q Could you also turn to Page 18 and tell us about Figure 6?

A Figure 6. This is a curve where I plotted the maximum air temperature--

Q Air temperature or water?

A Pardon me, the maximum water temperature at the lower thermograph station.

Q This is by Boardman Road crossing?

A Boardman Road crossing, and I plotted the average daily flow from the USGS table, which appears on Page 15, Table 3. Now, this graph shows me that when the temperature was up, the flow was down, and when I had low temperatures, there were higher flows. So, this indicates an inverse relationship between flow and temperature.

Q What would we have to do to have a good trout fishery in the Lower Chamokane?

A I believe we need more cool water emanating from the springs.

Q And what temperature do you set as an upper limit for the water of the Lower Chamokane?

A I believe it should go no higher than 68 degrees.

Q You said that we must increase the stream flow. What stream flow, then, is necessary for the fish to have this adequate habitat of water no higher than 68 degrees?

A I believe we need 30 CFS.

MR. TORVE: I'm going to object to that, your Honor. I think that is a conclusion that is not supported by any studies he has made so far. Any conclusion that it needs increased water is purely a supposition on his part.

MR. REKOFKE: I join in the objection. I don't think there is any qualifications here today, or any testimony, qualifying him on that ultimate conclusion.

MR. GERMERAAD: Your Honor, I would say that the years of experience, the training up until 1956, and work with trout since 1956 certainly entitles Mr. Navarre to draw this conclusion. And, what I would like to point out to your Honor, is I would now be prepared to take him through on how he came to this conclusion.

THE COURT: The objection will be overruled.

Q (By Mr. Germeraad) Mr. Navarre, could you please tell

us how you arrived at your conclusion that 30 CFS would be necessary, then, to have a good trout habitat in the Lower Chamokane?

A The way I came to this conclusion was that I took my maximum water temperature in the lower creek, which was 75 degrees. This was on, I believe, the 17th of July. Also on the 17th of July, we had a flow of 22 CFS. Now, between the springs, which was at 47 degrees, and the lower station, the stream water heated 28 degrees. Now, if we were going to hold the water temperature at 68, we would have to have had seven degrees less heating, or seven to eight, or one-quarter less heating degrees in that lower section of the stream. Now, I believe, to get that lower reading, we would have to increase the flow by one-quarter. Now, my calculations, one-quarter times 22 gives me about five and a-half CFS additional.

Q And this takes you to what level, then?

A Well, it would be 22 plus five and a-half, twenty-seven and a-half. Now, we also have to take into consideration that if we added one-quarter more water to the stream, that is going to widen out a little bit. The water will be deeper, but the water will be widened, and it will have a little more surface area subject to solar radiation, and adding a little more temperature,

then, if it's maintained right in the same wooded area. And, we also have to make allowances for days when the air temperatures become much higher, where if we had a series of hot days where the stream didn't have such time to cool down at night, and this is where I allowed another two and a-half CFS to take care of these problems.

Q What was the maximum air temperature that you had on July 17th?

A On Page 17, Figure 5, is a comparison of maximum daily air temperature data at the Spokane Airport. Now, on the 17th, it appears from this that the air temperature reached about 91. Whereas, in the historical high, during the periods of 1881 to 1973, it appears to be about 103.

Q Before you go on, these temperatures on Figure 5 are taken at the Spokane Airport, is that correct?

A That is correct.

Q You said this is maybe 91 or 92 degrees at Spokane, but you said, did you not, there was a different temperature at--

A The temperature I had recorded on that date at the stream site with my pocket thermometer, I previously stated was 94 degrees and that it was probably a little higher than 94 degrees.

Q Looking at that same Figure 5 on Page 17, and, now, directing your attention to the 26th of July, what is the historical maximum temperature of the 26th of July of Spokane?

A I believe 108 degrees.

Q You mentioned that the water might not, if you had a succession of warm days, the water might not cool down at night. Does the temperature of the water seek to arrive at the same temperature as the air?

A It's always trying to seek the air, the mean air temperature, but water, being more dense, it heats and cools slower; there is less temperature variation of water. The stream bed heats up with the water as the water heats up, and it also heats the stream bed by conduction. So, the stream bed has to cool off also. These are reasons that the water heats and cools more slowly than air.

Q If you also had warm nights when the temperature did not drop, you would have a higher mean and you might not, then, have any cool-off from day to day?

A This is correct. You'd be starting out the next morning with water in your stream that is higher.

Q Is there some type of example that you could tell the Court that illustrates the principle of increasing the amount of cold water, or the amount of flow of water,

to achieve a lower temperature, then?

A Well, we took two pans, each having a surface area of one foot, and we had these pans, the sides of them insulated, and the bottoms of the pans insulated, so that the only way heat could be gained or lost was through the one-square-foot surface area. We poured three-quarters of a gallon of water in one pan and one gallon into another. The only difference now in the pans are the depths of the water.

Q Also the quantity of the water.

A And the quantity of the water. Now, the pan with the one gallon of water is going to take one-quarter more calories of energy to heat that up to any given temperature, or if they're exposed to the same amount of calories of heat absorption or conduction, it would take one-quarter longer for the water, the one gallon of water to heat up than the three-quarters of a gallon of water to heat up.

Q Would it actually be, because if you have three-quarters and four-quarters, would it actually be a one-third more increase than the smaller one; or, going the other way, the smaller one takes one-quarter less, but the larger one would take one-third more? Wouldn't that be the way the fractions would work?

MR. REKOFKE: He's testifying. I object to counsel

leading the witness.

THE COURT: Sustained.

Q (By Mr. Germeraad) Would you simply re-think the quantities in your fractions, please, and decide if you want to change your testimony any?

A Well, it takes one-quarter more calories of energy to heat one gallon of water. One-quarter more-- I believe that's right.

Q Anyway, I'll go on to the next question. I believe you've already covered the example at the reservations down in Arizona and New Mexico where you have trout being driven from the stream. I won't ask you any more questions about that, but you've already testified that it would take 30 CFS flow in the Lower Chamokane to get a good trout fishery. Is there any other uses for the Lower Chamokane?

A I believe the Chamokane would make an excellent place for people to go sport fishing. And, there certainly, if the Tribe wanted to develop it and attract people in there where they could sell them licenses and lease campground space, there's lots of nice flat areas in along the stream that are suitable for development of campgrounds to help attract people. If the stream were-- If there were good campgrounds installed along there and associated facilities, and if the stream was kept well

stocked to provide good fishing, there would be many people attracted to that area.

Q So that there is a rather wide recreational use, then, that can be made of the Lower Chamokane?

A Certainly.

MR. GERMERAAD: I think that is all the questions I will have. I do believe that plaintiff intervener has just a few questions they would like to ask.

DIRECT EXAMINATION

BY ROBERT DELLWO:

Q Mr. Navarre, you were mentioning about the loss of fish into the Spokane River and preditors, and so forth, and their weakened condition. Are you familiar also with the nature of the Spokane River as a trout fishing habitat, with regards to water temperature, pollution, oxygen content, and things of that kind, that might have some effect upon the survival of any trout that get into the Spokane River above Little Falls?

A I haven't made any particular studies myself. I understand there may be some pollution problems.

Q Is there a minimum oxygen content of water, that below the minimum, of it being a good salmon habitat?

A Yes.

MR. CAMPBELL: If your Honor please, I object to

that. He stated that he hadn't made any study.

MR. DELLWO: Now, I'm asking a general question.

THE COURT: This is a different question, I think.

A There are minimum tolerance levels for oxygen.

Q (By Mr. Dellwo) What are those minimum tolerance levels?

A I can't recall exact. It's different for different species of fish. Offhand, as a biologist, I would not like to see the oxygen levels go down below five parts per million. If water temperatures are cooler, they could withstand a little lower oxygen levels than they can if the water temperature were higher. There's a very direct relationship.

Q Let us assume an oxygen content in the Spokane River of two parts per million or less. Would salmon survive in such a water environment?

A I doubt it. The water temperatures, unless they are pretty darn cold.

Q Mr. Navarre, based on your general knowledge of the Columbia River system, the work that you've done for many years in this area along the Chamokane, the Spokane River, and the Columbia River; the work you've done for a number of years associated, for example, with U.S. versus Washington, and your general knowledge of the Columbia River system and its relationship to the Spokane River; and reconstructing in your mind what that

river system would be before there were any dams; and letting you know that there is, through archives in this case, and will be evidence to the effect that the Spokane Indians and their associate tribes and bands resided historically in this area for many, many years prior to the date of the formation of the reservations, the period of 1877 to 1887, and that they were relying upon the fishery in this Columbia River system, particularly from the Kettle Falls area on down to the confluence and on up to the Spokane Falls, which is the falls in this city, including Little Falls, Long Lake Falls, Chamokane Creek, and various tributaries of the river, would you have an opinion as to the nature of Chamokane Creek at that time in history before the dams were built and before there was substantial pollution of the Spokane River, and there was access by the migratory fish to this area, and, in that point of history, would you have an opinion as to the nature of Chamokane Creek as to a fishery, as of that date?

MR. TORVE: I'll object to it. I assume I'm the first in line, but I assume that he's not testifying from any knowledge here. The hypothetical is too general for him to be able to answer. I assume that before the dams, we're talking about anadromous fish, rather than the type of fishery that is local to the areas. It seems

to me there are so many variables here this witness cannot possibly answer that situation. First of all, he's not testified to anything he's made a study of the Spokane or Columbia River, even at this point in time, as opposed to what it might have been before the dam.

THE COURT: Well, of course, the hypothetical question, and not having it waded through all of the exhibits, I can only assume that the elements contained in his hypothetical are in the exhibits. Now, if he's left out any, he can be challenged on that groud, but the Court simply can't at the moment evaluate them. I think, if it were a jury, I'd have some reasonable concern about this question, but I think we can let him answer. It will go to the weight, rather than the relevancy.

You may answer.

Q (By Mr. Dellwo) The only answer you need give is whether or not you have an opinion as to the nature of Chamokane Creek at that time as a fishery.

A Well, I am somewhat acquainted with the fish runs. I understand historically they used to come--

Q Let me ask you to answer yes or no, whether you have an opinion?

A Yes, I do have an opinion.

Q What would your opinion be?

A I believe that the anadromous fish runs were up in that particular area. They would move into Chamokane Creek and utilize it as a spawning ground; both salmon and steelhead.

Q Would you have an opinion as to how good it would be as a spawning grounds?

MR. TORVE: We would have the same objection, again, your Honor. It seems to me this applies as it existed at that time, that he could not be aware of, or that he could not even be supplied by any evidence.

THE COURT: Well, I take it it's a question of relationship as to relevancy. A matter of this, as a spawning grounds to other available spawning. I'll let him answer that.

A Yes, it is a spring-fed stream, and, I guess, the springs were there when the salmon were there. And as such, it's an excellent-type stream for salmon to spawn and steelhead to spawn in there.

Q Could you compare it, for the information of the Court and counsel, as to other streams that might be tributary to the Spokane, smaller or larger, as to what salmon and steelhead seek as a spawning grounds or spawning stream?

A Well, this just appears like a good salmon stream. We work with salmon over on the reservations in Western Washington, and we're acquainted with the size, and the

depth of water, and the movement, and this just compares favorably with some of the reasonably good spawning areas.

Q As a matter of fact, if it existed then as it does now, would it be a good spawning site?

A As the stream exists now and salmon were coming up?

Q Yes.

A Well, by the time the salmon would enter at the spawn, the temperatures would probably be suitable; and the steelhead. This could present some rearing problems for steelhead at this time because of excessive temperatures, and any species of salmon that might rear there.

Q What is the time table of the runs of salmon and steelhead and other anadromous fish?

MR. TORVE: Your Honor, I want to prove another objection here. It seems to me if we're going to talk about anadromous fish, as it were in the old days, that it proves the immaterial of this lawsuit; and, I assume that any runs of anadromous fish that might have been have now been cut off by federally-located dams on the river system, that I assume by federal action has been authorized by acts of Congress, and, therefore, are not involved in the scope of any water rights that the Indians have.

MR. DELLWO: It has to do, your Honor, with the purposes of the reservation, both of the land and the

water, at the time the reservation was formed; the reason why the Chamokane Creek was included in its totality within the reservation; how the Indians looked at it, why they required it, and why, in conjunction with the United States Government, they reserved it.

THE COURT: It has a relevancy in that regard. You may answer.

A Would you repeat the question, please?

Q (By Mr. Dellwo) Merely the timetable of the fish migrations, so that we know what period of the year we're talking about.

A Well, I believe you would get the spring run chinook up here, summer run, fall run. You'd get summer run steelhead, and winter run steelhead, so that there probably would be adult fish here the year around. Between the salmon and the steelhead, there would be fish here the year around.

Q Would this type of fish make their way above the Chamokane Falls?

A I doubt very much-- I don't know; I would say not.

Q What type of fish would there have been above Chamokane Falls?

A At that time, there probably would have been rainbow trout, rainbow and steelhead being the same species, and steelhead being a migratory fish. I believe, rainbow

trout would have been up there.

Q Would there have been rainbow trout also in the lower stream?

A Yes, probably.

Q What about the main stem of the river system? Do the non-migratory fish also fill that type of stream? I'm talking about the main river, the Spokane River, as it must have been before the dams were in; would there have been both migratory fish and non-migratory fish?

A I would think so.

Q What happens in a stream like the Chamokane to the brook trout and the rainbow trout during the wintertime; are they there; are they available?

A I believe they're in the stream in the winter.

MR. DELLWO: That's all.

THE COURT: Mr. Rekofke, would you like to lead off today, since you were last yesterday, on Cross-examination?

MR. REKOFKE: Your Honor, I think it's pretty much decided to follow the same sequence.

THE COURT: All right. I just didn't want to show any prejudice or preference here. So, Mr. Dufford or Mr. Roe, whoever is going to examine for the Department of Ecology?

CROSS-EXAMINATION

BY MR. DUFFORD:

Q Mr. Navarre, is that correct?

A That's correct.

Q What was the total length of this study period involved in the study that's recorded in this Exhibit 64?

A I believe, I mentioned data in here from the 17th of-- Let me be sure here first. I believe I have data in here from July 17th through about September 30th. I've had thermographs in the stream later than that, in fact, they're still there. Some of the data, I wasn't able to recover, because of high water, so there may possibly be in here some data a little later than September 30th.

Q I believe there is some--

A Well, there is some in October, right. I got some October and November readings of station one. I was able to find the thermographic at station one and station three. The water was too deep on that particular trip, so the chart is still in there with the data on it for that period.

Q What does that data, after the end of September, add to your report? Are any comparisons or analyses in the report based on that additional data?

A I believe the only thing I made mention, that when the

air temperatures fall below the water temperatures, that then the water coming from the spring would be warmer than the air and would provide a beneficial effect at that time to the fish, since they are keeping the water a little warmer and near their optimum growth range.

Q Are you aware of any other study of this kind, with respect to Chamokane Creek, having been conducted?

A Of this type of study?

Q Yes.

A We've had one person in our office did a flow study report on the White River for the Muckleshoot Tribe. It involved salmon. It was a little different, because they were evaluating the amount of water in the stream that was required for salmon migration upstream, and evaluating the amount of water that was needed for salmon production of the juveniles.

Q My question is: Is there any data prior in time with respect to Chamokane Creek that you relied on or used in any way in your report?

A No, I don't think so. I think there was maybe some flow information that went back that I received from Mr. Woodward.

Q Do you know what kind of water year the period of study, of 1973, was, in general, in this part of the country?

A In 1973?

Q Yes.

A I understand it was a dry year.

Q In your view, then, does this study represent conditions in a typical year, or an unusual year, or a worse year, or do you have any analysis of that kind?

A No, but the Chamokane Creek, the Lower Chamokane Creek, is wholly dependent upon what the flow from the springs is, in the summertime, because unless they get some additional flow-- Maybe there is some extremely wet years where the stream would flow all the way through, I don't know, but the general information that I obtained, it doesn't flow through in the summertime, and all the water comes from the springs.

Q Your analysis just related directly to the flows in this particular 1973 study?

A That's right. Unfortunately, there is not a spigot up at the springs where we could turn on 30 CFS and study it, and, then, turn the spigot and let 20 CFS come down and study it, and 25, and so on. So, we have to go with what's available.

Q During your testimony, you spoke on several occasions about the significance of the 68 degrees, and, I believe you said-- Well, perhaps you could recap that for me, if you don't mind. What is the significance of

that number?

A I believe this is kind of a breaking point where trout can withstand stress from these rising temperatures with their metabolic rates increasing, and it increases five percent for every one degree Fahrenheit, and the heart rate is increasing, the circulatory system is going up. When it reaches 68 degrees, I believe they're getting to a point of stress, and beyond that, the fish, especially those occupying areas where there is current, the stress becomes so great that they cannot maintain their position in that stream, and start moving gradually downstream.

Q If a fish is exposed to 68 degrees, isn't there some sort of lag between his exposure to that water temperature and the effect on his body?

A They're cold-blooded; they're almost the same temperature. I believe the temperature would adjust, the body temperature would adjust, quite rapidly to the surroundings of this ambient temperature. What, if any, delay or lag there is, I don't know of any delay, if there is any.

Q Well, in the figure 68 degrees, is there built in any particular duration factor? Would you get into that?

A I believe there-- When the stress is increasing as the temperature rises to 68 degrees, and it just becomes

too much when it goes beyond to maintain position. At least, for some of the fish, not all of them.

Q Do you think an instantaneous exposure of a fish to 68 degrees would have any harmful effect?

A If the temperature is gradually increasing, possibly. If you had taken the fish out of 40-degree water and thrown him in 68, it would distress him quite a bit.

Q But if it was in a gradually-increasing situation, what would that be?

A In a gradually-increasing situation? I think he's reaching stress. The water flowing over the gill surface area is immediately making that surface area the temperature of the stream, and his blood is just circulating through those cold areas, and is going to have to be that temperature.

Q I notice in your Table 1, and this is a report that you recorded maximum, minimum, average temperatures-- Does that give you any information on how often the temperature approached the maximum during the day?

A How often?

Q Yes, or is that just a single reading that was the highest of the day, where you said maximum?

A I think it hit its maximum just once during the day. It might stay at that maximum for a period of time.

Q Do you have any idea, or does any of your information

show what the period of time might have been?

A How long it would stay at that maximum temperature?

Q Yes.

A No, except in my field notebooks, I've got temperatures, maybe, within half an hour apart which might indicate within that period of time.

Q Where you speak of the "average temperature", is that simply an averaging of the maximum and minimum figure?

A That's right. That's taking the maximum temperature and the minimum temperature, and adding them together and dividing by two. That's what I call averaging. This is just to compare with the airport temperatures, which are done the same way, which is from the U. S. Weather Bureau records. This is how they obtain averages.

Q It doesn't represent, then, a true average temperature over--

A No, it's just an averaging of the daily maximum and the daily minimum.

Q Does your study show you anything, really, about exposure time of fish to any particular kind of temperature?

A Any particular temperature? Yes, I think your curves recorded on the thermographs would give an indication of exposure time. For example, if you--

Q What are you referring to now, please?

A Well, these are the-- This is on Pages 7 and 8. Now, the solid line-- Probably Page 8 has got more curves and would be a better illustration. If we could imagine a line at 68 degrees and you could carry that on across, the amount of time above 68 degrees would be the high part of the curve, and at the bottom of the page is the hours, so you can get, maybe, a relative knowledge by extending the line down to determine the number of hours that it was above 68 degrees.

Q Did that kind of information about duration enter into your thinking when you made the analysis that you have here?

MR. GERMERAAD: Would you read the question, please?

(Question read back by the Court Reporter.)

A The fish could withstand stress for shorter durations than they can long durations, but the stress, at least at a setting of 68, and as I said before, maybe during that particular period, they might get moved downstream, maybe just to the next pool area. And so, on the next day, maybe the next hour, eventually they just disappear.

Q With respect to the temperatures that you did record, referring you again to Table 1, how many days did you find that the temperature exceeded, as a maximum, 68 degrees?

A At which station?

Q At any station?
A Well, at Station 3 we got, on the 18th and 19th, that's two; 26th is three; 27th is four; 28th is five; 29th, 30th, 31st, let's see, that's eight; August 1st is nine. It appears to be about nine days total there. At least during that time it was recorded.
Q That's right, and what about at Station No. 1?
A Station No. 1 was the one closest to the springs. There were no days.
Q So, the only places-- Did you take any temperature readings at Station No. 2?
A No. I have incidental pocket thermometer temperatures at that station, if you're interested in those.
Q Why don't you give us some of that information?
A On the 19th--
Q Of what month?
A --July 19th, and this was a little bit above Station 2, it was 63 degrees Fahrenheit. I got this at a point seven miles upstream from the falls. Where Station 2 was, I think I determined there was four-tenths of a mile. Let's see, Station 2. Station 2, on August 8, '73, was 62 degrees at 1:45 p.m. I think these may be--
Q Excuse me, could you speak a little louder?
A I believe those are the only two.
Q Is Station 3, then, the only station at which you've

ever measured the temperature above 68 degrees during the course of the study?

A This is right, only at Station 3. Oh, pardon me. I have read temperatures up at the gaging station which were in excess of 68 degrees.

Q Let me ask you this: Did you ever make a measurement above the falls?

A Nowhere above the falls.

Q As I understand it, your study focuses heavily on temperature as a critical parameter in terms of fish habitat. Now, is there anything in your report to indicate that there's any problem up above the falls, as far as temperature?

A I don't believe, at least from Station 2 on up, there's too much of a problem, or any problem, as far as temperature is concerned.

Q Were you able to identify any other kind of problems up there?

A No, I didn't look for any other problems. There is also a limiting factor, what we call a "limiting factor" on any more expansion of the fish population. The stream eventually can just produce so many pounds of fish per acre, and somewhere there's a limiting factor on that population. It might be food, or it might be something else.

Q In your Direct testimony, you testified fairly extensively about what you did on July 17th, and, again, what you did on August 8, and I notice on both of those days, with respect to the temperature information, Table 1 is blank. I wonder if you could--

A Is this Table 1?

Q Yes. I just wondered why that was the case on the days you were there?

A On the 17th? Well, these, you see, this temperature information came off of the continuous recording thermograph. Now, other temperature information was collected using a pocket thermometer at the times I visited the streams, and in various places along the stream. And, these are the only days when they have complete maximum and minimum for.

Q I see. Is that attributable to your tape getting snarled up or something after you put the thing in there, in July?

A Well, on the-- At Station 1, it recorded fine along to the 27th there, and then it started binding and ripped in half; and at Station 3, the chart unrolled fine until it got down to August 1st, in which it no longer unrolled and recorded temperature.

Q You walked the area, didn't you state that?

A I walked the area.

Q How much of the stream, in terms of distance, do we have from the mouth of the Chamokane to the waterfall?
A To the waterfall?
Q Yes, how much of a distance is that?
A I don't recall the exact distance. If I was giving an estimate, a mile, maybe. I don't know the exact distance. I could only-- A mile, is my guess.
Q A mile doesn't seem unreasonable to you?
A No, it doesn't.

MR. GERMERAAD: Could I have that previous question and answer re-read, please?

(Last two questions and answers read back by the Court Reporter.)

Q (By Mr. Dufford) Then, is it fair to say that you report in sum, detail some kind, or in the conclusions reached, in detail, a problem in a one-mile stretch of the Chamokane?
A I think it's more applicable to that lower section of the stream. Some falls; maybe, above the falls on down to the mouth. That is the section I would be concerned about.
Q Can you tell me a little something about these temperature measuring devices, the continuous recording; could you tell me how that works?
A It records the temperature on a chart, just exactly like

it is on Table 7, but on a smaller scale; this scale is a little larger. It can record temperatures between, I think it is, 20 degrees and 80 degrees.

Q The question I'm really interested in: The stream has a certain width at any particular point, and how do you know that this recording device is telling you what the temperature is in that particular cross-section of the entire stream?

A Well, due to the mixing in the riffle areas, the waters in a stream such as this are pretty homothermal. The waters are mixed; the temperature is uniform. I did, in fact, try to determine whether there were temperature differences between the surface of the stream and the bottom of a hole, and to do this, I brought over what we call an "electric thermometer". With the thermometer on the end of a line, we can take the temperature on the surface, lower it a little further, and on down to the bottom, and the meter gives us a reading. When I did this, I found, at Station 3, the temperatures uniform from the top to the bottom, it correlated with my pocket thermometer temperature, and I took the continuous recording device out, and it correlated the same. All three instruments read the same temperature.

Q Is there any difference, in terms of the accuracy; if you would ascribe to the continuous recorder as opposed

to the pocket thermometer?

A I thought-- The reason I did this was because I thought there was a possibility, and there was some readings higher with the pocket thermometer than there was on the continuous recording thermometers. This was one reason I went to check this situation out, to see if they were all reading the same, or there were differences. Now, when I did read-- When I discovered this-- Well, it was just one or two degrees, but when I did discover this, it was later on in the year, and this could have made a difference. Maybe it was just a-- Maybe these continuous reading thermometers were reading a little bit lower; maybe the temperature down there earlier in the year may have been just a little bit warmer; perhaps, the position that the recording thermometer lays, the temperature sensing device, if it was laying on the bottom, may have had some influence from the cooler bottom underneath the instrument, and maybe that recorded a little lower temperature; maybe if it turned up-- I wouldn't expect these differences to be but one or two degrees.

Q Do you know, from your temperature records, how many days there were at Station 3 during the period of your study when both the temperature exceeded 68 degrees and the flow was above 20 CFS?

A Well, I'd have to look that up from the data here.

MR. GERMERAAD: Excuse me. Are you asking Mr. Navarre to make a computation now, and give you, then, an answer? I thought you were talking about the time factor, that's all. So, he might want to recheck his first answer.

THE COURT: Well, he hasn't answered anything yet.

MR. GERMERAAD: Your Honor, I believe he has asked him to make certain comparisons. So, unless there is one table that does this, he is going to have to go back and forth between the tables.

THE COURT: I don't know yet.

A I will have to go back and forth between tables.

MR. DUFFORD: Your Honor, it's very close to noon. Could we break at this point?

THE COURT: Can you make those comparisons during the noon recess?

A Would you repeat that question one more time?

Q (By Mr. Dufford) Yes. The question is: There were a certain number of days when you measured in excess of 68 degrees; how many of those days was the flow 20 CFS or above?

MR. RUDOLPH: Your Honor, for clarification, and this is primarily for the witness: Do you mean 68 or more, or above 68?

MR. DUFFORD: More than 68.

MR. RUDOLPH: But that wouldn't be the correct figure, then, consistent with his testimony. I think the figure should be 68 or more, and not above 68.

MR. DUFFORD: Mr. Rudolph, that's the question that I asked.

THE COURT: He has a right to ask it any way he wants, as long as he is making the comparison. You may want to make the other, of course.

You can do that during the noon break. We'll be in recess until 1:30.

(The noon recess taken at this time.)

Hon. Marshall A. Neill, Judge
Spokane, Washington
Thursday,
March 14, 1974
1:30 P.M.

MR. GERMERAAD: Your Honor, before Mr. Dufford continues his Cross-examination, just before the Court convened this afternoon, Mr. Swiger, one of the defendants, approached me as to how he could enter an affidavit with the Court stating his position, and I told him I would advise the Court and let him present it to the Court now, or whatever your Honor would like to do. He expressed an opinion that he would like to get back to take care of his other business.

THE COURT: I see no objection to that. Does he have it?

MR. GERMERAAD: Yes, I believe he does.

Mr. Swiger, do you want to wait a second. The Judge may have some questions.

THE COURT: No, that's all right, thank you.

After looking at the affidavit, counsel may want to read that.

MR. CERUTTI: I would, just for a moment, your Honor. We could during Cross-examination,and then we wouldn't hold things up.

THE COURT: You may proceed, Mr. Dufford.

(Cross-examination continuing)

BY MR. DUFFORD:

Q Mr. Navarre, do you recall what we were talking about before the recess?

A Yes, and part of the answer to the question is a statement I have in the report on Page 6. It's the bottom paragraph, the last paragraph, which reads: "The maximum water temperature (Table 1) recorded at Station 3 exceeded maximum temperatures recommended for the well-being of salmonids on nine days during the period July 18 through August 1." Now, I have checked those nine days, and of those nine days, seven of the nine days had average daily flows of 20 CFS and below.

Q What about the other two?

A What was the other two days?

Q Yes.

A I don't believe I have the other two days written down.

MR. GERMERAAD: Your Honor, he didn't ask that question. If he allows the witness time, I'm sure the witness can answer his question.

MR. DUFFORD: Your Honor, that is the question I asked.

THE COURT: That's what he asked, yes.

A On the other two days?

Q (By Mr. Dufford) Yes.

MR. GERMERAAD: He asked for the total number of days below the temperature, and unless my ears are wrong, he just said "seven".

THE COURT: No, he's since asked a separate question.

MR. DUFFORD: It was the other way around, though. I asked him how many days when the temperature was above 68, the CFS was 20 or above, or above 20.

A Seven of nine days, that average daily flow was 20 CFS or below. It must be the other two days that the flows would be greater.

Q On the two days?

A Yes. Is that what you're looking for?

Q Yes, thank you.

Now, Mr. Navarre, in connection with this study that you did, I understood from your Direct testimony that you were actually present at Chamokane Creek, at some point, on July 13th, 17th, August 8th, and September 6th. Were those four days the entirety of the time that you spent on Chamokane Creek?

A No, I believe those were the days of my trips from Olympia to Spokane. I'll try to give you the dates I was actually on the creek. There was 7-13, 7-17, 7-18, 7-19, August 8th, September 6th, October 17th, October 18th, December 12; that's it.

Q What were you doing up there in October and December?
A I was going to retrieve thermograph information from my thermographs.
Q Did you take the tapes off?
A The tapes and charts.
Q Did you do anything else on those days?
A I just observed the stream, nothing specific. Now, what-- Pardon me, what specific date?
Q The ones in October and December.
A In October? On October 17th, I walked from the Boardman Road to the mouth of the Chamokane. I got here, I observed fewer suckers, but I did observe one group under the bridge. At that time, I--
Q Excuse me, fewer than when?
A Oh, on previous visits.
Q Were these visual observations?
A It was just visual observation, looking in the pools. On the 18th, I changed the chart at the upper station.

MR. CAMPBELL: If Your Honor please, I wonder if we might ask the witness to speak up?

A On the 18th, I changed the chart at Station 1, measured the surface temperature, the temperature at Galbraith Springs, the temperature at the confluence of Galbraith Springs and Chamokane Creek, I took the air temperature, I walked upstream a half mile to observe the stream area

up in that section. Also, on the 18th, I talked with the Hatchery manager while I was up there. Did you want me to continue?

Q (By Mr. Dufford) No, that's fine. What temperature did you record at Galbraith Springs, then?

A At Galbraith Springs on the 18th, the surface temperature-- The temperature of Galbraith Springs above the confluence of the Chamokane, now this is where it runs right into the creek, was 49 degrees.

Q Well, earlier you were talking about calculations that you made that led you to arrive at a figure of 30 cubic feet per second as a recommended minimum flow for the lower reaches of Chamokane Creek. There was in that calculation a figure for the temperature of Galbraith Springs. When did you derive that temperature figure that you used in that calculation?

A The temperature of the Springs, of Galbraith Springs, as it comes out of the ground, I assume to be the same as Ford Springs, because it's coming from the same source of water. Now, I didn't-- It was impossible for me to get the temperature as it comes out of the ground because as the water, at the Springs surface-- Warmer water is lighter, and so right on the surface of the spring we get a little warmer water, because it's less dense than the actual water as it's emanating from

the ground itself. So, we get some heating right on the Springs surface.

Q Is the temperature figure for Galbraith Springs that you used in calculating the 30 CFS figure, is that the actual measurement of Galbraith Springs or a measurement at what you just referred to as "Ford Springs"?

A I used the 47-degree water temperature which I obtained from the Hatchery manager, who has temperatures, I guess he keeps regular temperatures on it, and he told me that the temperature was right at 47, it varies very little. Now, experience in other spring areas, springs coming out of different areas close by, from the same source of water, is the same temperature. So, I did not get the 47 degrees, actually measure the 47 degrees myself. This was the same.

Q Does this variation, that is very slight, is this on a year-round basis, is that your understanding?

A That's my understanding, yes.

Q Would a variation of just a couple of degrees affect your computations, though?

A Yes. The difference of the actual water as it comes from the ground, it would, because it would either increase or decrease the temperature difference between the spring source and the lower thermograph station.

Q With respect to this calculation, I notice that the

recommendation of the report is for the 30 CFS figure. Since that was really the essential thrust of the report, I wonder why you didn't include a method of arriving at that number in the report.

A Would you repeat that question, please?

Q Why didn't you put how you got 30 CFS in the report; how you figured it out?

A Well, I don't think I can explain every little thing that I put in a report in detail. The report would get pretty thick.

Q Part of that calculation, which you explained in Direct testimony, is based on flow information, as I understand it, and you used the figure of 22 cubic feet per second. Now, am I correct that that calculation was based on figures derived from one day?

A That was the maximum temperature I recorded, the very maximum temperature I recorded during the study period. So, it would be derived on that one day.

Q And you took the flow for that one day. Now, is that an average daily flow or instantaneous?

A That was the average daily flow as come off the, from U.S.G.S. records.

Q You did now, then, take a flow measurement at the same moment that you read the thermometer?

A Not at the same moment I read the thermometer. I relied

on the U.S.G.S. gauge information.

Q But the temperature value of that calculation is based on one instantaneous measurement?

A That's correct.

Q Since you used the average daily flow as part of that calculation, why didn't it make more sense to use the average temperature of that day with respect to your calculation?

A I just don't believe it's logical.

Q Could you explain to me what is illogical about it?

A Your water temperatures vary much less than your air temperatures, and I don't think you can relate the averages necessarily.

Q Well, we're talking about a comparison between water temperature and water flow, aren't we?

A Yes.

Q What does air temperature have to do with the thing, with the calculation?

A Pardon me, maybe I misinterpreted your question. Would you repeat the question?

Q Yes. The question was: Since you based your CFS figure on a daily average, I believe it was July 17th--

A Right.

Q --why didn't you also use the daily average water temperature figure, rather than the maximum in that

calculation?

A I don't believe that's the logical way to do it. The average flow for that date probably only varies, from the average, only varies a couple of degrees. The average water temperature would have varied 14 degrees.

Q Do you know what the variation was with respect to flows on that day?

A No, I don't know the variation of the flow.

Q Since you did bring up the question of atmospheric temperature, I was interested because I did not understand the relationship of the air temperature, if any, to the calculation that you made as to the July 17th day and the necessity for 30 CFS?

A I misunderstood your question when I was speaking. I don't believe the air temperature-- I did not use air temperatures in the calculation.

Q Directing your attention now to page 18 of your report, which you state demonstrates an inverse relationship between water temperature and stream flow. Is there a component of that graph or the analysis, the way that is drawn, which has something to do with air temperature, or is that simply a comparison of the water--

A (Interrupting) No, it's just a comparison of the maximum water temperature that I recorded compared to the flow record from the U.S.G.S. records.

Q Well, on another graph in here, you have some kind of bars that show the temperature data-- This is page 16, figure 4, and likewise page 17, figure 5-- which shows air temperature data at the Spokane Airport?

A Yes.

Q And my question is: What does that have to do with any of the analyses that you've made in your study?

A Well, it just demonstrates that there were hotter days that occurred, and that since water does gain some heat by conduction or from the air, besides solar radiation.

Q Let me change the direction of the questions for a moment. Did you find any problem with food production, fish food production, at any of the stations where you analyzed that?

A No, I thought the food supply was pretty good.

Q But was there any problem at all with any of the pollution parameters that you made?

A No.

Q Was dissolved oxygen, was it comparable at all of the stations?

A Yes.

Q Is temperature, then, in your view, really the only critical parameter with respect to the trout habitat?

A In my opinion, temperature is a limiting factor. Although I also stated that the reduction of flow

between a point of 30, or any reduction of flow, exposes additional areas of the streambed, which is then out of production. So, there is some effect.

Q Did you have any way of measuring that effect?

A No. As I stated before, although I wish there was a spigot at the springs that I could turn on and off at will and control the flows, there unfortunately was none.

Q Let me ask you to look at your fish population sample, table 6 on page 21, and just directing your attention to the information under Station 3, there.

A Yes.

Q I believe that shows that there was one brown trout obtained, and then a number of other kinds of fish. How would you categorize those other kinds of fish?

A Most of these other fish, the suckers, are a scrap fish. They're a bottom-feeder, as opposed to a trout, being a drift-feeder.

Q Would those kinds of fish compete with trout for food?

A Perhaps to some degree, but primarily the trout feeds on drift organisms and the suckers are feeding on bottom organisms. But, as can be seen from the invertebrate samples, despite the fact that the suckers were there, the invertebrate samples compared to other areas very favorably. So, there was adequate food supplies there for trout.

Q As well as the other kind?
A As well as the others.
Q Would there be any predation effect from these kinds of fish on trout?
A Sculpins probably could prey on trout fry, some very small trout, the suckers would not.
Q Is it your opinion, then, that the food competition and predation are not particularly significant as factors on trout habitat at Station 3?
A I don't believe they are.
Q If you lowered the temperature of the water there so that it never got above 68 degrees, would that have any effect, one way or the other, on those kinds of things; predation and competition for food?
A It would depend upon how much lower it was lowered. I mean, you might lower the temperature-- If you want to lower the temperature low enough, it might make unsuitable habitat for the suckers.
Q Now, at one point in your Direct testimony, you talked about going into the stream early in the year and figuring out what was there, and then going back in later to see if there were fish losses. Would that be the normal way to go about determining whether the population was declining?
A Right.

Q Was that done?
A This was not done in this study, because it was too late in the year before we got started on it to make early population estimates.
Q You did some electro fishing, though, at all three of the stations, did you not?
A That's correct.
Q And did the results of that electro fishing tell you anything about the population, really, of the stream?
A As I stated before in my testimony, I do not believe this represents every individual fish within that section of the stream. However, at Station 3, we put considerably more effort into trying to capture every trout in that section of the stream, more effort than we did at the other stations. And, I was not trying to make absolute population estimates, because this is a long, involved procedure, involving marking and recapturing. I was merely attempting to make a relative comparison of abundance.
Q As between the three stations?
A Right.
Q If you had wanted to conduct a population study, how would that have been made?
A I would have went into a mark-and-recapture-type of method, where every time I'd catch a time of fish and

re-mark them and go back through and after they had settled down, and recapture another group and see what percentage of unmarks I was getting at various stations.

Q Does this information that you did get by electro fishing, then, tell you what kind of fish are present, but not how many of them there might be?

A Not the exact numbers, no. In fact, we made every attempt to capture every trout that was turned over, or at least recorded. The sculpins and suckers were incidental. We weren't interested in them, we let many of them drift by.

Q What does this kind of information taken at three stations tell you about distribution of fish at any places in between the stations?

A Oh, I think-- I don't know if you can pick out-- You would have to shock the whole stream to tell exactly how many. I think this indicates what is relative there. If we had shocked more areas, we may have turned up more brook trout, or in other areas, we may have turned up a few more rainbow trout in relation to the number of brown trout.

Q Likewise, with reference to your temperature measurements, can you make any assumption about temperatures in between the places where the temperature measurements were taken?

A On that particular day, I was sampling the population?
Q No, I'm just talking about the temperatures of the stream. You just had a thermometer in at certain places. What does that tell you about the temperature at the other places?
A It doesn't in the thermographs. Now, when I was on site, when I had my pocket thermometer with me, I got lots of temperatures recorded at various portions of the stream, and some of these on the same day.
Q In July, August and September, did you ever find that the flow was 30 CFS or more?
A I'll rely on my table 3, page 15, which is the gauge height and discharge data for Chamokane Creek for the period July 1, '73, to September 30, 1973. Now, your question was-- Would you repeat that again, please?
Q In your period of study, was there ever a discharge of 30 CFS or above?
A No, I do not see any discharges of 30 CFS or above.
Q All right. How many days did you say there was a temperature above 68 degrees in that entire period?
A You're asking a different question than you've ever asked before, Mr. Dufford. I don't think you can relate this question to any previous questions you've ever asked. You're talking about different periods and different temperatures.

Q No, that's not true. In fact, I'm being repetitious at this point. I've already asked that question, and I will withdraw it if counsel finds it objectionable.

MR. GERMERAAD: If you want to ask a new question based on 68 degrees, I have no objection.

THE COURT: Are you objecting to the present question, or just commenting on it?

MR. GERMERAAD: I'm objecting, Your Honor, because he predicated this question on an earlier question, saying that he had asked this question earlier, and he has not. So, I am objecting to that question in its form. If he wishes to change the form, I would probably have no objection.

THE COURT: I'll overrule the objection.

A If I recall what I said earlier, I believe I said, "Two."

Q I think I have confused you at this point. The question was: During the period July through September, how many days was the temperature over 68 degrees?

A July through September.

Q And I have asked that question before, and I was just attempting to elicit a comparison.

I only have a couple of further questions. Since there were no days when the discharge was 30 CFS or above, is it correct to say that you have no way

of knowing what the temperature would be at that flow rate?

A No, I do not personally have knowledge of what the temperature would be if the flow had been 30 CFS on that day.

Q There were no measurements?

A There were no measurements.

Q Now, in the course of your study, did you find any dead fish?

A No.

Q Under any temperature regime?

A Under any temperature regime, I did not find any dead fish.

Q Now, you stated that when you first got into this, you were contacted by the Solicitor's Office in Portland, I believe, is that correct?

A I said that the Program Manager was contacted through the Solicitor's Office.

Q Did you have any communications with the Solicitor's Office?

A Yes.

Q In the course of those contacts, was there any reference made to the figure 30 CFS?

A I was aware of the figure 30 CFS; I was aware of a figure 20 CFS.

Q In what respect were you aware of them?
A Well, I saw the figure of 30 CFS in a report by the biologist that had done a study in 1970. I saw the 30 CFS figure in a copy of the brief that was filed, if I'm calling it by the proper term. I was aware of a 20 CFS that applied to some type of water application permit.
Q Then, in your study, in coming up with the number 30 CFS, am I correct in saying that you used figures derived from one particular day, July 17th?
A That's right.
Q And was that, in your view, a representative day, or was it selected because it was the worst?
A It was the most critical day. I think you have to get fish through the most critical days in order to get them through the year.
Q Did you make like calculations for any other days?
A No, I did not.
Q Just that one?
A Just that one.
Q You speak in your report, in its summary, of the volume of water-- Well, let me rephrase that. You're talking about a quality trout habitat, and am I correct in saying that's what you're directing your attention to, conditions that would provide that?

A This is what I was asked to do, is determine the flow for quality trout habitat.

Q What do you mean by "quality trout habitat"?

A A habitat where trout will live and grow throughout the year; they would not be forced out of the stream because of high temperatures or pollution or any other adverse factors.

Q Did you make any analysis of what kind of habitat you would have at some figure lower than 30 CFS?

A No, I did not.

Q Would the fish population be eliminated?

A When?

Q If the minimum flow were allowed to be less than 30 CFS.

A I don't know. It would all depend on the water temperature and other factors affecting the fish at that time.

Q But, the flows were, in fact, below 30 CFS during your entire study?

A That's right.

MR. DUFFORD: I believe that's all the questions I have, Your Honor.

THE COURT: Mr. Torve?

MR. TORVE: Your Honor, I just have a few questions.

CROSS-EXAMINATION

BY MR. TORVE:

Q Mr. Navarre, I take it you have no information as to what the population of the stream in the lower reaches were in 1972 or 1971, is that correct?

A I do not.

Q Do you have any information on which you've based your conclusions as to what had happened to the waters of 1971 or 1972 or any prior year?

A No, I did not relate to any prior years.

Q Let me ask you this: Would storm runoff affect this fish population?

A It could, depending on the severity.

Q When you look at the fish population, as you did in 1973, is that population there related to what had happened the year before, or the year before that?

A I don't know.

Q You talk about the fish under stress leaving at one time if the water temperatures there, and if flood conditions do affect it, I assume that what you're looking at in '73 might be somehow related to what happened in prior years.

A I don't think so. What happens is that, although the fish may leave in summer months, during the winter and cooler months, you could get recruitment from upstream

areas. Therefore, fish would be moving into these areas in the springtime or winter, and so by the next spring there might be a lot more fish than were there the previous summer.

Q You haven't made any studies as to population studies, anything, other than the two stretches of the river we talked about, right?

A At the three sampling stations, that's where I sampled.

Q Is there much regeneration from the area above the falls into the lower reaches, of fish?

A What do you mean by "regeneration"?

Q I mean, you're speaking about in the fall the fish will come into these areas, but are fish from above the falls liable to come back into the area below the falls; the relationship between the two populations?

A There could be fish from above the falls drifting down the stream. Is that your question?

Q Yes. Now, I take it your conclusions are that the fact you found only one brown trout in the lower reaches, and other scrap fish, is that the temperatures of the water have precluded trout raising there, is that correct?

A I believe the temperature is the factor affecting the density of the trout. That means, there was fewer trout there. I believe there were fewer trout in that section

of the stream and in upstream areas, and that it was because of temperatures.

Q Do you have any studies which you base that on?

A No, this is just related to experiences I have had with other streams where we have sampled fish in the spring and sampled them in the fall, and we find that they disappear, and in areas where disappearances could not be attributed to just angling pressure. And, then, they're absent in the late summer, but you go back in the next spring, and the trout are there again.

Q I take it you've made no studies, however, as to water temperatures prior to July 17th, is that correct?

A Just only the temperature recordings I had on July 13th.

Q Did you study any other rivers in this particular area that might be related to the Spokane River as to trout populations?

A No, I have not.

Q I take it you did not study the Spokane River as far as the trout population might be concerned?

A No.

Q Or the scrap fish population?

A No.

Q I notice in your tabulation of your lower area, the comment you make is that you observed many more types of scrap fish?

A Types?

Q Well, I should clarify that.

A I've got "many other suckers and sculpins observed".

Q You did not make that comment as to the other areas?

A Not suckers; the suckers were restricted below the falls. There were sculpins above the falls and below the falls.

Q Now, I take it that the calculations that you made as to determining 30 CFS-- Could you go over that formula that you utilized for the one reading you took on July 17th?

MR. GERMERAAD: Your Honor, in the interest of time, I am going to lodge an objection, that the previous counsel, for the Department of Ecology, went through this entire line of questioning in detail. If we're to repeat for each witness, to ask the same line of questions, we'll never finish.

THE COURT: This is the problem we anticipated in the beginning of the trial, the different defense counsel following the same ground. I do think, counsel, that he did go into his method of arriving at his figure. Now, maybe there was some area you wanted to inquire about.

MR. TORVE: Well, I was more concerned specifically with the exact calculations he'd made. I don't think

Mr. Dufford had asked him, the formula which he had, and it was passed over rather quickly on Direct and it's not in the study, and sitting at counsel, it's awful hard to pick that question up.

THE COURT: All right, you may proceed. We can't be too tight on this.

A The maximum water temperature below the Boardman Road Crossing that day was 75 degrees; the temperature of the Springs, 47 degrees; subtract the two and we get 28 degrees. Now, if we were to maintain the temperature, if the temperature that day was not to have exceeded 68 degrees, we should have had 7 degrees less, or 7/28, which is equivalent to one-quarter, one-quarter less temperature degrees. Now, the flow on that day in the U.S.G.S. reports was 22 degrees. Pardon me, 22 CFS. And, what I have said, that in order to reduce the temperature by one-fourth, we should have a flow increase of the 47-degree water of one-fourth, or one-fourth of 22, which is, what, 5-1/2. Now, I also said that in order for this formula to work, that that one-quarter water should not have spread out, it should just become deeper in that exact point. But in reality, when you add another quarter of water to a stream, it's going to spread out more. And, so, this is going to result in more surface area of the stream exposed to solar

radiation or to the air, which you might gain heat by conduction. And I also said that the air temperatures on that particular day were lower than the historical highs for that particular day. So, that sometime in the future, if this particular day again occurs and the air temperature is up near historical high, we might expect that water to get even warmer than it did on July 17th of '73. So, I have allowed 2-1/2 CFS to compensate for these possibilities; for the possible increase of air temperature, but the definite increase in the area of the stream exposure.

Q That comes up in your estimation, 30 CFS?

A Thirty CFS.

Q Now, on that air temperature in Spokane, where did you get your readings, that these were the highest recordable temperatures between 1881 and 1973?

A I got the historical records from the U.S. Weather Bureau.

Q Did you take any other period as being representative? Why did you take 1881 to 1973?

A That was the period of record.

Q That were available?

A That were available.

Q And did you make any attempt to determine what the probability of their recurring in 1974 or on, or not?

A No, I did not make any probability studies.
Q So, in effect, the only thing we know about that particular conclusion is that those were recordable highs during that period at one time, one time, according to history?
A One or more, because there's some historical highs that have been equaled in other years, later years.
Q But we don't have that in your studies, do we?
A Not in the study.
Q Now, the table on the provisional, I believe it's the provisional maximum temperature, when it says "provisional", whose provisional are we talking about?
A We're talking about the-- Provisional? Well, these were temperatures set out at the time by the Advisory, the National Technical Advisory Committee, and as far as to my knowledge, these have not been changed.
Q But I take it these must be pfovisional as far as this particular group is concerned?
A This is what they call them, provisional. Whether they have since called them permanent or not, I don't know.
Q And they're recommended temperatures, I gather?
A Recommended maximum temperatures as being compatible with the wellbeing of various fish in their associated biota.
Q Is the term "wellbeing" defined anywhere in those

standards; is that term utilized?

A I don't recall whether they define the term.

Q Let me ask you this: Does your temperature gauge show the extent of the maximum water temperatures on any one day; the length of time that it remained, let's say, at 68 degrees?

A I believe this question was asked previously, and if we turn to page 8 and you see where the curves are up at 70 or near 70, if you could imagine a line at the 68-degree level and draw it straight across and then relate that amount of curve to the time of day, which I have listed on the bottom of the graph, you may be able to determine the length of time from that.

Q I guess what I'm asking is, did you prepare this particular graph?

A I prepared this particular graph.

Q Was that taken from minute-by-minute trepidations?

A This was continuous throughout the course of the day and recorded on the charts. This is a little larger scale than what appeared on the charts, so I had to draw these on, increasing the scale.

Q So, these are your freehand representations of what the graph shows?

A Freehand, but I used the lines on the charts and I measured the distances. These curves are actually a

compilation of many points, of points that I measured when I took the data off the charts. So, they're more accurate than freehand.

Q When you did your chart, figure 6 on page 18, I take it that is more of an average of the various figures and then a comparison of the average, is that correct?

ATTORNEY: Would you read back the question for me, Mr. Reporter, please?

(Reporter reading back the last question.)

A No, the water temperature is the maximum temperature recorded at Station 3. The water flow points were taken from the U.S.G.S. flow records as to the flow that they recorded for that date.

Q (By Mr. Torve) But the chart is based on daily figures and not hourly figures, is that correct? When you put a point on here, it represents the daily figures?

A That's right. It represents the daily maximum water temperature and the, I believe, the average daily flow.

Q Mr. Navarre, had you discussed the hypothetical Mr. Dellwo had asked you on the stand before coming into the court?

A The hypothetical that Mr. Dellwo asked; which one?

Q Relating to the fisheries in ancient times.

A This was brought up. I can't recall whether Mr. Dellwo had brought it up or Mr. Rudolph.

Q Were you asked a specific hypothetical earlier?
A A specific hypothetical? I don't know if it was specific or not.
Q I note nothing in the study that you made related to the questions which you were answering relating to what might have been prior to the dams. Did you make any particular study at all of that?
A No, I did not.

MR. TORVE: I think that's all the questions I have.

THE COURT: Mr. Campbell?

CROSS-EXAMINATION

BY MR. CAMPBELL:

Q Mr. Navarre, my name is Campbell and I represent one of the individual defendants. You know, your testimony this morning sounded to me as if all the fish in the stream would tend to float downstream and be lost when the temperature got to be 68 degrees. Now, that isn't what you meant to imply, is it?
A I didn't say all the fish would be. I said that particularly the smaller individuals that are already, that's in the more unfavorable habitat where they have to exert more stress on themselves to maintain their position in the stream, would be the ones to first

drift out or be moved.

Q So, the answer to my question is really no, isn't it?

A That all the fish?

Q Yes.

A At 68 degrees? No, I don't believe all the fish would be eliminated at 68 degrees.

Q You've had a lot of experience in this area. Does 30 cubic feet a second flow faster than 20?

A Does 30 flow faster?

Q Yes, the larger volume?

A I don't think significantly.

Q Then, I notice on the table on page 21, that you are familiar with, the last sentence says, that the brown trout are the dominant species, or were the dominant species, found in the stream?

A That's correct.

Q How many types of game fish are there in the Northwest; trout?

A How many types of trout?

Q Yes.

A You have the cutthroat, brook trout, the brown trout, the Dolly Varden (phonetic), the rainbow trout; is that five?

Q You did say Eastern Brook, too, didn't you?

A Brook trout.

Q What types are being raised at the State Fish Hatchery on the reservation?
A I'm sorry, I just don't remember. I think I've been told, but I don't remember what they're raising.
Q Do you know whether they're raising any brown trout or not there?
A I'm not sure whether they're raising brown trout or not.
Q Would you agree with me that they're raising just Eastern Brook and rainbow?
A I have no knowledge. I couldn't agree or disagree with you.
Q All right. If they were raising only the Eastern Brook and rainbow, where do these brown trout come from?
A The brown trout is actually an introduced species, and a brown trout is amongst the trout that's in the stream, is a better competitor, and I would expect them to be the dominant species inhabiting the stream.
Q They're more hardy, then, than these other trout I asked you about, are they?
A No, I won't say they're more hardy. In fact, as far as lethal temperatures are concerned, brook trout can tolerate a slightly higher temperature than the brown trout.
Q What do you mean by a "better competitor", then?

A They're just able to select the habitat or the niche in the stream and kick the other species out, that's all.

Q So, if you found more brown trout than the other species, like, that was all you found at Station 2, apparently those trout have lasted through the years, have they not?

A The size of the brown trout that I found, I would expect that they would have lasted through the year.

Q How does the flooding affect the fish population, like the spring floodings that we have, or, for example, this last winter's flooding?

A This last winter's flooding could have had pretty significant effects.

Q When the fish get down below the falls, I believe you testified this morning, they can't get back up?

A That is correct.

Q The brown trout?

A That's correct.

Q So, if you found a dominance of brown trout at Station 2, that is above the falls, isn't it?

A That's right.

Q And at Station 1, which is even farther upstream, then those fish have been there for some years, have they not?

A I would expect the ones at Station 2, from the larger size. Now, the fish at Station 1, at least some of them, were smaller and they may not have been there for years.

Q Well, I should say, this species has been here for years?

A I would expect so.

Q So, they've survived the temperatures, correct?

A Yes.

Q They've survived the flooding?

A Yes.

Q And they've survived the fishing that is done on the stream?

A Yes.

Q Do you know whether the stream is restocked by anyone at this time?

A I do not know. As I recall, the Hatchery manager said they used to stock the stream, but I can't-- Well, I know he said definitely that he-- I remember one time he told me about restocking the stream. I don't know if he's stocking the stream currently.

Q Nor when it was last stocked?

A No, I don't know when it was last stocked.

Q You're familiar with the stream, and we've heard a great deal about it the last few days you've been here,

but I don't believe we've had any testimony as to the length of the stream from the Matthews (phonetic) Spring area to its confluence with the Spokane. Do you have a figure for that?

A The figure I've got, when I run it off the U.S.G.S. quad with my map wheel, was about six and a-half miles from the Ford Bridge down.

Q So, then, the area where the main studies were done, below the falls or below the Boardman Bridge, is one-sixth of the length of the stream that we're talking about, is that correct?

A If indeed it is one mile from the mouth to the falls, which I think it probably is fairly close.

Q It would be--

A (Interrupting) It would be one-sixth.

Q All right.

MR. CAMPBELL: That's all I have, Your Honor.

THE COURT: Mr. Tracy?

CROSS-EXAMINATION

BY MR. TRACY:

Q I only have one or two questions, Mr. Navarre. You stated on July 17th you took this high reading of 75 degrees?

A That's correct.

Q And on that date the average flow was 22 cubic feet per second?

A That's correct.

Q Now, if the minimum flow on that date had been 17 cubic feet per second and the high temperature had occurred at that time, then your recommendation would be that you would only need 25 cubic feet per second to keep this stream as a natural fish--

A (Interrupting) I don't--

Q Wouldn't that be correct?

A No, I don't believe so, because if the Court should decide that 30 CFS is necessary, this would be the flow that would be recorded by a U.S.G.S. gauge, and fluctuations during the day above or below this would be expected to occur at that time as well as it did on the 17th, due to the evapotranspiration rate.

Q Now, the only other question I would like to ask is: Were there any days where there was less than 20, or 20 cubic feet per second or less than 20 cubic feet per second, and you had a temperature of less than 68 degrees in the stream? Did you have any days like that?

A Less than 20 CFS?

Q Twenty or less, and less than 68 degrees as your temperature in the stream?

A Less than 68 degrees. I had seven and nine days at an

average daily flow of 20 CFS, and below--

MR. GERMERAAD: Could you specify a period of time, Mr. Tracy, or this whole period of time?

MR. TRACY: Well, his study apparently went from, of the temperature went from, July 1st to September 30, and I would assume that his chart flow went the same length of time.

MR. GERMERAAD: He was asked a different question earlier, so if you want him to make a calculation, I'm sure he will.

MR. TRACY: Well, I would just ask that he make that calculation and supply it when it's available.

A Do you want it later on?

Q (By Mr. Tracy) Well, if it would take a lot of time, you can supply it later on.

A Maybe you had better repeat the question so I can write it down.

Q Well, my question was: Were there any days where there was less than 20 cubic feet per second flow, 20 or less, and the water temperature was less than 68 degrees, that you found in your study?

MR. GERMERAAD: Your Honor, I might make an objection. You would be the best one to decide, in your discretion, but most times witnesses are not required to do a lot of additional work and then come back,

because that might open the whole witness all over again. And there has to be a limit as to how much you can require a witness to do and bring back into the courtroom, especially when he may be off the stand in a few minutes or a half hour.

THE COURT: That's true, but I think, if I understand his question, it relates to figure 3 on pages 7 and 8. So, you've got the flow chart and water temperature, and I suppose you can--

A (Interrupting) Your Honor, this flow chart I've got is from Mr. Woodward's gauge, and it reflects the evapotranspiration rate, and it would be hard to pick out the average flow from these. I think it would be best done from a table.

THE COURT: If you can't answer it from your study, just say so.

A It can be answered; it would take a little time.

Q (By Mr. Tracy) Well, you can answer it directly from the table?

A Oh, yes. The information is in the table.

MR. TRACY: That's all the questions I have. Thank you.

THE COURT: Mr. Cerutti?

MR. GERMERAAD: Excuse me, Your Honor. Than, I assume, since the answer was, "It is available in the

table," that Mr. Tracy could make the calculation, and the witness can forget it?

THE COURT: Yes, that's what I've got figured out.

CROSS-EXAMINATION

BY MR. CERUTTI:

Q Am I correct in understanding, sir, that on the basis of your study, there is only a one-mile section of this creek in which there's any problem as to the quality of the environment of the trout?

A I would say that the, from the mouth up to the falls and possibly a little way above that, is the part of most concern, concerning temperatures. As far as reduced flow is concerned, the whole creek, because of the exposed wide perimeter of the area caused by reduced flow is of concern.

Q I'm afraid I don't understand the qualification to your answer. You say the reduced flow is of greater concern? Do you mean that a large river can hold more fish than a small creek, is that it?

A It depends upon the stream. We generally, in terms of the fish production, we term it in pounds-per-acre, or pounds-per-surface-acre. If the stream were larger, it would produce more fish.

Q From your experience and knowledge as to this matter,

can I safely assume there is nothing we can do to bring back the steelhead or the salmon?

A Nothing we can do?

Q That you're aware of?

A That'I'm aware of. To where, bring back the steelhead or salmon to where?

Q Bring them back to the mouth of the Chamokane Creek, assuming that they were ever there in the first place.

A I think we'd have to do a heck of a lot of trucking.

MR. CERUTTI: Thank you. I have nothing further, Your Honor.

THE COURT: Mr. Rekofke?

CROSS-EXAMINATION

BY MR. REKOFKE:

Q Mr. Navarre, you mentioned, I think, earlier in your Direct Examination that some sort of a study, one-page study or something, that was made in 1970 or 1971?

A That's correct.

Q Do you have that with you?

A I believe I have it in my briefcase.

THE COURT: Didn't he testify he did not use that?

MR. RUDOLPH: Could I have just a minute. I think it's on file. May I ask the witness a question, Your Honor?

THE COURT: Yes.

MR. RUDOLPH: Do you remember who that's by?

A I believe that was by Braden Pillow, the biologist.

MR. RUDOLPH: That was filed with the Court a long time ago; 3-1-74-2.

ATTORNEY: There has been a change in that number.

THE CLERK OF THE COURT: 3-1-74-2 Is now Plaintiff's 38.

Q (By Mr. Rekofke) Apparently, this was a different study, I gather, from the content.

A I believe it was just a very brief study in, maybe, just a one-day trip, I'm not sure.

Q Mr. Navarre, you were first requested to conduct this study sometime last year, sometime in 1973. When was that, more precisely?

A I believe it was sometime in April.

Q Of 1973, and who requested you, specifically?

A Mr. James Heckman (phonetic), our program manager of the Northwest Fisheries program.

Q He's your immediate supervisor, is he?

A He's my immediate supervisor.

Q And that's over where, in Olympia?

A Tumwater, right outside of Olympia.

Q Okay. Then, you went up to the Chamokane, I believe, the first time, in July, July 13, 1973?

A That's correct.
Q That's the first time, apparently, you'd ever seen it?
A That's right.
Q Prior to that time, July 13, 1973, who did you discuss this matter with?
A Prior to--
Q July 13, 1973, yes; besides the gentleman who commissioned you to do the work in the first place?
A I had talked to Mr. Jim Coon of the Regional Solicitor's office.
Q Did he discuss the facts of this case with you?
A He told me some things about the case. I can't recall what he told me.
Q Did you discuss at that time this 30-second-feet matter?
A He gave me a copy of the brief, or whatever it is,that had the 30 CFS in it.
Q In other words, before you ever made your study, and as you've testified to here in court, you were aware of this, apparently, requirement of this 30 second feet being established?

MR. GERMERAAD: Your Honor, I object to the use of the word "requirement" in that question.

THE COURT: He can phrase the question as he likes.

A I was aware that 30 CFS was being asked as a minimum flow.

Q (By Mr. Rekofke) Then, your studies, that you've testified to here, by means of your studies, you were, of course, attempting to justify that particular figure?

MR. GERMERAAD: Your Honor, I would object to that as an improper question.

THE COURT: Overruled.

A The figure compared to both what was in the brief and on the report, the written-- By the other biologist.

Q (By Mr. Rekofke) By what?

A By the other biologist. The short biological report that was done in '70, I believe.

Q In other words, when you started out, you knew the ultimate goal you had in mind?

A No. Well, I knew what was asked for, but I didn't know what might be required.

Q I see. But your study was done in contemplation of this litigation, was it not?

A I was asked to do the study, and knew the information would be used in the litigation, or, at least, it might be used in litigation.

Q And discussed it with counsel. You apparently had some other reports indicating this 30-second-feet figure. Any other persons you discussed this with prior to the time you made your examination?

A Oh, just people in the office, I think, talked about it

a little bit.

Q And discussed the figure of 30 second feet, I suppose, along with everything else, in connection with this project you were undertaking?

A It might have been mentioned, I don't recall.

Q I see. I'm not going into the computations, I agree with counsel for the Government that it has been gone into a couple of times, but when did you first make your calculations, in point of time?

A I waited until I had all the data in.

Q When was that?

A And was writing the report.

Q When was that?

A When did I start compiling the draft?

Q Yes.

A Sometime in the fall of '73. I was compiling data as I went along in some of these charts. By the time I actually made the calculations and put a recommendation in the report, it was in, you know, the late stages of the report; December, maybe.

Q Your actual going onto the site started July 13th, but you did keep, apparently, some devices up there up until sometime in November?

A In fact, the devices are still there. I just haven't been able to recover them yet.

Q Apparently the device at Station 3, for some reason, terminated about October 15th?

A That's because of high water, and I couldn't recover it. Actually, I intended to keep the data just right on up to trial time, if possible, but I just couldn't get over to recover the thermograph, and when I did come over, the water was too high.

Q I see. I would gather from your testimony previously that your only connection with the Chamokane Creek was during the summer and fall of 1973, is that correct?

A That's correct.

Q And the last time you were there, apparently, was sometime in December?

A I believe that's about correct.

Q And, so, you are not familiar with any of the conditions up there anytime before July 13th, 1973?

A I had never seen the creek before July 13, '73.

Q You have never lived in this area, have you? When I say "this area", I mean in the Spokane area.

A No, I have not.

Q Were you aware of last summer being rather a dry year, or were you aware of that?

A I understood it to be a dry year.

Q Let me ask you this: All the trout that you collected at all of the locations in Chamokane Creek were in

excellent condition?

A They appeared to be in good condition.

Q Well, I was just reading your report. It says, "excellent condition".

A Good to excellent condition.

Q So, apparently, if the temperature did get above 68, apparently it wasn't bothering very much.

A Well, at least, the one fish that I did take in the Station No. 3 where the temperature was getting above 68 degrees, he was in good condition and apparently doing all right.

Q Would you expect, if these flows as they are recorded on the gauges which appear in your report and with temperatures going up above 68 on a number of occasions, some detrimental effect on those fish?

A I think the fish that the temperature has a detrimental effect on left the stream.

Q Oh, they went down the river?

A I think when they become stressed that they just cannot maintain themselves in the stream.

Q Why do they go downstream where it's warmer rather than upstream where it's cooler.

A When a fish is stressed, he isn't about to try to fight his way up a riffle.

Q I see. So, he kind of goes along with the current?

A He is kind of swept down.

Q You've testified that temperature is a factor. What are the other factors?

A Water chemistry, food supply, velocity of the stream, competition for other species that would be competing for the same food and space.

Q All of those, I guess, are pretty good.

A They all appear good.

Q And this particular formula, in determining 30 second feet, is this a method or formula that is recognized in your line of work, or is this something that you have developed?

MR. GERMERAAD: Your Honor, I was going to rely on Mr. Rekofke's promise that he wasn't going to go into the formula, since it's already been gone into three times.

THE COURT: He's going to ask now whether this was his own formula or something that's the standard in the industry.

MR. GERMERAAD: I'll withdraw any objection, Your Honor.

A It's kind of a modification of a formula. In logging studies, for example, where they are doing clear cutting on one branch of the stream and you've got another branch of the stream that isn't clear cut, where

the water temperature won't change, but up here, where they clear cut, you expect water temperature changes. So, we use formulae to direct relationship, direct mixing, where the two streams come together, we would predict the temperatures on downstream from that point.

Q (By Mr. Rekofke) So, if I understand your answer, it's your modification of some sort of fairly good formula?

A Yes, that's my opinion.

Q I see. So, would you call it the "Navarre formula"?

A If you wish.

Q I'm not going to go into the computation. Do you have them written down somewhere?

A The formula?

Q No, the actual computations that you made in your book or your report.

A I had written them down on scraps of paper when I was figuring it up when I was doing the report.

Q You don't have them in the field notes?

A No, they ended up in the round file.

Q So, the actual computations that you used are nowhere to be found?

A That's correct.

Q Now, this report is dated February, 1974, Exhibit 64. Is that when you completed it, February, 1974?

A No, I completed it a little earlier. We always date

our completed reports at the time that the signatures go on before running them off, and this report has got the signature also of my other regional supervisor of the division. So we have to allow a delay in time from any given time, and so we try to date it for the month that the report was signed.

Q At what temperature-- I guess no one has asked this, maybe you can help me out-- What temperature would trout, brown trout, perish or asphyxiate or whatever trout do when it gets too warm?

A Letal temperature for brown trout is 25.-- Now, I don't have the temperature for brown trout. I've got it for brook and rainbow, and I didn't write down the temperature for brown, which was slightly less than the brook. This would be between 76 and 77. Could I qualify that one more? This, of course, if the trout is, if the temperature is that, I mean, we couldn't just take him from 50 degrees and dump him into this temperature and expect him to live. He has to be acclimated slowly.

Q Yes, I think you testified to that this morning.

A Yes, I just wanted to qualify my answer.

Q Incidentally, I was just going through this report and I found, perhaps you probably found the same thing, apparently 12 days between July 18 and October 15 that the maximum temperature was 68 degrees or above. I

mean, you can count it, I guess, during the recess if you want, but does that sound about right to you?

A Yes, that sounds about right.

Q And, apparently, the average temperature on any of those days from July 18 to October 15, never exceeded, or, as a matter of fact, was below 68 degrees?

A The average temperature?

Q Average.

A At Station 3?

Q Yes.

A The average temperature, which I took from adding the maximum and minimum and dividing by two, no, I don't see anyplace here where that average exceeds 68 degrees.

Q The highest average, as far as I can tell from your report, is about 64 1/2 degrees?

A That could be right.

MR. REKOFKE: Thank you.

THE COURT: I think this is a good time to take the afternoon recess. We'll take about 10 minutes.

(A 10-minute recess was taken at this time.)

THE COURT: Is there further Cross-examination of this witness?

MR. REKOFKE: No, Your Honor.

THE COURT: All right, Redirect.

REDIRECT EXAMINATION

BY MR. GERMERAAD:

Q Usually, when is the highest temperature of water recorded, during what periods of time during the day?

A In the late afternoon.

Q The temperatures of the water, would they be more critical during certain seasons of the year than others?

A The warmest temperatures, the hot temperatures, would be more critical in the summer.

Q Because that is when the hot temperatures would be more likely to occur?

A That's when they're more likely to occur.

Q Although this seems an obvious question, I would like it in the record. The air temperature changes from day to day, does it not?

A That's correct.

Q And, I believe, you mentioned two factors that heat the water, and would you please tell us what those two factors are?

A The primary source is from solar radiation,and the water would also receive some heat through conduction.

Q This is conduction from the warm air, ambient temperature of the air?

A That's correct. There is a possibility that if it's running over a stream bed, and if for some reason it

happens to be warmer, they could receive some warming from confection.

Q Is this the case in Chamokane, to your knowledge?

A No, but it could be the case if the flow was suddenly increased or something like this, that would pick up heat from the additional area that is exposed to air temperatures.

Q Would it be an accurate statement if I were to summarize in part your conclusion, that if we had 30 CFS of flows, the water temperature in Lower Chamokane would probably not exceed 68 degrees?

MR. REKOFKE: I'm going to object to this, Your Honor. This question is leading.

THE COURT: I'll let him answer. It is leading, but I think we'll get to it quicker that way.

A I believe at 30 CFS the temperatures would remain at 68 or below in the summer.

Q (By Mr. Germeraad) Would the relationships that you have established between stream flow and temperature of water in the stream apply to other years under similar conditions?

A If all other conditions were similar, the flow, the air temperature, winds, solar radiation, and all other factors influencing the heating of the stream, it should be the same.

Q If a person were to draw a reasonable deduction or conclusion from your report, he could apply, could he not, those conclusions or deductions as to other years?
A I believe he could.
Q Would you please get up from the stand and go over to Plaintiff's Exhibit 10, which is on the board.
A (Does so.)
Q The square blocks on Plaintiff's 10 are section marks, are they not?
A They appear to be so.
Q And in reference to Plaintiff's 10, what would be the length of Chamokane Creek from its mouth at the Spokane River to the location of Chamokane Falls?
A In a direct line between the mouth and the falls, it appears that it might be a mile and a-half, but the meanders occurring in the stream, it could be probably a little bit longer than that.
Q On Cross-examination, I believe Mr. Rekofke asked you about being aware of certain other stream flow measurements. I believe you stated that one you were aware of was 20 CFS. If it wasn't Mr. Rekofke's question, it was one of defendants' counsel. Do you know, was that a study conducted by a State or federal agency which came up with the 20-CFS figure?
A I saw the 20 CFS, 20 cubic feet per second, in a letter

signed by Mr. Biggs (phonetic), then-Director of the Game Department, stating that that was the flow, minimum flow that should be retained. I think it had reference to a water right permit or water use permit.

Q The study which you did of the Chamokane Creek, stream and its fishery resources, does this study also relate to the overall purpose of the entire Northwest Fisheries program?

A Yes, it does, because the function of the Northwest Fisheries program is to provide this type of technical assistance to Indian tribes. It's what we're paid to do.

MR. GERMERAAD: I'm pausing, Your Honor, to find a particular exhibit.

Q (By Mr. Germeraad) Mr. Navarre, I asked the bailiff to hand you a copy of Mr. Smithpeter's file. This is a State file for one of the defendants in the case, and I believe the State has filed all these previously with the Court. Do you find in that file a letter which you earlier referred to?

A I believe that this is it.

Q Is this the letter that you were referring to as the 1969 letter from Mr. John Biggs.

A I think this is where I got the, saw the 20 CFS figure mentioned.

Q Would you read into the record, please, the second paragraph of that letter?

A "Chamokane Creek is one of the best unspoiled trout streams in this portion of the State. It flows through an undeveloped area, such as, no housing, minimum agriculture, logging, mining, et cetera. It contains an excellent riffle-and-pool ratio which has and continues to be conducive to maintaining outstanding spawning and rearing areas for trout."

Q Thank you. Have you made other inquiries as to the reputation of Chamokane Creek as a trout fishery?

A Yes, I have.

Q What is that reputation?

A I understand that it's--

MR. REKOFKE: I'm going to object. I don't see what relation there is to that question and answer.

THE COURT: I'll have to sustain the objection. This didn't come out on Cross.

MR. GERMERAAD: I'll withdraw that question, Your Honor.

Q (By Mr. Germeraad) Were you in court when Mr. Walter Woodward stated that from his studies the base flow of Chamokane Creek over the period of time 1960 to 1970 was 30 CFS?

A I heard the 30 CFS mentioned. What the exact period was,

I don't recall.

Q Did you also hear as to a certain period of time; I think the record would reflect that this would be 1931 to 1970, that the average flow would be 33 CFS?

A Again, as I recall, I heard the 33, but I don't recall the period.

Q Assuming that the figure given by Mr. Walt Woodward is correct, that is the flow of 30 CFS over the period of time 1960 to 1970, what relationship does that have, do you think, to the opinion of Mr. Biggs expressed in this letter as to the reputation of Chamokane Creek as a trout fishery?

MR. TORVE: I object to that, Your Honor. How could he know what is in Mr. Biggs' mind in regards to that? There is no showing Mr. Biggs knew of any of the calculations Mr. Woodward had or even would agree with him. I assume that he probably wouldn't agree.

MR. REKOFKE: I further object, Your Honor, on the grounds it's not proper Redirect. I'm not aware of any defendants' bringing in this particular matter on Cross-examination.

MR. GERMERAAD: I would like to explain the relationship to the Cross-examination, Your Honor: I believe there were several lines of questioning by different

counsel that would imply that because this study was conducted during only one year, it had no relationship to what might have occurred in other years, and a line of questioning that because there was not a flow of 30 CFS measured last summer, that a figure of 30 CFS would be coming just out of the thin air, and I think my question relates to both of these lines of questioning that were asked in Cross-examination, Your Honor.

THE COURT: Read back the question, Mr. Reporter.

(Reporter reading back the last question.)

THE COURT: He may answer.

A I don't know if the witness understands the question. Could you possibly rephrase it?

Q (By Mr. Germeraad) If you have a flow, if you assume a flow of 30 CFS, and assume that flow of 30 CFS on an average did exist at that time, would having a good water flow at that period of time, in conjunction with the other characteristics described by Mr. Biggs in that letter, lead you to conclude that this area would be a good trout fishery?

A At 30 CFS, I think it would be a good trout fishery, and from the letter, it states it was a good trout fishery.

Q Is the 30 CFS recommendation for a minimum stream flow that you expressed in your report your best professional

judgment?

A That's the best figure I could come up with.

Q Have you, in any way, testified to a figure you do not believe it?

MR. REKOFKE: I'm going to object to this.

THE COURT: That question is all right. He was attacked on it on Cross-examination.

MR. REKOFKE: In answer, it's self-serving.

MR. GERMERAAD: Your questions were self-serving for your purpose.

MR. REKOFKE: I presume, the witness is, I guess, supposed to be presumed to be telling the truth. In addition, this is an attempt to rehabilitate the witness in some fashion, and I object, Your Honor; it's improper.

THE COURT: You may answer.

Q Could I please have the question again.

(Reporter reading back the last question.)

A No, I have not testified to a figure which I do not believe in.

MR. GERMERAAD: No further questions, Your Honor.

THE COURT: Any further questions of this witness?

MR.DUFFORD: I would like to ask a couple.

RECROSS-EXAMINATION

BY MR. DUFFORD:

Q In the Redirect Examination, reference was made to the Northwest Fishery program. When did that program become applicable to this part of the State?

A It became applicable and was formed in the spring of 1973. Before that time, we had a biologist in the regional office in Portland--

Q That answers my question. Have you, in fact, then had extensive experience with the watersheds in this part of the State?

A No, I have not.

Q With reference to Mr. Biggs letter of August 22nd, 1969. I believe you have it before you, do you not?

A Yes, I do.

Q Since you read the second paragraph, I wonder if you would read the last paragraph?

A Certainly. "We believe that in order to perpetuate this valuable fishery, a minimum flow of 20 CFS be established. Therefore, these two departments wish to recommend that the above-referenced application be approved providing that all diversions for consumptive water use ceases when the flow of Chamokane Creek falls below 20 CFS as measured immediately below the applicant's point of diversion."

MR. DUFFORD: Thank you.

THE COURT: Are there any further questions?

RECROSS-EXAMINATION

BY MR. CERUTTI:

Q Sir, I wonder if you would step back over to the Plaintiff's Exhibit No. 10.

A (Does so.)

Q Using the same method that you did to calculate the distance from the mouth of the river up to the falls, I wonder if you can tell me the distance of Chamokane Creek from the falls up to the place where it begins to run.

A Somewhere around five miles, and that would take in all along the springs.

MR. CERUTTI: Thank you. I have nothing further, Your Honor.

MR. CAMPBELL: If Your Honor please. Is this letter from Mr. Biggs that he's read in evidence?

MR. GERMERAAD: It isn't. I assume that at some point in time, the State would ask that all the files that it had on file would be--

THE COURT: It was filed with the other materials, but I don't know what you gentlemen have done about those other exhibits.

ATTORNEY: I would move that it be marked as an exhibit and admitted at this time.

MR. GERMERAAD: Would it be better for the State to have a copy of that marked so the file would remain intact?

MR. DUFFORD: Yes. We have a carbon copy of it here.

MR. GERMERAAD: As long as we note that the original in the file did have two signatures, and this-- I wonder if we just couldn't Xerox this and enter it later. There are some differences on it, the lack of signatures and who carbon copies go to, that are different, and there are written pencil marks at the top.

THE COURT: I can't see that that makes any difference.

MR. GERMERAAD: Well, as long as it's on the record that it's slightly changed and the original was signed.

MR. TORVE: Your Honor, I think the point being that if he read from this, this is the document that ought to go into evidence because he utilized it for cross purposes.

MR. RUDOLPH: He read from that one, Mr. Torve.

THE COURT: That's 65?

THE CLERK OF THE COURT: Yes.

THE COURT: Plaintiff's 65 will be admitted.

(Thereupon, Plaintiff's Exhibit 65, was received in evidence.)

THE COURT: I might call to counsel's attention that my records don't show the Redback (phonetic) report has ever been offered as an exhibit yet; 64?

MR. GERMERAAD: Your Honor, thank you. I would move its admission.

THE COURT: I assume there's no objection, since everybody has used it. Plaintiff's 64 is admitted.

(Thereupon, Plaintiff's Exhibit 64 was received in evidence.)

THE COURT: You may step down, Mr. Navarre. Thank you.

MR. DUFFORD: Could we have a brief recess to confer between counsel, Your Honor?

THE COURT: Fine, if it's necessary.

MR. RUDOLPH: We had had a discussion with Mr. Dufford and Mr. Roe concerning the State's witness coming out of order at this time; their fish biologist. The idea being if he testified at this time, then Mr. Navarre could be available to hear him for possible rebuttal and not have to stay until the defendants' case, and I had thought that was agreeable. Is there

something further you wanted to confer about, Wick?

MR. ROE: What we were going to ask for, Your Honor, is about five minutes to figure out whether we really wanted to call Mr. Simon--

THE COURT: We'll take a five-minute recess while you reorganize.

(A five-minute recess was taken at this time.)

MR. RUDOLPH: Call Mr. Harvey, please, Your Honor.

MARLAN D. HARVEY,

being first duly sworn, testified on behalf of the plaintiff as follows:

THE CLERK OF THE COURT: Would you please state your full name to the Court, spelling your last name?

A My name is Marlan D. Harvey, H-a-r-v-e-y.

COURT REPORTER: Marlan is M-a-r-l-i-n?

A Marlan, M-a-r-l-a-n.

DIRECT EXAMINATION

BY MR. RUDOLPH:

Q Would you state your present address, Mr. Harvey?

A 1413 Monte Vista, Pocatella, Idaho.

Q By whom are you employed?

A Bureau of Indian Affairs.

Q What is your present work assignment?

A Employed as a soil scientist on the Fort Hall Indian Reservation.

Q How long have you been down there?

A About two years.

Q As a soil scientist, did you have a particular specialty within that profession?

A My job says classification in mapping.

Q That's soil classification in mapping?
A Yes.
Q What is your education background?
A I have a B.S. Degree in Agronomy in Soils from Brigham Young University in Provo, Utah.
Q Did you commence work following your graduation in the soil field?
A Yes.
Q Tell us your work experience.
A I was employed by the Soil Conservation Service of the USDA for one year, and I went to work for the Bureau of Indian Affairs, and I have been with them about 18 years.
Q And what has been the nature of your work, then, with the Bureau of Indian Affairs?
A Mostly land classification and soil mapping and soil interpretation and other duties as assigned.
Q Do you belong to any professional organizations?
A Not at the present time. I have belonged to the Soil Scientists Society of America for about 15 years, and the Western Society of Soil Scientists.
Q Is there a national organization which works with standard soil classifications?
A Yes, we have a National Cooperative Survey, which is headed by the Soil Conservation Service. They are the leaders in soil classification work.

Q What does that organization do?
A They set up standards for the land classification and soil survey in the United States.
Q Have you participated in the work of that organization?
A Yes, I have.
Q And describe briefly in what manner you have participated and to what extent you have become familiar with the standards developed by that organization?
A Each year, each state, under the leadership of the U.S. Department of Agriculture, conducts a Soil Survey Work Planning Conference, and all interested organizations are invited to participate in this conference, and new technology are discussed, and decided whether, what standards are going to be implemented, what standards are going to be changed, and the plans for the soil survey and land classification work within each state.
Q Were you active within that organization during the decade of the 1960's?
A Yes, I was.
Q Were you requested at some time in the past to conduct a soil inventory on the Spokane Indian Reservation?
A Yes, I was.
Q And were you assigned to that task?
A Yes.
Q By whom?

A To be area soil scientist in the Bureau of Indian Affairs office in Portland.

Q Do you remember the year you commenced the performance of that soil inventory?

A Yes, it was 1964.

Q How long did you spend in taking the information, overall?

A About three years.

Q Describe for us, again relatively briefly, how you performed the inventory?

A We get together with, and cooperate with, the Soil Conservation Service, and the university, the State University, and work up a legend from past experience that has been conducted in the state and in the surrounding areas on the reservation, and then we go out in the field and use necessary implements to examine soil profiles and all the necessary examinations of the soil, so that we're sure in our own minds we have all the information necessary, and a direct examination of the soils, and in addition to this, we take representative samples of soil and send them to the laboratory for complete laboratory analysis, and all of this information is recorded on photographs and in soil legends, and notes, et cetera.

Q Now, are you describing this as something you actually

did on the Spokane Indian Reservation?

A Yes, that's right.

Q Did you, in fact, take soil samples?

A Yes.

Q These tools which you mentioned, what are some of those?

A Mostly spades and augers; backhoes, once in a while.

Q Did you have any basic working material that you worked from in order to give you a mapping pattern?

A We use all the information we can possibly get; geology information, meteorology, and others that I can't recall right now.

Q Do you take aerial photos of the lands you're classifying, or how do you approach that?

A The aerial photos are provided.

Q Did you have aerial photos here?

A Yes.

Q The sampling process, is this uniform?

A Yes.

Q That is, do you take the same number of samples on each tract of land, or will this vary?

A It will vary according to the quality of the land.

Q In the classification which you did following the sampling, whose standards did you use?

A The standards set up by the National Cooperative Soil Survey.

Q And did you at that time, and when you finished, in three years, did you set forth a written record, or, on these aerial photos, I should add: On these aerial photos, would these aerial photos be the result of your classification?

A Yes.

Q Do you have at least some of those here?

A Yes, there are.

MR. RUDOLPH: Could you put the sticker on the back? That would be Plaintiff's--

THE CLERK OF THE COURT: Sixty-six.

MR. RUDOLPH: --66. Your Honor, I might state the reason for that: We were going to ask, if possible, after the exhibit has been used, if the Clerk would make a copy of it and substitute the copy for the original, so it could be withdrawn, and would ask your permission, and counsels', for that to be done.

THE COURT: Any objection?

MR. DUFFORD: Fine.

MR. TORVE: None.

THE COURT: This is 66?

THE CLERK OF THE COURT: 66.

(Thereupon, Plaintiff's Exhibit 66 was marked for identification.)

MR. CAMPBELL: Well, I might ask, Your Honor,

counsel, do you have a series of these you're going to introduce?

MR. RUDOLPH: No, I do not, and I was, well, while you are looking at that, I was going to explain to the Court, I do have a series of them, and I do not plan to introduce them, and the one being introduced is purely for purposes of illustration. The others are available for examination, but we did not intend to add to an already large file.

MR. CAMPBELL: I think we will all agree the aerial photos were taken of the Indian Reservation.

Q (By Mr. Rudolph) Do you have in front of you, Mr. Harvey, a copy of what is entitled, "Classification and Correlation of the Soils of the Spokane Indian Reservation"?

A Yes, I do.

Q So, as I ask concerning it, you're referring to a copy of it?

THE COURT: Where are we on 66? We haven't had a chance to finish examining it.

(Inaudible response.)

THE COURT: All right, go ahead.

Q (By Mr. Rudolph) Now, they're examining 66, which, I'll simply ask you: Describe a little for us what that is. You may not remember the particular land shown in that

particular photo, but tell us how you work from those aerial photos?

A We, of course, we can identify the physical features on the aerial photo, and know exactly where we are on the ground, and then we examine the soil profile at intervals which we think will give us complete information about the soil, and then we draw lines on the photograph and insert a symbol in those delineations.

Q A "symbol" being what, a symbol which designates as it refers to that soil type?

A We refer to it as a "mapping unit", and that is generally considered a soil type, yes.

Q Would you refer to the first page of what is Exhibit 11, namely that classification book, and I'll ask, are the symbols you just referred to, are those in the left-hand column on page one and subsequent pages of that exhibit, are those the ones you mean?

A Yes, those are the mapping units.

MR. CAMPBELL: May I interrupt at this time and ask counsel, may we see the others that you weren't going to introduce, the other--

MR. RUDOLPH: To be clear, if I was misunderstood as saying those are all of them, they're not; for the entire reservation, there were many more than that, but those represent those right along the west, westerly

area of the Chamokane, and does not include those on the Chamokane Bench. Now, those are out at the agency office, but they are not here.

MR. CAMPBELL: But we do have larger area photos I have seen of this area?

MR. RUDOLPH: Oh, yes.

MR. CAMPBELL: But they're the western part of the Reservation without the classifications on them?

MR. RUDOLPH: No, this doesn't have the western part of the Reservation.

MR. CAMPBELL: Eastern?

MR. RUDOLPH: Yes, it does have the eastern, but these aerial photos, the ones, I don't remember the number now--

THE CLERK OF THE COURT: Twenty-eight.

MR. RUDOLPH: --28, do not have any soil classes on them.

Q (By Mr. Rudolph) You were referring to drawing in certain lines. Would you describe a little the type of lines, are they in pattern and rectangular form, or what form do they follow?

A This particular area is what we call an alluvial soil that's been deposited by a moving water, and, of course, the lines will follow old preme (phonetic) channels, generally speaking.

Q And am I correct, then, that that one, or others, will have a number of loops and variations and so forth?
A That's right.
Q And am I also correct that in drawing those, you have designated the confines or boundaries of a given soil type?
A That's right.
Q Now, do you have, or did you complete, in connection with your soil classification and inventory, did you complete similar type aerial photos as 66, of the entire Reservation?
A Yes, I did.
Q Did this complete your function, then, at that time?
A No.
Q What else did you do?
A Well, I have been called upon to interpret soils for many other purposes.
Q You mean those soils on the Spokane Reservation, you mean?
A Yes.
Q Now, in what form were your findings left in 1967, and when did you come to the preparation of Exhibit 11, which is the classification book?
A It's mostly field notes and descriptions, including the exhibits you referred to.
Q Would you describe for us, I'm referring to the first

page of Exhibit 11, which is dated June, 1970, and states, "The final correlation was prepared by J. Ellsworth Brown after conference from April 6 through 10 with Norman C. Donaldson of the Soil Conservation Service and Marlin Harvey of the BIA." Tell us a little what you did in making that correlation and what went on at that conference?

A First we all got together and went out in the field and examined typical profiles of each mapping unit, and the Soil Conservation Service having been designated as the leaders in land classification and soil survey, we more or less followed his direction. Mr. Brown is a soil correlator with the Western Regional Technical Service Center of the Soil Conservation Service, and we discussed all of the notes and all of the field data which we had, and came to an agreement about how to group these mapping units into a soil series, and we designated a name for that series.

Q And is Exhibit 11, then, the published result of that work?

A Yes, it is.

Q I see in the three columns throughout the book, symbols, field name, approved name, and in some cases, we have a field name and approved name which is different. Tell us how this happens.

A The field name is the one I used at the beginning of the survey, and, well, used it throughout the survey, in fact, in order to eliminate some details cluttering up my thinking, and you'll have to ask that question again, I guess.

Q The first line, for example, on page one, gives a symbol and then a field name, "Hagan loamy fine sand", and then an approved name, "Bisbee loamy sand", and that appears to be an approved name for three or four different categories of soil type. Explain for us this process of how the three of you made that correlation and final result.

A Through the discussions that we'd had, we decided the characteristics of the five mapping units, and the--

Q Excuse me, did you say "five mapping units"?

A Yes.

Q Or what words did you use?

A Five mapping units are referred to, are classed under Bisbee loamy sand.

Q Let me interrupt at that point, and it isn't clear to me, what is a mapping unit?

A That is the smallest category which I mapped on the field photographs. That is the soil type.

Q That is the smallest soil type you would find on Exhibit 66, or any of these other photos?

A Yes.
Q Any of them?
A Yes, that's correct.
Q And how many mapping units, overall, are there?
A I'm sorry, I don't remember that.
Q You said five mapping units.
A Oh, in this one named soil series, yes, that's right.
Q All right. If I understood you correctly, there are five mapping units under the category of field name, which came out with an approved name of Bisbee loamy sand?
A That is correct.
Q Now, is that a reduction of five mapping units into one mapping unit?
A No.
Q Or is this Bisbee loamy sand something else?
A Bisbee loamy sand is a soil series name, and the five mapping units will remain as the individual mapping units.
Q Is there any further explanation you can give us as to soil series, then?
A To answer that, I'd like to read a description of the 1957 Year Book of Agriculture, so that I'll be sure to get everything in there: "Soil series is a group of soils that have horizons similar in their depreciating

characteristics and arrangement in the soil profile except for the texture of the surface soil and are formed from a particular type of parent material. Soil series is an important category in detailed soil classification."

Q You have read--

MR.RUDOLPH: May I approach the witness a moment, Your Honor?

THE COURT: You may.

Q (By Mr. Rudolph) You have read from page 766 of what book did you call it?

A 1957 Year Book of Agriculture.

Q Very well.

MR. RUDOLPH: Could I have, Exhibit, Defendant's 1, I think.

Q (By Mr. Rudolph) Are you familiar with what is Defendant's Exhibit 1?

A Yes, fairly well.

Q And is the work which you did in the inventory and preparation of Exhibit 11, is that consistent with whatever standards are promulgated in that book?

A I believe them to be, yes.

Q Do you likewise believe the results as found in Exhibit 11 to be consistent with the standards of the National Soil Survey Conference which you referred to?

A Yes.

Q Explain to us a little more how the symbols are arrived at, will you?

A Yes. My supervisor in the Washington Central Office set forth the symbolization standards for making soil surveys within the Bureau of Indian Affairs.

Q And those symbols vary from organization to organization?

A They are uniform throughout the Bureau of Indian Affairs.

Q Is there a particular meaning to those letters and figures?

A Yes, there is.

Q As an example, can you tell us what the first symbol, how that would have been arrived at?

A 11Q5/AD, The eleven stands for a profile which is deep, over 36 inches, is coarse texture, and rapidly permeable; the Q means that it's formed from sand; the five is an arbitrary designation indicating precipitation; and the AD refers to slope.

Q Were you in accord, I mean, there were three of you that came out with Exhibit 11; were you in accord with the final results that are indicated in Exhibit 11?

A Yes, generally.

Q Where were you assigned at that time within the Bureau?

A I was assigned to the Spokane Indian Reservation.

Q Did you then cause, under your direction, cause to have

prepared a map which would set forth in soil classes, namely Class 1, 2 and so forth, the result of Exhibit 11?

A Yes.

Q And how did you proceed to have that mapping done, and I'll direct your attention to Exhibit 12 first, which is on the blackboard, or bulletin board, it isn't black.

A I provided a draftsman with the aerial photographs and a legend.

Q And that legend, consisting of what?

A Designating the land classes, which would be superimposed on the mapping units.

Q What determines what soil types go into what land class?

A This probably isn't extensive enough, but I'll read this definition of the land capabilities classification, and that's what our classes are, when we refer to it. "Grouping of kinds of soil into special units, subclasses and classes, according to their capability for intensive use and the treatment required for sustained use."

Q I notice Mr. Adolph's name on Exhibit 12, and is he the draftsman that did that task under your direction?

A Yes.

Q Did you develop the schedule in the legend which you referred to which is designated which approved names or soil types were to go into each specific land class?

A Yes.

Q Exhibit 12 is on the board upside down. Exhibit 12 has a legend of Class II, Class III, Class IV, VI, VII and VIII. Are those the classes on the legend which you gave to Mr. Adolph?

A I believe we just limited the classes to II, III and IV.

Q Did you check Mr. Adolph's work when he completed the preparation of the map?

A I spot-checked it.

Q Have you looked at it again here within the last couple of days?

A Yes, I have.

Q Does Exhibit 12, which sets forth the location of land classes II, III and IV, faithfully and accurately represent to the best of your knowledge the results of the soil classification and inventory which you had made?

A I believe it does reasonably well, yes.

Q Have you examined, also, Exhibit 13, which is the map which Mr. Woodward prepared, utilizing Exhibit 12, showing land capabilities below 2500 foot elevation on the Reservation; have you examined that?

A Yes, I have.

Q And to the best of your knowledge, does that Exhibit 13

and that map, does that faithfully and correctly reflect and show the location of the lands which you had designated to be in land classes II, III and IV?

A Yes, I believe it does.

Q Now, referring to land classes, what classes of land are considered to be in the soil field, considered to be feasibly irrigable?

A I don't believe the feasibly irrigable land can be limited to land classes.

Q Well, let me ask this--

A But I will--

Q Excuse me, go ahead.

A I'm sure that class II, III and IV can always be considered irrigable.

Q In fact, you said it couldn't, wouldn't be limited to that, what do you mean, could you explain that a little more?

A I mean other classes of soil can be feasibly irrigated, in my opinion.

Q Have you seen other classes of soil being irrigated?

A Yes, I have.

Q Is there any question as to soils in class II, III and IV, being feasibly irrigable?

A No, I believe not.

Q When you say "other classes", what classes are you talking about, or how are they designated?

A I'm thinking of class VI lands which have been planted to orchards, and the factors which make them class VI is the coarse-textured, gravelly content, low water-holding capacity, and perhaps others.

Q Am I correct that generally speaking, that is how the classes were developed, the soils and the lands which are put into class II, III and IV are considered to have the better types of soil?

A That's correct.

Q And that's how they got there, I take it?

A I might add, the area in which I'm working now, we have class VI land, which is class VI because of sand-textured and low water-holding capacity, which is producing the best potatoes in the world.

Q Are you familiar with the boundaries of the Spokane Indian Reservation?

A Fairly well, yes.

Q Are you familiar with the lands which lie to the east of the Chamokane Creek and outside of the Indian Reservation?

A Somewhat.

Q Have you noted on Exhibit 13, Mr. Woodward's map, certain soil land classes, which are mapped, lying to the east of Chamokane Creek?

A Yes, I have.

Q Have you had any experience in determining the accuracy of those land classes?

A I borrowed the mapping that had been done by the Soil Conservation Service and prepared the map you refer to.

Q Do you have an opinion as to the comparability of the soil types and the land classes lying east of Chamokane Creek with those which lie within the Reservation west of Chamokane Creek and which are on the map shown as land classes II, III or IV?

A They are very comparable, in my opinion.

Q You do have an opinion, and you're stating your opinion now, which is what?

A They are comparable.

Q Would you or would you not consider the lands within the Reservation you refer to as being of equal productivity with the lands lying to the east of the stream?

A Yes.

THE COURT: Counsel, I think this is a good place for us to break.

MR. RUDOLPH: Very well, Your Honor.

THE COURT: So we will be in recess until 9:00 a.m. tomorrow.

THE BAILIFF: All rise; this court stands adjourned.

Hon. Marshall A. Neill, Judge,
Spokane, Washington
Friday,
March 15, 1974,
9:10 A.M.

THE COURT: Good morning, gentlemen. Mr. Harvey, I believe, can resume the stand.

MR. GERMERAAD: Right. I don't believe the plaintiff has any questions, and although the plaintiff-intervenor is not present at the time, they indicated yesterday they had no further questions and Mr. Harvey would be available for Cross-examination at this time.

THE COURT: Very good. Well, do you want to take the same order we had before, or does somebody want to volunteer?

Mr. Dufford?

CROSS-EXAMINATION

BY MR. DUFFORD:

Q Mr. Harvey, I believe in your testimony you read us a definition of land capability classification from a Department of Agriculture publication of some kind; is that correct?

A Yes, that's correct.

Q Does the Bureau of Indian Affairs use the same classification system as the entities of the Department of Agriculture?

A Yes, they do.
Q You stated that the classifications contained in your report on this matter were consistent with those found in Defendant's Exhibit 1, which is the Soil Conservation Service bulletin on this subject. What, when you said "consistent", are they the same, or is there some difference?
A They are reasonably similar. We tried to make them the same.
Q Is there any way in which there is a difference?
A Just very minor. Individual interpretation.
Q In addressing yourself to the matter of these mapping units that are shown on the aerial photographs, you stated there is a uniform system with respect to designation of mapping units throughout the Bureau of Indian Affairs, is that correct?
A Yes, that is correct.
Q Is there another system used outside of the Bureau of Indian Affairs?
A This is just a symbolization that I was referring to.
Q I see. Do other entities of the government use other kinds of symbols?
A Yes, they do.
Q But in some, does the end result differ in any way?
A No, the end result would be very much similar.

Q Now, in talking about the land classifications themselves, that's classes I, II, III, IV and so on, you stated that, I think up through class IV, we're talking about feasibly-irrigable classes, is that a fair statement?

A Yes, class II, III and IV are feasibly irrigable.

Q When you say "feasibly irrigable", are you including analysis in that of how one might get water to that soil?

A No, not specifically.

Q Does the classification simply mean that if water were in some way obtained to put on that soil, it would be productive, according to that classification?

A Yes, that is the general thought we have been trying to follow.

Q Does your kind of work in making this classification determination, do you have to decide what the duty of water might be on any given parcel of land to grow things?

A You mean the amount of water necessary?

Q That's right.

A Yes, we go along with other disciplines in trying to determine this.

Q Would a consideration of what quantity might be needed in a growing season be included in the designation of any particular class?

A No, I don't believe that.

Q In making these classifications, is there any consideration given to growing season available where those soils lie?

A Yes, there is.

Q So, in that respect, well, could you expand on that, and tell me how you take that into consideration?

A Just as an example, there are no class I soils on the Reservation, and this is because of the short growing season.

Q Then the growing season, the length of the growing season, might cause a classification to be a higher number than otherwise because of the--

A That's right, yes.

THE COURT: Where does topography fit into this classification, or does it?

A Yes, it does. The degree of slope may determine what class of soil this is.

Q (By Mr. Dufford) Perhaps you could expand on that a little. If you had the same kind of soil on a flat piece of ground and one, say, that was a 30-degree angle, or something, what would the difference be in the classification?

A It may go from class II to class IV, or VI, depending on the degree of slope.

Q I see.

A Maybe I should say the percent of slope.

MR. DUFFORD: I have no further questions.

MR. TORVE: A couple of questions, Mr. Harvey.

CROSS-EXAMINATION

BY MR. TORVE:

Q I haven't had a chance to go through your report with any particularity, but I gather you had done an initial field examination and come up with some field classifications, is that correct?

A Yes.

Q Then you met with two people, I gather, who were your superiors?

A No, they were with the Department of Agriculture.

Q Then, at that point in time, there was adopted other classifications or different terminology for the different classifications that all three of you discussed, is that a fair statement?

A Not different terminology. As I stated before, the Department of Agriculture was given the authority, or the job, of, I want to say "supervising", but leading-out in a soil survey of the whole country, so there would be some degree of uniformity of soil surveys throughout the whole nation, and in order to keep this

as uniform as possible, we all get together and try to conform to these standards that are agreed upon, and this is called a correlation of the soil survey, and that is all the publication was that you referred to.

MR. TORVE: Could I have Defendant's 1?

THE COURT: I don't believe Defendant's 1 has been admitted, has it?

THE CLERK OF THE COURT: No.

MR. TORVE: No, it hasn't yet.

Q (By Mr. Torve) Mr. Harvey, I believe on Direct Examination, you said that, and I'm not quite sure how you put it, but this was consistent with your study, is that correct, or your land classifications?

A Yes, we tried to make this as consistent as possible.

Q Let me ask you this: On the different type of land classifications, would they be similar to what the definition of land classifications are in this bulletin?

A Yes.

Q Mr. Harvey, you indicated that one of the, well, let me ask you this, I wasn't too sure what you said; is the length of the growing season material to the land classification?

A Yes, it is.

Q And those areas that you classified as number II, that lie on the bench, do you know what the growing season is

up there?

A No, I don't, not precisely.

Q Then, if the growing season is material to the land classification, how do you know whether or not; well, let me ask you this, then: Is the classification number II, then, made without taking into consideration the growing season?

A No, we took it into consideration, but I can't say the growing season would be exactly 80 days, or 85 days.

Q Do you know what kind of crops you can grow up there; did you make any study of that point?

A With the experience that farmers have had in other areas on the same kinds of soil, we have some good ideas of what kinds of crops can be grown there, yes.

Q Did you make any studies of the land in the Chamokane Basin, or around in this area, to know what might be grown at those types of elevations?

A Yes, we made some general.

Q General?

A Yes.

Q Let me ask you this specifically: Could you grow grapes up there on the class II land?

A I rather doubt it.

Q How about corn?

A Yes, I believe so.

Q It's your opinion that you could grow corn up in the class II lying at the elevation above 2200?

A Oh, above 2200?

Q I'm sorry if I misled you. When I mentioned the bench, I think it's been referred to as land that lies above 2200.

A No, it's my opinion that corn would not be economically feasible.

Q Now, I take it that when you indicated that the lands were feasible for irrigation, we're really talking about, in your terminology, the productivity and not necessarily the economics of bringing water to it, is that correct?

A Yes.

Q And I didn't quite understand what you meant by the relationship or taking into consideration the duty of water on these types of lands; is that included in the classification, or is it something other that you have to bring in otherwise, to know whether you can develop the land?

MR. GERMERAAD: Would you re-read the question?

(Question read back by the Court Reporter.)

MR. RUDOLPH: That's not a very clear question.

THE COURT: Rephrase it; I didn't understand it, either.

MR. TORVE: I'll rephrase it, Your Honor.

Q (By Mr. Torve) In the determination of class II or III or IV lands, is the duty of water part of that analysis?

A I still don't know exactly what you mean by "duty"?

Q Maybe if I could clarify the terminology I'm using, when I say the "duty of water", the amount of water necessary for a particular type of crop, might be necessary to grow a particular type of crop.

A We take into consideration the available water-holding capacity of the soil, is that what you mean?

Q Well, what I'm referring to is, how much water corn might need, or alfalfa might need, or some other types of crops.

A That is a little beyond, I believe, our land classification.

Q Mr. Harvey, just a couple more questions. In determining where the class II land lying above 2200, did you make any determnation whether they were within or without the Chamokane watershed area as shown on Exhibit No. 10?

A Yes, I believe that is all within the Chamokane watershed.

Q Did you make any effort to superimpose the watershed limits over and, over and above your classification, to determine actually whether that was true or not?

A Yes, we made a reasonable effort to do that.

MR. TORVE: Your Honor, I believe that's all the questions I have, but I'd ask that Defendant's 1 now be admitted into evidence.

THE COURT: Any objection to Defendant's 1?

MR. RUDOLPH: No objection.

THE COURT: Defendant's 1 will be admitted.

(Thereupon, Defendant's Exhibit 1 was received in evidence.)

THE COURT: I think, also, I don't show that that, photograph, Plaintiff's Exhibit 66, has ever been offered.

MR. RUDOLPH: May we offer that.

THE COURT: Objection?

MR. DUFFORD: No objection.

MR. TORVE: No objection.

THE COURT: Plaintiff's Exhibit 66 is admitted.

(Thereupon, Plaintiff's Exhibit 66 was received in evidence.)

THE COURT: All right, I guess, Mr. Campbell, you're up.

MR. CAMPBELL: We have no Cross, on behalf of Mr. Smithpeter, Your Honor.

THE COURT: Mr. Tracy?

CROSS-EXAMINATION

BY MR. TRACY:

Q Just one or two questions, Mr. Harvey. You said you did make a study of the lands east of the Chamokane Creek and the lands west of the Chamokane Creek, is that correct?

A No, I didn't make any study of the lands east.

Q So you don't know whether or not the lands east are comparable with the lands west, then?

A I borrowed the information from the Soil Conservation Service, and that's where I got the information to--

Q You don't have any specific knowledge of your own that would lead you to conclude that the lands are comparable; wouldn't that be a correct statement?

A Just within my association with the soil surveyors who did the survey on that side of the creek, and the fact that our surveys have been correlated and the soils have been determined to be the, our mapping, under either, have been determined to be the same.

Q Well, is there number I land on the east side of the Chamokane?

A Is it number I?

Q Is there number I land on the east side of the Chamokane?

MR. RUDOLPH: Excuse me, you mean class I?

A Not that I know of.

Q (By Mr. Tracy) So you don't know whether there is or not, then?

A I'm not aware of any.

MR. TRACY: Okay, thank you.

THE COURT: Mr. Cerutti?

MR. CERUTTI: No Cross, Your Honor.

THE COURT: Mr. Rekofke?

MR. REKOFKE: Just a couple of questions, Your Honor.

CROSS-EXAMINATION

BY MR. REKOFKE:

Q I think some of this has been alluded to, and I'll try not to be repetitious. As I understand it, if I could have Defendant's Exhibit 1, perhaps Mr. Harvey could have it. These various soil classifications which you testified, there are some differentiating characteristics between the various classes, are there not, Mr. Harvey?

A Yes, there are.

Q And it's a fact that class II soils have some limitations that reduce the choice of plants, or require a moderate conservation practice, isn't that right?

A I believe that is correct.

Q As you get into class III soils, soils in class III have severe limitations that reduce the choice of plants or

require special conservation practices, or both, is that a correct statement?

A The term "severe" is relative.

Q Well, isn't that what the book says, page 7, Defendant's Exhibit 1?

A Yes, it is.

Q You're in agreement with that book if I understood you?

A Yes, that is correct.

Q Soils in class IV have very severe limitations that restrict the choice of the plants, require very careful management, or both, is that also a fair statement?

A Yes, um-hum.

Q So that all these lands, II, III and IV, on the Spokane Indian Reservation, have some limitation with respect to the choice of plants that might be grown and the manner in which the soil is cared for, is that correct?

A That's right.

Q Did you make any determination the amounts of lands above the 2200-foot contour?

A The amount of lands?

Q Yes.

A The acreage, no, I did not.

Q And, of course, that particular land would be, there would be some limitations on the crops that could be grown because, among other things, the elevation, isn't that

right?

A Yes, that is correct.

Q Would that reflect itself in the classification, that is, the elevation of the land?

A Yes.

Q And so when you say, and correct me if I'm wrong, when you say that so-many acres are irrigable, what you're saying is that if we can get water up to these particular lands, we can grow some kind of a crop?

A Yes, that's correct.

Q And, of course, depending upon the type of soil in the elevation, that would depend, of course, upon the type of crop which you could grow, isn't that right?

A Yes, I believe that is correct.

Q And the cost, for example, of getting the water up to those lands, and perhaps the fertilizer, and other practices that you'd have to engage in, that is, a person who was tilling the soil, could render it economically unfeasible, isn't that right?

A It could, yes.

Q Yes, you have made no such determination in this case?

A No, I haven't.

Q Is there some average, Mr. Harvey, as to cost-per-acre when; in other words, when it becomes unfeasible to irrigate; in other words, when the cost of doing this

gets to a certain point, is there any particular figure--

A I'm, I'm not aware.

THE COURT: Just a moment.

MR. RUDOLPH: Your Honor, I guess he can specify a point in time, but we're talking about many, many decades, and if you want to project economics into each year in the future, I can, I guess he can go into this, but I just want to point out--

MR. REKOFKE: I'm talking about today.

MR. RUDOLPH: --but I just point out how impossible it is to try and project an economical, how it is at one point in time.

MR. REKOFKE: I'm talking about today, that's what I'm talking about.

THE COURT: Well, counsel, the only thing that concerns me, I don't believe this man has stated or is qualified as an expert in economics, but if he wants to try to answer it--

MR. REKOFKE: You Honor, the only reason I was asking, if the Court please, because we're talking about feasibility. If it's beyond his field of expertise, all he has to say is just say so and I'll--

THE COURT: Proceed.

Q (By Mr. Rekofke) Go ahead.

A I feel that's beyond my field.

Q All right. Your particular survey that you made, and I don't know which exhibit it's in, the map that was ultimately made as a result of your work, you know what we're talking about?

A The field sheets.

Q The what?

A Oh, you mean the classification, land classification?

Q That included all of the land on the Indian Reservation, did it?

A Yes.

Q I see.

MR. REKOFKE: I believe that's all I have, of this witness. Thank you.

THE COURT: Is there further Cross-examination?

(No response.)

THE COURT: Any Redirect?

MR. RUDOLPH: First, Your Honor, I would like to apologize to you and everyone else for completely forgetting what you said yesterday afternoon about the changed starting time. I've got no other excuse--

THE COURT: Very well, we went ahead anyway.

MR. REKOFKE: Are we back on Direct, or--

THE COURT: Redirect.

REDIRECT EXAMINATION

BY MR. RUDOLPH:

Q In answer to Mr. Rekofke's questions, you were starting to explain, and then he sort of cut you off, that these expressions of limitations in Exhibit 1 are relative things. Would you go ahead and explain what you were starting to, at that time?

A The terms are relative, in my opinion. This could be a real involved discussion, but--

Q Well, okay, I don't think we need to get into such an involved discussion, but can you tell me, just briefly, what you mean by the term "being relative"; relative to what?

A Well, for instance, we call class IV soil severe, it has severe limitations, and, but, as I pointed out yesterday, we have a class VI soil that was being farmed on the Fort Hall Reservation.

Now, excuse me, the class III soil has severe limitations; class IV is stated as having very severe limitations.

Q All right.

A Now, class VI, that is being farmed on the Fort Hall Reservation. I can't think of any superlative adjectives to use for their limitations on it, but it's more severe than class IV.

Q What does class VI say? If class IV is very severe, what does class VI say?
A It merely states here it has severe limitations that makes them generally unsuited to cultivation.
Q Let me ask a general question, then, are class II, III, IV lands generally considered to be suitable for cultivation?
A Yes.
Q Are class II, III and IV lands generally considered to be those classes of lands which can probably and feasibly grow crops?
A Yes.
Q Are they generally considered to be what you would say are good lands?
A Yes, I believe so.
Q Would the application of water to class II and III and IV lands improve the quality and the quantity of the crops grown thereon?
A Yes, I believe that is a correct statement.
Q If class II land on the Reservation had a longer growing season, is it possible that some of those lands would have been placed by you in class I?
A Yes, it's possible.
Q Is it because of the short growing season that you reduced them to class II in some cases?

A In some cases, yes.

Q You gave an answer to Mr. Rekofke that, I believe, and this was before you expressed that this was really out of your field, but the answer does show that application of water on some of these lands might be economically unfeasible. At what time were you speaking of, in saying what you did?

MR. TORVE: I'm going to object to this question; he's already indicated he's not an expert in this, and could not answer the question, and I think to go further on it is going beyond--

MR. RUDOLPH: All right, may I ask, then, that the answer and the question be stricken from the record on Mr. Rekofke's examination?

THE COURT: I think this man is not qualified in that area. It will be stricken.

MR. RUDOLPH: I think I should have been more alert at the time the question was asked, but I wasn't.

Q (By Mr. Rudolph) Pertaining to the lands east of the Chamokane Creek, and your familiarity with them, did you make a sufficient review in checking of the classifications made by the Soil Conservation personnel to give you a general knowledge of those soils and the land classes existing there?

A Yes, I made a reasonable effort to become acquainted

with the--

Q Now, give us your comparison, then, with those lands lying immediately east of the Chamokane Creek and those lands lying immediately west of the Chamokane Creek.

MR. REKOFKE: I'm going to object to that, Your Honor, on two grounds. First of all, the witness doesn't know, of his own knowledge, as a practical matter, and secondly, it's repetitious, it was gone into yesterday on Direct Examination.

THE COURT: Well, no, I think, Mr. Rekofke, you opened that up in Cross-examination, and I think it goes to the weight of what he knows about it, so I'll let him answer it.

A I'll have to have that question again.

(Question read back by the Court Reporter.)

A I don't believe there is any difference whatsoever in the lands on the east side and the west side of Chamokane Creek, with regard to the quality of soil and the land classification.

Q (By Mr. Rudolph) You were asked specifically on these lands about 2200 elevation, whether grapes could be grown, I believe you answered no, and whether corn could be grown; let me ask: What are some of the other crops which could be grown?

A All small grains can be grown; hay crops.

Q In your opinion, what is the bench of the land higher up probably best suited for, what crop?

A I would say hay crops.

MR. RUDOLPH: I believe that's all I have.

THE COURT: Any further questions of the witness?

MR. ROE: I would just like to ask one question, Your Honor.

RECROSS-EXAMINATION

BY MR. ROE:

Q Did I understand you to say that class IV lands are to be considered good, cultivable lands?

A Yes, I think that is a fair statement.

Q Are you acquainted with how the Bureau of Reclamation determines what types of lands should be irrigated from federal projects when they deal with the issues of feasibility?

A Not specifically, no.

Q You're not included with whether they include class IV lands in those?

A They have a different system of classification. I don't know that.

Q Are you a, a second line of questions: Are you, as I understand it, you're acquainted with the lands in the Chamokane Creek Drainage, as far as the lands you

testified were irrigable?

A Yes, on the Reservation.

Q And you're acquainted with what the United States is claiming irrigable lands in this case?

A (Witness hesitates.)

Q Is that correct?

A Well, generally--

Q Let me ask you this question: Are all the lands the United States is claiming in this case located within the Chamokane Creek Drainage, do you know?

A I believe that's correct, yes.

MR. ROE: Thank you.

THE COURT: You may step down. Thank you, Mr. Harvey.

MR. RUDOLPH: For the record, Your Honor, and this is, I think, in order to clear up a possible implication from Mr. Roe's questions, I would ask that unless he has evidence that the Bureau of Reclamation doesn't include class IV as irrigable in their projects, that the implication arising from his question be removed, because I'm specifically aware of the fact that the Bureau does include class II, III and IV lands, and I don't like that implicated in the record, and so, would you clarify that, Mr. Roe, please?

MR. ROE: I just asked the question whether he

knew whether they did or not.

THE COURT: And he said he doesn't, so there is no problem.

MR. RUDOLPH: All right.

(Witness excused.)

MR. RUDOLPH: The next questions, which witness comes next, Your Honor, this came up yesterday--

THE COURT: Yes.

MR. RUDOLPH: --and I didn't know whether they were intending to proceed or whether we should be proceeding with our witness.

MR. TORVE: Your Honor, I had planned to call Mr. Simon for a few questions. Now, I wasn't a party to the agreement at the time he talked to Mr. Roe about having Mr. Simon taken out of order and put on Direct, notwithstanding they had not finished their case. Now, I'm quite willing to go along with that, but only on the condition that it would not prejudice any motions or any rulings on any evidentiary matters, or any other items that might be, that we, or any of the other defendants, might be able to pose on the plaintiff's case; that the presenting of this evidence will not be prejudicial to making a motion to strike their case for failure to prove their cause of action, or any ruling upon evidence that might come out pursuant to other

witnesses that they put on, which would require striking of their evidence.

MR. RUDOLPH: Speaking for the Tribe, that's understood.

MR. GERMERAAD: I wish Mr. Torve would be a little more specific in his general, all-over about whatever motions he might file not being prejudiced. Are you saying that you might file a motion because you are required to strike something, or you are prejudiced because you are taking Mr. Simon out of order?

MR. TORVE: All I'm saying, Your Honor, is that, at this juncture, it may be possible that there are bases for legal motion for striking the evidence. Frankly, I haven't had an opportunity to review everything in my , what the legal grounds might be, but I don't want to prejudice my ability to do so at the end of their case.

THE COURT: I don't view that as any great problem. I think the problem here is getting the evidence in as expeditiously as possible, so whoever has got a witness who is ready, let's produce him.

MR. TORVE: The State will call Dick Simon to the stand.

MR. GERMERAAD: Could we have that made that the State Department of Natural Resources has called Mr.

Simon--

THE COURT: Yes.

MR. GERMERAAD: --rather than simply the State of Washington.

THE COURT: All right.

RICHARD R. SIMON,

being first duly sworn, testified on behalf of the plaintiff State Department of Natural Resources, as follows:

THE CLERK OF THE COURT: Please state your full name for the Court, spelling your last name.

A Richard R. Simon, S-i-m-o-n.

DIRECT EXAMINATION

BY MR. TORVE:

Q Mr. Simon, would you state what your present occupation is?

A Pardon me?

Q Would you state what your present occupation is?

A Presently, I'm employed as Regional Fisheries Biologist for the Washington Department of Game, stationed in Spokane.

Q And what area does your duties encompass?

A My area of responsibility includes a 10-county area adjacent to the east boundary of Washington State,

including Pend Oreille, Stevens, Ferry, Spokane, Whitman, Lincoln, Garfield, Asotin, Walla Walla and Columbia Counties.

Q Can you give the Court a resume of your educational background?

A I commenced my college education at Everett Community College, where I started in '63, and I graduated in '65, with a two-year degree. I then went to the University of Washington, where I received, in 1968, a Bachelor of Science in Fisheries Biology from that institution.

Q And can you give the Court a resume of your occupations since graduation?

A I went to work in 1968, July of 1968, for the Washington Department of Game, stationed in Spokane, as a Fish and Game Technical Aid, functioning as an assistant to the Regional Fisheries Biologist in this area. I held that position for eight months, at which time I was promoted to a Biologist I Aquatic, moved to the Lower Columbia River, to Cathlamet, and there participated in a cooperative study on the Lower Columbia, with the Oregon Game Commission. After six months in that position, I was, I accepted a lateral transfer to Walla Walla, where I functioned as a Regional Fish Biologist, although my official position was Biologist I Aquatic, for approximately one year, and then I advanced to a Biologist II

Aquatic, for another six or eight months, and eventually received the full status of Fishery Biologist in Walla Walla. To summarize, I was in Walla Walla functioning as a Regional Fish Biologist for just less than three years, at which time I transferred to the Spokane Region. This was in 1972, in August of 1972, I transferred to Spokane as a Regional Fishery Biologist, and have functioned in that capacity since that time.

Q Can you explain to the Court some of the fields of endeavor that a biologist with the Game Department has, what some of your duties are, the studies you might make, and the types of activities you carry on?

A There is a variety, a wide variety of activities that a biologist with the Department of Game carries out. Principally, he has, let's refer specifically to a Regional Fish Biologist, and particularly to my situation in Spokane here. I direct the Fisheries Program for this 10-county area, which includes supervision of two Assistant Fish Biologists, supervision of four fish hatcheries and their entire fish culture operation.

Specifically, or more specifically, I plan and program and direct research studies of various types that explore and evaluate the results of various management measures that we get into, fish stocking of various types of fish, varieties of fish, the results

of those stockings; we, to be a little more specific, to this particular case, we evaluate, by a request of the Department of Ecology, and we investigate and evaluate water right applications; going into the field, making specific measurements on specific streams, and from that information, usually fairly basic field information, we make recommendations as to whether a water right should be issued or not, whether it should be issued with certain provisions, such as low-flow provisions, which, say, after the flow of a stream reaches a particular level, all irrigation must cease, this type of recommendation. We evaluate applications which are made by individual organizations, agencies, contractors, this type of thing, who wish to do some work in streams of the State, or of this area, in my particular case, and evaluate the effect those projects may have on a stream hydraulicly, what detriments there may be to the fish, we make recommendations to Olympia on those applications as to what steps, what measures can be taken to prevent serious damage to the fishery resource.

Q Let me ask you this: In your job, are you concerned with fish habitat and fish culture?

A Yes.

Q Now, Mr. Simon, have you had an opportunity to review

the study made by Mr. Navarre?

A Yes, I have.

Q And have you been in court and listened to Mr. Navarre's testimony concerning the activities that he carried on, and the studies that he made on Chamokane Creek?

A Yes, sir, I have.

Q Have you had an opportunity to analyze the results of fish population samples that were taken from Chamokane Creek, and Mr., and listened to Mr. Navarre's testimony concerning his observations during that time?

A Yes, sir.

Q Specifically in relation to the Lower Chamokane Creek, lying below the falls, are you acquainted with the results of the fish population sample taken by Mr. Navarre, and specifically Station 3?

A Yes, sir.

Q Could you tell us how you would characterize the results of that sample, in terms of its species and population?

A The sample that was taken at Station 3, and as Mr. Navarre has pointed out, it is specifically a sample, and no estimation of the standing population or crop. It appears that there are large populations of what we should call "scrap fish", or undesirable species of fish. Obviously, they found one brown trout, according

to the study, and great numbers of suckers, sculpins, and, two types of suckers and sculpins, and that is it, I guess.

Q All right.

A This indicates there is a fairly substantial population there of undesirable species. That is what this sample says.

Q What, generally, when you have the, that condition present, how does this relate to the culture of a trout population?

A This particular type of situation usually precludes establishment of any desirable population.

Q Can you explain why?

A The various scrap species described here provide a competition factor that, like I say, precludes the development. Now, when I say "competition factor", this must be pointed out, that some of these fish, some of these competing species do not use the same type of food articles, so we can assume possibly they're not competing directly for food. On the other hand, they are competing directly for living space. This is quite important. We have several examples in the immediate areas here where the species you're talking about here, the sculpins and the two species of suckers, and in this case I'm, well, I'd better not enlarge on that,

but we have examples where these species are present in waters that are very accessible for trout, although we find no trout there. We feel very strongly the reason there are not trout there is because of these competing species. I cite one example in particular, the Little Spokane River, which is a tributary to the large Spokane, flowing into the Long Lake a short distance out of town here. We have a few trout in that stream. We have a potential of good trout development, with the exception of the fact we do have a large number of competing species, just as we have in the Lower Chamokane.

Q Is there any way, in a stream such as the Lower Chamokane, to rid the population of the scrap fish, or are there measures that can be taken which would eliminate these scrap fish and make it a better habitat for trout fish?

A In the Lower Chamokane, there would be no way, with the physical parameters we have there at the present time, to eliminate these species. They would reinfest, if they were poisoned out of the lower portion of the Chamokane, there would be nothing to prevent those fish from reinfesting out of the main Spokane River, in that area.

THE COURT: Would that be limited to below the

falls?

A The falls would also be a physical barrier there now that is preventing the upstream migration of those scrap species at the present time, from Mr. Navarre's testimony.

Q (By Mr. Torve) Assuming that the stream, let me ask you this, are there alternative methods by which to establish a fishable condition in the Lower Chamokane, other than natural population?

A There are alternative methods, yes.

Q What would some of those alternate methods be?

A An artificial population of trout could be established there by stocking of legal-sized rainbow in that portion of the stream, or, as a matter of fact, in any body of water, generally speaking. Legal-sized trout could be planted in there. This would creat an artificial fishery there, and this could very well be done. Another step that I should bring out here that could be done, a structure possibly could, now, I say possibly, because I surely haven't explored that possibility to any extent at all, but possibly could be established, or installed, at the lower portion of the Chamokane Creek just upstream from the mouth that would prevent in-migration of the scrap species we referred to before, and that, with that structure in

place, then our resident population could be established, in there, exclusive of making these legal plants, I suppose.

Q Assuming, of course, that a natural population could be cultured in the Lower Chamokane, what effect would a fishery program, sports fishery program, have on that population?

A I think it should be made specific there in your question, and I'll answer it that way, that you're speaking now of a native, or resident, population.

A Yes, right.

A You're not speaking of legal trout. If this portion of the stream was made in some way quite accessible to resident species of trout and resident population of trout in this, let's call it a mile and a-half, as Mr. Navarre pointed out on the map, there certainly would be a great possibility that that population could not be established and self-sustaining if there was any development, or any attention called to it. A stream with a fish population, and all the ecological necessities that are there to form it. It's a very fragile situation. If you would put a concentrated number of fishermen on that, say, mile and a-half of stream, on a native population, or a natural population, a resident population, it probably would be eliminated, if not

reduced to an undesirable level as far as the fishing has gone.

Q What would be the alternative, then, to maintain a high level of fishing opportunity, if I could put it that way?

A The only alternative there, if a development was made and attention called to that portion of the stream, the only alternative would be to just sit there with a planting truck and keep putting fish in, and then you could have an artificial fishery that way.

Q Has that type of program been instituted in other areas, to your knowledge?

A Yes, that type of program has been carried out. In fact, probably on Chamokane Creek at one time. This was the management plan for Chamokane Creek. The Washington State Department of Game, for many years, planted legal-size rainbow in Chamokane Creek and created this artificial situation, and it has been pointed out, quite graphically, by at least one in-depth study in Montana that this is certainly a poor management practice. It eliminates, over a period of time, it eliminates the native population and the resident population from that stream, and if you stop planting your legal-size rainbow in there, you end up with nothing. Two factors are in play in this type of situation: The large numbers of

hatchery legal fish that are stocked in those streams compete very directly with the resident population, and very successfully they compete, and particularly probably for living space. The native or resident population, if they're driven from the area and you have nothing left but the legal fish planted. Another factor that eliminates the native population is the fact that by planting, and if planting is made, it is usually, there is usually attention called to this portion of the stream, and when this happens, of course, fishermen will concentrate in that area and they will be catching not only planted fish, but those native fish that may be there. So, in essence, the resident species of fish of Chamokane, hypothetically, would be eliminated if legal fish were planted in that creek for a number of years.

MR. TORVE: I think that's all the questions I have, Your Honor.

THE COURT: Well, I guess we treat the rest as Cross. I'm not sure how the defendants-- I guess we can go back to where we started before. Mr. Dufford, do you have questions of this witness?

MR. DUFFORD: No, Your Honor.

MR. CAMPBELL: Before you ask, no, Your Honor.

THE COURT: Mr. Rekofke?

MR. REKOFKE: I'll pass for the moment, Your Honor.

THE COURT: Mr. Tracy?

MR. TRACY: No, Your Honor.

THE COURT: Mr. Cerutti?

MR. CERUTTI: Just a couple, please, Your Honor.

CROSS-EXAMINATION

BY MR. CERUTTI:

Q Mr. Simon, I'd like to direct your attention to what was previously referred to as the "Navarre formula", the formula by which Mr. Navarre developed his recommendation of 30 cubic feet per second flow in the lower mile of the Chamokane. Are you familiar with, and do you remember, that testimony?

A Yes, sir, I do.

Q And I want to ask you just briefly about that formula; maybe you would help me first, to be sure I understand. Is it your understanding that the computation is 7/28 or one-fourth, times the 22 cubic feet per second--

A That's--

Q --that supports the recommendation?

A That's correct.

Q What is your understanding of 7/28, as to how that was derived?

A Just a minute. Excuse me, just a minute, maybe I'd

better take a closer look here. Can I clarify my last statement where I said "yes"?

Q Please do.

A I believe you asked me if the computation were 7/28 times 22?

Q Yes, that was my question.

A Was that what you asked me; that is not the computation, no.

Q What is the computation?

A The computation is 7/28, I'm sorry, I'm sorry, you're right, it's 7/28, or one-quarter, times 22.

Q Thank you, sir. And what is the seven, the enumerator in the fraction, then, what does that represent?

A The seven represents one-quarter in the differential in temperature between the spring and the measurement that was made downstream. In this case, his computation was 47, the difference between 47 and 75.

Q Now, excuse me, that would be 28, would it not?

A I said "one-quarter" of the differential is seven.

Q Am I correct in understanding that the fraction used here, 7/28, is derived in part from the difference between the hottest temperature ever recorded and the ideal temperature, in other words, 75 minus 68?

A That's correct.

Q My question--