PUBLIC HEARING

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

STATE OF CALIFORNIA

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SUBJECT: AMENDMENT OF CITY OF LOS ANGELES' WATER RIGHT LICENSES FOR DIVERSION OF WATER FROM STREAMS THAT ARE TRIBUTARY TO MONO LAKE

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Held in

State Water Resources Building

901 P Street

Sacramento, California

Thursday, February 17, 1994

VOLUME XXXX

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Reported by: Kimberley R. Mueller

CSR No. 10060

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I N D E X

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SACRAMENTO, CALIFORNIA
THURSDAY, FEBRUARY 17, 1994, 1:30 P.M.
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HEARING OFFICER DEL PIERO: Ladies and gentlemen, this hearing will come to order.

This is a continuation of the hearing regarding the amendment of the City of Los Angeles' water rights licenses for diversion of water from streams that are tributary to Mono Lake.

My name is Marc Del Piero. I'm Vice-Chairman of the State Water Resources Control Board. I'm acting in the capacity of Hearing Officer.

With us today is my good friend and colleague, Mr. John Brown, who is also on the State Water Resources Control Board.

Mr. Canaday, we have -- is it Dr. Stine and Mr. Vorster?

MR. CANADAY: Dr. Stine and -- I'm not sure how Mono Lake wants to bring their witnesses on.

MR. DODGE: Dr. Stine, towards the end of his presentation, will be joined by Stacy Li, and then we plan to call Tim Messick. I think that will probably be a pretty full day.

HEARING OFFICER DEL PIERO: Do we have any procedural issues to take care of before we begin, Mr. Dodge?

MR. DODGE: I just have one. I saw something in writing that we were going to set the briefing schedule. I thought we'd already done that.

HEARING OFFICER DEL PIERO: I thought we had, also, but Mr. Frink, perhaps, was reiterating in writing what we had indicated orally already.

MR. FRINK: Yes. All that letter was intended to state was that we would announce the dates. As it happens, 30 days after the close of hearing, assuming the hearing ends tomorrow, would be on a Saturday or Sunday. I think we would go forward to the Monday, and the same thing occurs with the 20 days for submittal of reply briefs. So we were going to set dates certain assuming that we end tomorrow.

HEARING OFFICER DEL PIERO: Mr. Birmingham?

MR. BIRMINGHAM: I was just going to announce that Department of Water and Power was not going to call Mr. Roos, Department of Water Resources, as a witness.

HEARING OFFICER DEL PIERO: Thank you very much, sir.

Any other procedural issues?

Ms. Cahill? Mr. Roos-Collins?

MR. ROOS-COLLINS: No issues.

HEARING OFFICER DEL PIERO: Mr. Dodge, why don't

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you proceed, sir?

MR. DODGE: We'll call Dr. Stine as our next witness.

HEARING OFFICER DEL PIERO: Dr. Stine, you've already been sworn in these procedures.

DR. STINE: I have this year.

HEARING OFFICER DEL PIERO: Nice to see you, sir.

DR. STINE: Good to see you.

DIRECT EXAMINATION BY MR. DODGE

Q. Dr. Stine, I have in front of me, and I hope you do, too, National Audubon Society rebuttal testimony of Scott Stine, and then there are various subject matters listed.

Can you identify that as a accurate copy of your rebuttal testimony?

A. BY DR. STINE: I can, though I would like to point out or remind you, as well as inform everyone else, that there was an initial copy of this that was apparently faxed that was the wrong one. There's one change that went in in a slightly later rendition, two hours later. I don't know which one people have.

If they look at the very last page of this exhibit, what they will see is that it is page 11, and if the last entry on page 11 is D, rather than 5, then we all have the same thing in our hands.

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HEARING OFFICER DEL PIERO: Everyone have the one that has A, B, C, and D on the page 11? Mr. Birmingham?

MR. BIRMINGHAM: Yes, I have.

Q. BY MR. DODGE: Dr. Stine, are there any --

HEARING OFFICER DEL PIERO: Wait. Wait, Mr. Dodge.

Mr. Roos-Collins, do you have a copy?

MR. ROOS-COLLINS: Yes.

HEARING OFFICER DEL PIERO: Ms. Cahill?

MS. CAHILL: Yes.

HEARING OFFICER DEL PIERO: Ms. Scoonover?

MS. SCOONOVER: Yes.

Q. BY MR. DODGE: Are there any changes you wish to make in Exhibit 1-A?

A. BY DR. STINE: Yes, very briefly. On page 6, I

used the word "measured." That should be changed to "measures," and perhaps that's already changed. I guess it is already changed on here.

And there is a reference in here to a "natural" channel. This is in the second paragraph, second line from the bottom. That, rather than reading "natural," should read "previously existing." We're using natural in a different sense in this hearing when related to Rush Creek, so that should be "previously existing channel."

And that's the one change, I guess, that I would want to make.

Q. With that, sir, can you summarize your rebuttal testimony? And let me say you've also been designated as our witness in surrebuttal and to the extent you could weave the two of them together, that would be fine.

HEARING OFFICER DEL PIERO: Mr. Birmingham?

MR. BIRMINGHAM: Before Dr. Stine begins his oral summary of his written rebuttal testimony, we'd like to interpose an objection to page 5 of the written testimony, Mono Lake Committee and National Audubon Society Exhibit 1-A-F.

Quoting a great legal mind, F. Bruce Dodge, rebuttal testimony should be --

HEARING OFFICER DEL PIERO: I just want to check the Court Reporter to make sure she's got that on the record.

MR. ROOS-COLLINS: Did you get the quotation marks around "great legal mind"?

HEARING OFFICER DEL PIERO: Proceed, Mr. Birmingham.

MR. BIRMINGHAM: Quoting Mr. Dodge, "Rebuttal testimony should be limited to rebutting something that was entered in some other party's case in chief." We are unaware of any evidence in any party's case in chief which page 5 would rebut.

The Hearing Officer has previously ruled on this issue when Dr. Stine tried to introduce similar evidence during his some of his earlier testimony and it was excluded.

HEARING OFFICER DEL PIERO: Mr. Dodge?

MR. DODGE: I have, I guess, two points. One, of course, I have made that argument several times, and I've lost it consistently. So I would hate to lose the other side of it now.

So I guess that's point one: I agree in principle, but that argument has not been winning.

Secondly, I don't believe it was the Hearing Officer that excluded the information. I believe Mr. Del Piero was out of the room. If I'm recalling it right, it was Mr. Brown who excluded the evidence.

HEARING OFFICER DEL PIERO: Actually, it was Mr. Stubchaer who excluded that. I happen to know that because I read the record.

MR. DODGE: I believe at the time it was explicitly stated this would come up in rebuttal.

MR. BIRMINGHAM: Actually, it was the Hearing

Officer because Mr. Del Piero was out of the room and Mr. Stubchaer was acting as the Hearing Officer.

HEARING OFFICER DEL PIERO: Yes, that's correct.
MR. BIRMINGHAM: So I'll correct Mr. Dodge on that point.
We'll submit -- I told Ms. Goldsmith that I would raise this objection just as a point of order.
HEARING OFFICER DEL PIERO: Thank you.
Mr. Dodge, you're absolutely correct. Your previous argument has not been previously successful. Mr. Birmingham is not going to be particularly successful in his objection, either.
MR. DODGE: Thank you.
HEARING OFFICER DEL PIERO: So it will be allowed into the record.
Dr. Stine, proceed, sir.
DR. STINE: Thank you.
My first rebuttal point concerns the elevation of the playa ring at Mono Lake. There was testimony early on that at lake elevation of 6390 feet, the playa ring would be under water and Mono Lake would appear as a full-looking lake.
I would simply point out that the playa ends where I'm pointing it out here on Exhibit NAS/MLC 142, and approximately one inch to the south of the line that I'm pointing out where we go from a light band to a dark band.

One inch south of there on this same exhibit, we encounter a line that is exhibit -- pardon me, that is lake level 6390 feet. And I have a slide of that as well that shows at a lake level of 6390 feet, there will still be a ring around Mono Lake that is approximately 1500 feet in width.
And this is NAS/MLC Exhibit 184 previously shown. The playa ring ends here at an elevation of approximately 6400 feet where we go from the light material to the dark material. 6390 feet is this line right through here approximately 1500 feet, then, of width, 1500 feet of width between 6390 and 6400 feet.
The second point that I would like to make concerns the role of vegetation in instigating multiple channels on Lee Vining and Rush Creeks.
Mr. Tillemans, in his discussion of the role of vegetation in affecting the stream, noted that there were multiple channels on Lee Vining Creek that had been caused by vegetation.
I would simply like to point out again, by way of slide here, that those multiple channels were already in place on Lee Vining Creek and that the vegetation grew up around the existing channels rather than having caused those multiple channels.
Here we are on the Lee Vining Creek delta. This

is in 1982, and we can see that there are lots of braids on the Lee Vining Creek delta.
There's no vegetation to speak of out here at all. These multiple channels are very shallow. They're very wide and over the ensuing years up to

today, vegetation has colonized these channels, and it did not cause the multiple channels, rather the multiple channels dictated where the vegetation would grow.

Q. BY MR. DODGE: Does the slide have an exhibit number?

A. BY DR. STINE: Yes, it does. And it was Exhibit NAS/MLC 245.

Now, these channels are the result of deltaic processes on the delta there. They have nothing to do with the processes that created these very narrow, deep channels that we see on the bottomlands of Rush and Lee Vining Creek.

If we want these channels back, if we want the narrow, deep, and multiple channels back, we have to start doing some work out there. We can't count on the vegetation to make these multiple channels in any short period of time at all.

The third rebuttal point concerns Rush Creek above Grant Lake prior to 1941, and this is shown on

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Department of Fish and Game Exhibit 164, which I'm not sure, perhaps Ms. Cahill can tell us whether this was accepted and introduced before --

MS. CAHILL: It has been identified. To be sure that it's admitted, we should admit it today.

DR. STINE: This is Department of Fish and Game Exhibit 164. It's the upper half, as it were, of Grant Lake, and we can see that Rush Creek flowing into Grant Lake will follow a very sinuous path here that was highly wooded, there were a lot of wooded wetlands down here.

And in 1940 and '41 when the Department of Water and Power enlarged Grant Reservoir, Grant Reservoir made its way up into these lands taking out, inundating approximately 10,000 feet of channel and some hundreds of acres or about a hundred acres of wooded bottomlands and marsh.

Now, I haven't --

HEARING OFFICER del PIERO: Excuse me, Dr. Stine. What year was that photograph taken?

DR. STINE: This is 1929 or '30. December of '29 or January of '30. And sometimes these aren't marked, but it's one or the other.

I'm not suggesting that this, in itself, is recoverable. As long as the City of Los Angeles is

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going to be using Grant Lake as a storage facility, it's going to be tough to get this back, but I have suggested several times here that Mill Creek could perhaps be rewatered. And in rewatering Mill Creek, we could mitigate for the lost riparian vegetation that we lost here and above Grant Lake.

I don't pretend to be an expert on the water rights of Mill Creek, but I have walked the channel that would be used to get water back into the stream, and I consider it to be hydrographically feasible.

The persistence of sand tufa is the subject of the fourth rebuttal. Sand tufa, I want to say, will break down naturally independent of any lake rise. We have a

number of instances of deposits of sand tufa that have been on the shore and exposed for anywhere from 50 years to 300 years.

My sense is that sand tufa, independent of any lake rise, breaks down over a period of 50, 60 years, something like that.

When I say "break down," I'm talking about collapsing, rounding down to be similar to the forms that today have been exposed for 50 or 60 years.

So I don't expect the sand tufa out there to persist beyond, say, a half a century, or something like that, plus or minus.

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My fifth rebuttal point concerns drought and its effect on Mono Lake.

As I've previously explained, I found what I consider to be compelling evidence for very severe and persistent droughts in California. And with that in mind, I have suggested that what Jones and Stokes used as sort of a model drought as a basis for recommending a buffer, is probably not a strident enough drought to be safe to protect certain critical elevations at Mono Lake.

I considered those critical elevations, the ones that we should take into consideration at least, to be 6378 feet, which is the level at which Drs. Shufford and Winkler say that Negit Island can be invaded by coyotes; 6372 feet, which is the level below which Rush Creek, Lee Vining Creek, and Mill Creek will undergo a new wave of incision that will work its way upstream; and 6368 feet, which is the elevation of the nickpoint that surrounds Mono Lake.

And as I explained, if that nickpoint is exposed, we can expect widespread incision of the Mono shorelands, toppling of all the towers, all of the major tufa groves and draining of the wetlands that surround Mono Lake.

What we did was to not plug in hundreds of years

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to find out what the response to drought of hundreds of years -- or the response of the lake to hundreds of years of drought would be.

Rather, we plugged in 25 years of drought similar to the drought of the period of 1986 to 1990. And when we plug that into the Vorster model, we find the following.

If we start the lake at an elevation of 6377 feet, that elevation, because it's one of the lake level alternatives, obviously, the lake is already below 6378 feet, so we've already allowed coyotes on to Negit Island.

In the seventh year of drought, the lake would drop below 6372 feet instigating incision of the major influence streams, and in the 14th year of drought, the lake will drop below 6368 feet causing the problems associated with the exposure of the nickpoint.

If we start the lake at 6383.5 feet, again chosen because it's one of the lake level alternatives, in the sixth year of drought, Negit Island becomes susceptible to coyote invasion.

In the 14th year of drought, a new wave of incision is instigated in the streams, and in the 21st year of drought, the lake drops below 6368 feet exposing the nickpoint with the problems associated with it.

Starting at the lake level alternative 6390 feet, in the 14th year of drought, Negit Island becomes susceptible to coyote invasion.

In the 21st year of drought, the new wave of incision is instigated on the major influence streams, and given the drought conditions that we've assumed here, 25 years of drought similar to our most recent drought, given those conditions, 6390 would protect Mono Lake against exposure of the nickpoint.

If we start at a level of 6405 feet, which has been suggested as an elevation where we would get back, among other things, a great deal of duck habitat, after 25 years of drought, Mono Lake remains above 6378 feet and, therefore, that elevation, 6405 feet, is sufficient to protect all these three critical lake levels against 25 years of drought.

I'd simply point out that the 25 years is not even close to the persistence of the drought that we have seen in the prehistoric past nor is the present-day drought, the last six years of drought, as severe as the droughts of the prehistoric period. So we're being very, very conservative here both in severity of drought and in the duration of drought.

Now, the remainder of my rebuttal concerns Rush and Lee Vining Creeks. I've broken this down into three subjects; first, the armored meander of the Rush Creek, Rush Narrows. And I'm not going to say too much about the armored meander bend.

Secondly, some misconceptions concerning the historical and existing conditions along the stream.

And, thirdly, the Los Angeles Department of Water and Power video on the Rush Creek bottomlands.

Let me confine my discussion of the armored meander bend to the following. I guess it was last week, I wasn't here, but I guess it was last week that Dr. Kondolf introduced some cross-sections of that meander bend site, and what those cross-sections showed was that between 1989 and 1992 -- this is before any treatment was done on that meander bend -- the stream was both widening and shallowing as a result of the collapse of the bank.

When we went in to do that armored meander bend site, it was continuing. The stream was continuing to plane to the westward, and the bank was collapsing. As a result of the bank collapsing, we were not getting any deepening there.

The RTC, not Trihey and Associates, but the RTC deemed that as an immediate need site. We went in and armored it with so-called soft armor tree boughs and whatnot, in a sense, stapled it to the bend there, and we planted vegetation right along the stream margins with the hopes that if we keep the stream from

collapsing anymore, that we could establish vegetation along there, later on go back and take off the soft armoring and have the stream start to work on the root systems of newly established vegetation. And that would stabilize the bank.

This is still -- our purpose, though, we're going to go out within the next year, two years, three years, as soon as we consider that bank to be stable, and remove the soft armoring. And we will have a nice protective root system in there, and the stream will start doing what I think everybody in the room and all the witnesses would like to see the stream do; that is, undercut root systems, create overhangs, create deep water, et cetera.

Now, on to the misconceptions about the historical and modern conditions of Rush and Lee Vining Creek.

Here is Rush Creek on NAS and MLC Exhibit 213, Rush Creek below The Narrows, the so-called bottomlands. And there are a number of points that were made by Mr. Tillemans and particularly by Dr. Beschta about this. And I'd like to make sure the record, at least my reasoning on this, is very, very

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clear.

Firstly, I have said that there was 35 cfs at the time this photograph was taken, which was either December '29 or January 1930, the 35 cfs flowing through the bottomlands, and I said that was measured here at The Ford. There was not 35 cfs flowing into the entire bottomlands.

In fact, here at The Narrows, there was only from 7 to 10 cfs flowing through The Narrows, and spring flow added to that 7 to 10 cfs giving a total of 35 cfs by the time we got down to The Ford.

Secondly, Dr. Beschta stated that there was more than a natural amount of water in the bottomlands at the time this photograph was taken, which is not the case. Mr. Vorster went back through the wintertime records and found that at this time, or in the years prior to DWP's operation, that there would have been approximately 35 cfs flowing into Grant Lake, 35 cfs flowing out of Grant Lake, and 35 cfs flowing down through here the entire bottomlands, 35 at The Narrows, 35 at The Ford. There would have been 35 cfs throughout the bottomlands.

Here, on this particular photograph, we have only 7 to 10 at The Narrows, 35 by the time we get down here. The conditions here in the bottomlands,

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particularly in the middle part of the bottomlands, are not abnormally wet for this time of year. They're abnormally dry. There would normally be more water than is shown here in this photograph at this particular time.

A third point, despite these low flows here at the bottomlands -- or pardon me, at The Narrows, only about 7 to 10 cfs coming through here. We have two channels. And I would invite those who have not yet taken a close look at this up here to see this second channel right here that very definitely does have water in it. It's

a dark line. It's a black continuous line.
I would also ask that people compare these water channels in here which show up as black lines, with a dewatered stretch such as that right up here. And you can see here on this photograph, in the very northern part of photograph, a dry channel that has no water in it. It appears to be very, very light.
These channels down here are, indeed, watered. Now, I'm not sure that Dr. Beschta and I disagree on this anymore. He originally said on his transparencies that this channel did not have water in it, the second channel immediately below The Narrows.
But then upon questioning, he said that, "Yes, it does have water in it, but there's not a significant

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amount of water in it." I don't know what he means by a "significant amount of water," but I think we now both agree that there is water in the second channel here despite the fact that there's only 7 to 10 cfs down here.
The fourth point, Dr. Beschta said the stream is abutting the channel's rolls in only one place. And he pointed out one spot, right here, at this little ravine where the little ravine, which, in fact, is a fault running right through here, where the stream abuts the small ravine right here.
So that's the one place that the stream is abutting the canyon wall and quarrying gravels, the natural supply of gravels. In fact, again, I would invite people to look at this and see, for instance, right here, that the stream is right up against the canyon wall right there. That this meander bend that I'm pointing out in the center of Exhibit 213 goes right along the canyon wall there for a couple hundred feet. It is abutting the canyon wall. It is undercutting the canyon wall, and it is quarrying gravels out of it. And you can go up to that site today and see the layer of gravels in there that this stream was indeed undercutting.
A fifth point with regard to the natural versus

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artificial nature of the eastern-most channel. This channel that runs right over through here which shows up very, very nicely on this photograph and shows up very nicely today on the ground, there was some suggestion early on that that was an irrigation channel. And I think I'm not misrepresenting Dr. Beschta by saying that he's backed off that somewhat.
He's saying that it's not a dug channel; it's a natural channel. But that it had somehow been affected by artificial rewatering or something like that.
I've talked to a number of people, including Mr. Banta and Auggie Hess. Now, Auggie Hess spent a lot of his childhood down here in the Rush Creek bottomlands, because his grandmother lived down here, and they both say this was a very natural channel through here, that it had not been modified in any way. It has no spoils piled next to it.
It certainly is a natural channel. And there's no

indication anywhere along here that water was being taken out of this channel, and the lands adjacent to the channel watered.

And why would anybody take the time and the energy to pull water out of a channel and water lands in through here which are already absolutely saturated

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because of all the water coming in from the canyon sides?

A sixth point regards the road cutoff. And Dr. Beschta has maintained that the road cutoff here at what I call "Biggest Bend" did not occur in 1967, that it occurred some time after 1967. And he also contends that the road across here was the factor that instigated the meander cutoff, causing incision, causing channel shrinking and, therefore steepening, et cetera.

I have photographs, aerial photographs along for those people who want to look at them, and to look at them with a hand lens so you can really get in on it. This meander is in place in 1964 on the 1964 photos. On the 1968 photos, one year after 1967, the stream has cut that off and it is flowing right across here. And if you want to take a look at it, as I say, I brought the photographs along.

Furthermore, the road here has nothing to do, nothing whatsoever to do with that cutoff. The stream did not enter the cutoff by the way the road. It did not travel across the meander by way of the road. It did not exit the meander by the way of the road. The road is irrelevant.

The reason for this cutoff was very simple. We

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had Mono Lake drawn to a low elevation exposing that nickpoint on the delta. And as a result of the high flows that came down Rush Creek, we started to get incision, head-warned incision here from the mouth of stream.

Now, previously, when water had flowed across the meander neck here. It had gone down a low gradient surface from one overflowing stream to one overflowing channel to the same overflowing channel. There was no real hydraulic gradient right here for incision to occur.

Now, what happens is that we've got this unnaturally large amount of water moving down the stream across the meander right here, and we have an incision working its way headward. What happens is the incision works its way headward as all of a sudden, because of headward incision to the bottom point of meander right here, the water that's crossing the meander cascades down into the channel.

We've got a waterfall there all of a sudden, and that is what instigates incision, and we cut this off in a matter of minutes. Certainly, less than an hour would be required to cut that thing off.

MR. HERRERA: Excuse me, Dr. Stine.

20 minutes has expired, Mr. Dodge.

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MR. DODGE: Mr. Chairman, we would apply for an

additional 20 minutes, and I hope Dr. Stine can finish in that time. There is a variety of subject matters, and we're dealing with both rebuttal and surrebuttal. I've asked him to be as brief as he can, but I think 40 minutes is the best we can do.

HEARING OFFICER DEL PIERO: I'll grant the 20 minutes, Mr. Dodge.

MR. DODGE: Thank you.

DR. STINE: Thank you.

HEARING OFFICER DEL PIERO: However, I would observe that asking Dr. Stine to be as brief as he can be is an oxymoron.

DR. STINE: Only because Dr. Stine is always as brief as he can be.

MR. DODGE: I don't think that was my upshot.

(Laughter.)

HEARING OFFICER DEL PIERO: Please note everyone in the room is laughing.

DR. STINE: With me, not at me.

MR. DODGE: If you believe that, Dr. Stine, you may wish to purchase this bridge I have for sale.

DR. STINE: In your pocket, no doubt.

Dr. Beschta has said that stream widths today in the bottomlands are approaching those of 1941. And I

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would simply point out that he incorrectly quoted my materials.

I mentioned that the channel itself was 25 to 30 feet wide in 1930 and 1940. What I was talking about there, what I was actually measuring in the field, was the top width of the channel.

The point that I was making there was that because this was such a narrow channel, not stream width, not water width now, because it was such a narrow channel, the stream could readily overflow the channel and go up and flood the bottomlands. And there was a lot of flooding that went on in those bottomlands.

Today we have indeed many places where the water surface is 25 to 30 feet wide, but the channel itself has been greatly widened so as to now preclude the ability of the stream to get up on that surface anymore. We were dealing with sort of an apples-and-oranges situation there. The 25 to 30 feet is my channel width; it's his water surface width.

MR. HERRERA: Could you identify that?

DR. STINE: I sure could. I don't have a number on this, actually. Next in order.

MR. DODGE: We'll make that National Audubon Society and Mono Lake Committee Exhibit 265.

HEARING OFFICER DEL PIERO: Any objection?

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None? Fine. Continue, Dr. Stine.

(NAS/MLC Exhibit 265 was marked for identification.)

DR. STINE: The eighth point here, then, regards the vegetation of the bottomlands. I think Mr. Beschta, Dr. Beschta is under the --

HEARING OFFICER DEL PIERO: Dr. Stine, would you be good enough to write NAS/MLC on there?

DR. STINE: Yes.

HEARING OFFICER DEL PIERO: Thank you.
DR. STINE: Dr. Beschta seems to be of the impression that during the 1940s and '50s, and certainly by the 1960s, there had been a large vegetation die off in the Rush Creek bottomlands, and that was not the case. And I pointed that out in my reports that were written several years ago without the heat of battle being a factor here.
In fact, because these lands adjacent to Rush Creek continue to be irrigated up until 1970, at the time the second barrel of the aqueduct was completed, because those lands continued to be irrigated, the Rush Creek bottomlands stayed wet.
And this is something that had been confirmed by Mr. Wes Johnson of the Department of Fish and Game. The vegetation die off in here came after 1967 and 1969

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when the irrigation water was cut off, and that has some bearing here because there was, in '69, '70, and, indeed, even today, vegetation persisting in the bottomlands that had been there for many, many decades.
And with that in mind, I'd like to now, if it's okay, examine the last Los Angeles Department of Water and Power video. And I'd ask people to keep in mind not only the fact that there's a lot of old vegetation in mind there, but there are narrow places on the stream, as Dr. Beschta and Mr. Tillemans pointed out.
But I think you'll agree as you look at this, that every place the stream is narrow, it's because the stream is abutting not three-year-old vegetation, not ten-year-old vegetation, which is irrelevant and very, very small, it's because it's abutting vegetation that's been there for decades.
And every place, where we go through here, every place you see a narrow channel, it's not something that's narrowing today, something that would be clear when Dr. Li, I'm sure, shows his revisited cross-sections, it's places where the stream is abutting very, very old vegetation.
MR. DODGE: I was going to indicate that Dr. Stine is now going to show the video that Dr. Beschta and Mr. Tillemans showed. It has a DWP exhibit number.

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I've forgotten it.
MR. SMITH: I'm looking for it.
DR. STINE: L.A. DWP Exhibit 139.
HEARING OFFICER DEL PIERO: Okay.
DR. STINE: Great video, I might add.
(The videotape was viewed at this time.)
DR. STINE: I believe we're playing. It says play.
I know what happened, Mr. Roos-Collins -- oh, he did rewind it. Bless you.
Here we're approaching The Narrows, and we can see just off to the right, in the upper right corner, where the stream used to go off to the right. Today, it doesn't go off to the right as it did under natural conditions. Rather, it goes down what I have for years referred to as the Gun Barrel, a big relatively straight reach with little complexity.

It's riffle and run. There's very little vegetation along it, and we can see here the kind of vegetation recruitment in this reach that we've gotten over the past three and four and five years occasional willows, but not doing an awful lot to the channel.

Just below here, we'll see where the stream abuts vegetation that is very clearly on the 1964 photographs and arguably on the 1940 photographs. Now, that's a

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little less clear.

And it's right here in this area here, top of the screen, this vegetation is old vegetation. And you'll notice how the camera nicely focuses in for us, because it's narrow in through here. We have some deep water, and there the stream is interacting with old vegetation.

At this point now, the stream goes back into its old channel, and all along the old channel here, there is very old vegetation. Notice the size of this cottonwood right here. Notice the size of this tree. It's not three-year-old vegetation.

And in through here where we have a nice narrow stream here, the vegetation is old. As soon as we lose the old vegetation, it gets wide again. When we go back into the old vegetation like this, not a three-year-old tree by any means, we go back into the old vegetation, it gets narrow again.

This is the story throughout the channel here. Wherever we're against old vegetation, it's narrow. Wherever we're against new vegetation or non-vegetation, it's wide.

Likewise, right in from here, we get in abutting the root systems of this old vegetation, and the stream narrows way down. We get some nice bends in it. We

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get a lot of complexity in here as well.

I should say here, too, that what we don't see on this is the rest of the bottomlands. The bottomlands was a phenomenal area in that it had multiple channels, again, narrowing here because of the big vegetation. It had multiple channels, large amounts of wetland.

We're concentrating here simply on one stream. This channel can no longer overflow into those other channels because of the widening that has gone on in places.

Old vegetation again in here; old vegetation here along this bank. I believe Mr. Messick is going to say something about this. He's a riparian expert, and he may want to comment on this video as well.

We go in here to an area that has no old vegetation, and it's a wide reach.

This is old vegetation in through here. Not only that, but a lot of logs from old deadwood lying around causing the stream to be turbulent right there, causing some deep water associated with this.

But that's all old wood. And we do need old wood, as Dr. Platts has pointed out, to get the stream complex and to get the stream narrow and deep again.

We're into old wood again now, here, and the stream slims way, way down. This is not three-year-old

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vegetation. And, again, as Dr. Li will point out, this is not something that has narrowed during the last three years or even ten years.
Wide channel, there, where we have no vegetation, wide where we have no vegetation. And then it goes back into some old vegetation again, vegetation that we can find on the 1964 photos, and then it slims down. We get a lot of complexity in here again.
And here, notice the age of these trees or at least, the size of the trees; not three-year-old vegetation, not ten-year-old vegetation, by any means.
Wide where we're lacking old vegetation, then into old vegetation again. Notice how it slims down again where it hits that old vegetation.
Very non-complex in through there where we don't have the old stuff.
Couple ducks take off. Imagine how many more there would be if this was all a wetlands.
This is all old wood down in here, and we do get some complexity associated with all those old logs right there.
Here's an area where the bank is actively being cut back, where the stream impinges upon a bank with very little vegetation.
Notice here that we have a collapsing bank right
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along in through here where the bank is actually being undercut.
MR. BIRMINGHAM: Would you mark that spot in the video, please, on the tape?
DR. STINE: I think it's tough for her to do on the tape because there's no numbers.
And all of a sudden, we go down here in the old vegetation here and things start to narrow down and become more complex.
Very little old vegetation in through here, but right there, all of a sudden, we go into the old stuff, and it slims down and starts taking all kinds of bends, becomes much more insinuous, much more irregular, holes undercut banks because of the root systems that we can see through here.
This is the kind of bend that we just do not get here if there's no vegetation. The stream is undercutting the banks causing them to collapse.
Very regular channel in through here. No vegetation to speak of on the sides, no old vegetation, that is.
Notice right here we go from a very regular channel into a channel with some undercut banks and whatnot, when we get into this old vegetation, not three-year-old vegetation.
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Here's three-year-old, five-year-old vegetation right through here.
This is the where the helicopter decided to circle, so we're seeing some more of what we just saw.
A big log jam right here. But there's old wood that's caused by trees having been there for a long time, rather than by anything that's been going on

during the last three years.
The complexity here, the undercut banks, the old vegetation.
Very little vegetation in through here, and then down to The Ford.
And that's where we ended the video right there.
I would like to introduce, if I could, NAS/MLC Exhibit 251, which was a photograph taken by Chestley Wakeley, I believe, in the 1940s and, likewise, Exhibit 252, NAS/MLC 252.
It shows a young guy climbing into the stream. You can see how narrow the stream is there. We can see the kind of stream that existed prior to the diversions by the Los Angeles Department of Water and Power.
MR. BIRMINGHAM: Excuse me. May I see the photographs, please?
DR. STINE: Certainly.
MR. BIRMINGHAM: Are we going to be provided

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copies of these?
MR. DODGE: I thought you already had.
MR. CAIN: They have.
MR. BIRMINGHAM: Thank you.
DR. STINE: And I'd like to also put in three exhibits that are labeled NAS/MLC 248, 49, and 50, which are photographs of some of these same channels as they exist today that I believe can be rewatered. And we would recoup very rapidly some of these same conditions that existed out there in pre-1940 times, rather than having to wait for the existing vegetation to grow up all along the stream and create the conditions that existed out there prior to 1940.
HEARING OFFICER DEL PIERO: Any objection, Mr. Birmingham?
MR. BIRMINGHAM: No.
HEARING OFFICER DEL PIERO: All right.
DR. STINE: And I believe that that concludes my rebuttal and surrebuttal testimony.
HEARING OFFICER DEL PIERO: Mr. Dodge, did you want those exhibits introduced into the record now, or do you want to wait until you introduce all the rest of your exhibits?
MR. DODGE: I think we'll wait. Thank you.
HEARING OFFICER DEL PIERO: Thank you.

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Mr. Dodge, was Dr. Stine's presentation on behalf of the National Audubon Society/Mono Lake Committee singularly only?
MR. DODGE: Yes.
HEARING OFFICER DEL PIERO: Mr. Birmingham?
MR. BIRMINGHAM: Excuse me, one moment.
HEARING OFFICER DEL PIERO: I thought you might be leaving, Mr. Birmingham. I wasn't quite sure.
MR. DODGE: Mr. Chairman, I had indicated that I was going to put Stacy Li on with Dr. Stine. I think it might be simpler if we went through the cross-examination and then go to Dr. Li.
HEARING OFFICER DEL PIERO: I assumed that by virtue of the fact that you had not called him and moved back to your chair, that that was the case. But

thank you for clarifying that.
Mr. Birmingham?
MR. BIRMINGHAM: Thank you.
CROSS-EXAMINATION BY MR. BIRMINGHAM
Q. I'd like to go through NAS/MLC 1-A-F with you, Dr. Stine. That's the rebuttal testimony that you prepared?
A. BY DR. STINE: Yes, it is.
Q. And the first page of that rebuttal testimony has a title on it, "Rebuttal Testimony of Scott Stine

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Regarding the Persistence of Sand Tufa in the Mono Basin."
What evidence were you trying to rebut when you drafted this? Was that the evidence presented by Ranger Carl?
A. I'm not sure what "rebuttal" means, to tell you the honest to goodness truth, because it's been used so very, very loosely in the proceeding.
There was a question that was left hanging, in my opinion, and what I'm trying to do is simply clarify that question that was left hanging.
Q. That was the --
A. I'm not sure that there was anything ever resolved on this question to actually rebut, so I may be breaking the rules by bringing this up.
HEARING OFFICER DEL PIERO: Would the Court Reporter please mark that section so I can refer to it later on?
Q. BY MR. BIRMINGHAM: Well, in fact, it was a question that was asked of Ranger Carl by Mr. Del Piero; isn't that correct?
A. BY DR. STINE: I think it was directed to both Ranger Carl and myself, and I explained some things and then Ranger Carl came in and explained some other things. And we went on to another topic, and it was

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left hanging.
Q. And the question that was asked of Ranger Carl and you by Mr. Del Piero was how long you would expect the sand tufa to persist; is that correct?
A. Something to that effect.
Q. And Ranger Carl -- first, Ranger Carl was called by the State Parks Service and by the State Lands Commission; is that right?
A. I believe that's correct, yes.
Q. And when you were asked the question by Mr. Del Piero concerning the persistence of sand tufa, you were appearing as a witness on behalf of the State Lands Commission and State Parks Service; is that right?
A. That's correct.
Q. So you're offering rebuttal testimony to what was offered by State Lands Commission and State Parks Service; is that right?
MR. VALENTINE: Objection. That's argumentative.
HEARING OFFICER DEL PIERO: It is argumentative. You don't have to answer that, Dr. Stine.
Mr. Birmingham, why don't you go on?
Q. BY MR. BIRMINGHAM: Ranger Carl said they had a

photo. They were taking photos of sand tufa for some time period of approximately ten years. And in his

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opinion, he thought that the concern over the delicacy of sand tufa was a little bit overstated.

Was that his opinion?

A. BY DR. STINE: I don't think that he said that. I think what he said was that he saw relatively little change in the sand tufa, this is how I remember it, saw relatively little change in the sand tufa over the ten years that he had been photographically documenting the sand tufa.

My feeling on that, Mr. Birmingham, if you're still with us --

HEARING OFFICER DEL PIERO: Mr. Birmingham is securing an exhibit.

DR. STINE: My feeling on that, if you extrapolate his conclusion, is that sand tufa will be here 50,000 years from now. And I don't think that's going to be the case.

I think that sand tufa is something like an old barn. You build a barn, and for the first number of years, it looks awfully good. And as weather takes a toll, that barn starts to look a little shabby. And the shabbiness progresses very, very slowly at first, but pretty soon the termites have taken a toll on the bottom. And the more the thing collapses, the more it's going to collapse.

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And that's the way sand tufa is going to weather as well. We're going to have a period out there where it weathers very, very slowly. But there's going to be some undermining due to weathering, salt crystal growth, freeze-thaw, a number of other things that is then going to start to take a toll. The bigger the toll, the faster the toll will progress.

It's not, then, a linear degradation. It's a curvilinear degradation, the degradation proceeding faster as time goes on.

We see this in a lot of different rock types. This isn't peculiar to sand tufa.

Q. BY MR. BIRMINGHAM: I'd like to refer to page 12 of State Lands Commission and Department of Parks and Recreation, Exhibit 4, testimony of David Carl on behalf of the State Department of Parks and Recreation.

Do you have a copy of that with you, Dr. Stine?

A. BY DR. STINE: I don't.

Q. What I'll do is read with you, and I'll ask to read along while I read it aloud so you can confirm I read it accurately.

Or better yet, why don't I ask you to read the fourth full paragraph of Ranger Carl's testimony into the record? That's the fourth full paragraph on page 12.

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A. Which states, "The DEIR overstated the impacts of weather on the sand tufa. We have closely monitored sand tufa sites for over ten years with a photo inventory. We have documented very few obvious visual changes in that decade. The density of the sand tufa

material and the shelter provided by the surrounding hills appear to offer some protection from weather forces."
Q. By surrounding sand hills.
A. Surrounding sand hills, excuse me, yes.
And I would respond to that only by saying that what I said two minutes ago still stands.
Q. You disagree with the opinion expressed by Ranger Carl on page 12 of his written testimony?
A. Well, I'm not sure. I don't remember exactly what the DEIR said, so I don't know if it was overstated or not.
But my point remains the same: That we can go to 50-year-old sand tufa that's out there that we know to be 50 years old. We can go to 300-year-old sand tufa that we know to be 300 years. And, to me, that represents a much better way of assessing how sand tufa stands up over time than this photographic record. Then I get back to my barn analogy again.
Q. Now, as I recall Ranger Carl's oral testimony,

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during his oral testimony, he presented a bunch of slides that depicted sand tufa in different states; is that correct?
A. You may be right, but that's not how I remember it. I believe that he was showing different sand tufa localities all of which had been exposed by the modern drop of the lake. So relatively young deposits or young exposures of sand tufa.
Q. And he testified that some of the sand tufa that had been exposed for longer periods that had fallen down, or had become decayed were in that state because of the impact of livestock that had been grazing in the area of the sand tufa.
Do you recall him testifying to that?
A. I recall something to that effect, although, I would state that the areas that I've looked at and the sand tufa exposure that I've looked at, have not been trampled by grazing.
When you trample something with grazing, it's a big impact. It's an obvious impact. I'm talking about sand tufa exposures that have been weathered in cetu (phonetic), in place.
Q. So the condition of the sand tufa that Ranger Carl showed us in the slides, in your opinion, that's not a result of livestock grazing?

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A. That's not what I said at all. He may very well have shown slides of sand tufa that may have been impacted by grazing.
What I'm saying is that the models that I used to determine how long or to estimate, because it is an estimate, estimate how long sand tufa would persist, irrespective of a lake level rise, had obviously not been trampled. It was standing, somewhat dilapidated, the very thin plates were all removed. The sharp edges had all been subdued way down.
Q. Now, I may be mistaken, but as I recall, when Mr. Del Piero asked the question of you and Ranger Carl concerning how long the sand tufa would persist, Ranger

Carl responded and you leaned over and whispered something to Ranger Carl.
Do you recall what you whispered to Ranger Carl?
MR. VALENTINE: Excuse me, Mr. Del Piero. If there's going to be a long line of questioning on what happened six weeks ago, maybe Dr. Stine should have the benefit of the transcript.
HEARING OFFICER DEL PIERO: Do you have a copy of the transcript, Mr. Birmingham?
MR. BIRMINGHAM: I probably could find it somewhere, if necessary. Although, what he whispered to Ranger Carl isn't going to infringe on --

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HEARING OFFICER DEL PIERO: Dr. Stine, do you recall what you whispered into Ranger Carl's ear six weeks ago?
DR. STINE: I better say something otherwise imaginations in here will soar. I don't recall.
MR. BIRMINGHAM: You and I whisper things all the time, Dr. Stine, and I would not want imaginations to soar.
HEARING OFFICER DEL PIERO: That didn't get into the transcript now, did it?
DR. STINE: I'm not sure how it got in. I didn't mean S-O-R-E.
HEARING OFFICER DEL PIERO: Please proceed, Mr. Birmingham.
MR. BIRMINGHAM: I will.
HEARING OFFICER DEL PIERO: Quickly.
Q. BY MR. BIRMINGHAM: Dr. Stine, let's go through the video.
First, before we do, I take it from your description of some of the video that, in your opinion, some segments of Rush Creek are in pretty good shape; is that right, Dr. Stine?
A. BY DR. STINE: I would hesitate to remark about -- I think you've got it on fast there.
I would hesitate to talk about stream reaches

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without indicating exactly which stream reaches it is we're talking when. I feel much more comfortable talking about the bottomlands in its entirety if we're going to generalize.
If you want to go reach by reach, I'll be more than happy to. This, I think, is in abysmal shape. Here, the stream is not where it was prior to 1940.
HEARING OFFICER DEL PIERO: Dr. Stine, you need identify where "here" is.
DR. STINE: I'm sorry. This is the first 1,800 feet, 1,700 feet or so below The Narrows.
HEARING OFFICER DEL PIERO: Thank you.
Q. BY MR. BIRMINGHAM: Now, we're looking at vegetation. I've stopped this, Dr. Stine, at what is indicated on the frame counter as frame 42, and we see depicted in this frame some vegetation.
Is that vegetation old vegetation or is it young vegetation?
A. BY DR. STINE: I think that that's probably young vegetation right there. But this branch right here that's clogging the channel is probably some old

vegetation and, once again, having old vegetation in the system is really very, very important.
The old vegetation, branches like this, will do things to the stream that three-year-old vegetation

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can't do; indeed, probably ten-year-old vegetation can't do. So we do have a constriction right here, and it has to do with vegetation.
I would guess that that is probably ten-year-old vegetation, though, rather than three-year-old vegetation, because remember, we did have flows down here in 1980, '82, '83, and '86. It isn't just the last three years that we've had flow in the Rush Creek bottomlands.
Right here we're dealing, of course, with much older vegetation.
Q. I'm stopping this at what's identified as frame 58 on the counter. And you indicated this is older vegetation?
A. Yes, it is. I believe Mr. Messick will have something to say about that as well.
Q. Now, we're looking at a portion of stream. Is this old vegetation or young vegetation that we're looking at, Dr. Stine?
A. Well, I think that what we see here, perhaps, on the left bank, is young vegetation. What we're seeing here on the right bank of the stream looks to me to be old root systems sticking out into the stream. So I would say the right bank is probably old vegetation. The left bank is probably quite young vegetation.

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Q. That was frame 62 that we were looking at.
We're moving further down the stream.
A. Now, I would like to say, if possible, we're now in a place on the stream where the stream is occupying the same channel that it occupied in 1940. We're not into a new channel anymore.
HEARING OFFICER DEL PIERO: Can we identify the frame, please?
Q. BY MR. BIRMINGHAM: Yes. I stopped this at frame 72.
And I'm pointing, Dr. Stine, to some vegetation that exists on the right bank of the channel. That vegetation is young vegetation, isn't it?
A. BY DR. STINE: I would first like to clear up and say that that's not on the right bank of the channel. It's actually on a bar that is within the vegetation.
I would say it is young, though I would hesitate to say it's three years old. I suspect that it is due to the flows of the early and mid 1980s rather than anything that was there prior to 1940. This is all very old vegetation in here at frame 78, 79, and 80.
Q. I've stopped this at frame 82, and I'm pointing to some vegetation which appears to the right bank of the stream.
Is that vegetation young vegetation, Dr. Stine?

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A. I would say that is probably vegetation from the early and mid 1980s, whereas to the left bank, we're dealing with vegetation that's much older.

Q. Now, we're looking at some vegetation during the winter; is that right, Dr. Stine?
A. That is correct.
Q. And is it correct that this vegetation would appear green during the summer period?
A. Yes, it would. And I would point out that from frame 88 through 98, now, we're in through some very old vegetation, much older than we were looking at before. It would appear green. Now, it's pretty fluorescent orange.
Q. I'm going to fast forward this, if I may, to a point where I asked the Reporter to mark the transcript.
A. Nice old vegetation through there.
HEARING OFFICER DEL PIERO: Can I -- excuse me. Mr. Herrera, how much time left?
MR. HERRERA: Five minutes and 30 seconds.
HEARING OFFICER DEL PIERO: Mr. Birmingham, I'm assuming that you have some additional questions to ask of Dr. Stine?
MR. BIRMINGHAM: I do.
HEARING OFFICER DEL PIERO: In order to facilitate

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this process and not cause Mr. Birmingham to ask repeatedly for extensions of time, Dr. Stine, it may be appropriate for you to limit your answers to the questions he's asking.
DR. STINE: I will, sir.
Q. BY MR. BIRMINGHAM: Now, I think I've found the place on this video that I wanted to ask you about, Dr. Stine. Let me just stop it, if I may.
Now, Dr. Stine, this is a place where you indicated that a bank was being sloughed off; is that correct?
A. BY DR. STINE: Yes, it is. And we can see it through here on the left.
HEARING OFFICER DEL PIERO: You need to back that up, Mr. Birmingham. Either that or I'll move to the other side. When Dr. Stine stands up to point something out, I can't see.
DR. STINE: And here is the sloughing I was talking about, and here is some more of the sloughing that I was talking about here. The bank is being actively undercut, and it is playing to the left.
Q. BY MR. BIRMINGHAM: Now, that undercutting, is that what you attempted to stop through the project at the meander bend further downstream?
A. BY DR. STINE: I think that we have successfully

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stopped it, yes. That was done at the request of the RTC.
And here is the bank right here; and here is the soft armory here. And you can see how, in the past, this material was pulled away from the bank.
MR. HERRERA: Could you identify that frame, please?
DR. STINE: 252.
MR. HERRERA: Thank you.
Q. BY MR. BIRMINGHAM: And you indicated that it was the sloughing off and undercutting which you attempted

to stop through the project of the meander bend at RC 4.5?
A. BY DR. STINE: That's correct.
MR. ROOS-COLLINS: Excuse me. Let me interpose an objection.
Mr. Birmingham said "you" referring to Dr. Stine. Dr. Stine is not the restoration consultant and, therefore, is not responsible for the choice of the intervention which is being addressed here.
MR. BIRMINGHAM: The reason I selected the term "you" is because repeatedly throughout Dr. Stine's testimony, he used the term "we." He may have been referring to "we, the planning team," "we, the restoration technical committee." But the term he used

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was "we."
HEARING OFFICER DEL PIERO: I'm going to overrule the objection. However, I'll point it out, although it's not necessary. The RTC is well identified in the record. Dr. Stine's functions and activities on that stream are also well documented in the record. It's not a problem.
Q. BY MR. BIRMINGHAM: Now, Dr. Stine, with respect to your description of the old vegetation that has caused the channel to narrow, are you telling us that at those places where there is old vegetation, narrowing is no longer a continuing process, but it is, in fact, a completed process?
A. BY DR. STINE: You've set up an assumption there that's incorrect. And if you could restate the question, I think I would not be tripping over it. You said something in there that implied that narrowing had been caused by this vegetation. And what I'm saying is that the stream has not narrowed at these sites, nor has it widened at these sites. The stream is very much, at many of these old vegetation sites, it is very much the way it was prior to 1940.
I think that Dr. Beschta was incorrect in talking about ongoing narrowing on the stream.
Q. So it's your opinion that there is no ongoing

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narrowing on the stream?
A. It's my opinion, having looked at Dr. Li's cross-sections data, rather than speculation, that the stream is narrowing ever so slightly in the top six inches of the stream locally. It is actually doing quite a bit of widening in places at that depth, and that, overall, the stream has changed very little in width and in depth not only in the last three years but, in fact, since 1987. And that's based on actual data rather than speculations.
Q. Is that data that you've collected?
A. That is data that Dr. Li collected both in 1987 and in January of this year. And it's data that I've reviewed.
Q. I'd like to talk about your testimony concerning the future drought and its effects on Mono Lake. You indicate that this was -- the analysis that's contained in the testimony was prepared using the Vorster water balance model; is that correct?

A. That's correct.
Q. You didn't use the LAAMP model?
A. Didn't use the LAAMP model because I didn't have access. And at the time we did this, there was still questions about the LAAMP model. It was very simple for me to use the Vorster model, because I have

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depended on things that I've published on the Vorster model.

And Peter and I have worked together using his model to create the hydrologic conditions of the past couple thousand years at Mono Lake.

I should say, too, if I may, that either the LAAMP model -- and I think Mr. Hasencamp pointed this out, that both the LAAMP model and the Peter Vorster model actually underestimate the effect of drought. So in that respect, either model would be very conservative.

HEARING OFFICER DEL PIERO: Dr. Stine, I ask you to focus on the questions Mr. Birmingham is asking you.

DR. STINE: I'm sorry.

HEARING OFFICER DEL PIERO: That's twice.

Q. BY MR. BIRMINGHAM: Now, you make reference to droughts from prehistoric periods that were in excess of 25 years; is that right, Dr. Stine?
A. BY DR. STINE: Yes, that's correct.
Q. Is part of the basis of your opinion there were droughts that lasted in excess of 25 years, tree-ring analysis?
A. In part tree-ring analysis, but not tree-ring analysis in a dendro-climatological sense, tree-ring analysis in a dendro-chronological sense. I used the tree-ring to help date the phenomenon rather than to

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actually put climatic boundaries on the phenomenon.
Q. So you did not use tree-ring analysis to determine the duration of a drought, instead you used tree-ring analysis to determine when the drought occurred?
A. No. I used tree-ring analysis for both things that you've just stated. I simply didn't use tree-ring analysis to judge the severity of the drought.
Q. Now, is it correct, Dr. Stine, that -- well, tell me the analysis that you performed using tree-rings to determine the duration of drought.
A. There are trees, very long-lived trees, rooted in wetlands today, areas that are today very, very wet. One of those areas is Mono Lake. Another is Tinemaha Lake up by Tioga Pass. It's a lake that even during the past six years of drought overflowed in every year, yet that lake was over 60 feet below its overflow level for a long time during this drought for which we have evidence at a whole bunch of sites, Tinemaha Lake simply being one of them.

Those trees have upwards of 140 rings in them. That means that the lake has to have been below its lip for over 140 years for those trees to persist there.

And it isn't just at Tinemaha Lake. I give that as one example. Also, the West Walker River, the East Carson River, those other sites that I have pointed out

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to you. So there we're using ring counts to determine

the duration of drought.
MR. HERRERA: Mr. Birmingham, that's 20 minutes.
MR. BIRMINGHAM: I make an application for an additional 20 minutes.
HEARING OFFICER DEL PIERO: Granted.
Q. BY MR. BIRMINGHAM: The existence of a tree below the existing lip of Tinemaha Lake for a period of 140 years would not indicate a drought of that duration; isn't that right, Dr. Stine?
A. BY DR. STINE: In combination with all of the other evidence that dates precisely the same as the Tinemaha Lake work, and here it's Osgood Swamp, Tinemaha Lake, Mono Lake, East Carson River, West Walker River, Walker Lake, and a number of other sites, Yuba River and Independence Lake, we're getting more and more data, all of these lakes disappeared at this time.
In and of itself, I would say that it strongly, strongly suggests that there was drought. In combination with all of these other sites, I would say it's overwhelmingly compelling.
Q. Are you familiar with the work that's been done by the Department of Water Resources in connection with the duration of droughts in the San Joaquin and

0060

Sacramento Valleys?
A. You'll have to be a little more explicit, if you would, on the actual studies. I'm familiar with several of them, yes, but perhaps you could point out which one you're talking about.
Q. Are you familiar with the study performed by the Department of Water Resources at the conclusion of our most recent drought that was performed by the University of Arizona?
A. Yes, I am. I think that that was done by Fritz and his co-workers, and it was actually some work that followed up on work that was done within the last ten years, which took the tree-ring record back to approximately 1500 or 1550 A.D.
They looked then at the duration of droughts from about 1500 or 1550 A.D. to the present time.
Q. And it's correct, Dr. Stine, that that analysis concluded that a drought of six or seven years was the maximum duration of a drought during that period in the Sacramento and San Joaquin Valleys?
A. That is correct. Although, I would like to point out that 1550 A.D. to 1850 A.D. was the coldest and wettest period of the last 2,000 to 3,000 all over the world, and I brought this book along called The Little Ice Age that documents that cool, wet period all over

0061

the world, including in the Sierra Nevada of California.
At that time, Mono Lake was 28 vertical feet higher than at any time during the last 3800 years. It was a very cool, very wet period, and I would suggest that it would be prudent for the State of California to not use the Little Ice Age as their criterion for determining drought in California. They should look beyond the Little Ice Age, which is this very, very

aberrant time.
Q. Dr. Stine, NAS/MLC 245, when was this photograph taken?
A. That was taken in -- if I could check here, I can give you a month and a year, like a toaster -- it was taken in August of 1983.
Q. What was the flow in Lee Vining Creek in August of 1983?
A. The flow was probably on the order of 200 to 300 or so cfs, and I'm guessing here in July it maxed out, I believe, on about July 4th in excess -- well, in excess of 300 cfs. And it was still fairly high in August of 1983.
Q. Dr. Stine, I'd like to hand you a slide, and I'd ask if we can use your slide projector to show the slide which I'd ask to be marked next in order

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L.A. DWP, and I'll provide copies to the Board and to the other parties.
Now, Dr. Stine, do you recognize this slide which will be L.A. DWP 165 as the mouth of Lee Vining Creek?
A. Yes, I do.
Q. And is that what the mouth of Lee Vining Creek looked like in the fall of 1993?
A. I can't vouch for the actual year on here. This slide may have been taken before that. This doesn't depict terribly well the amount of vegetation that's out there. I think maybe that there may be even a little more vegetation out there in that month that you mentioned than there is on the slide.
Q. I'll have to apologize for the quality of the slide.
Dr. Stine, I will represent to you that it's a slide that was taken from the video prepared by the Department of Water and Power in the fall of 1993, which is of very poor quality.
A. Okay.
Q. But generally speaking, is that the way the mouth of Lee Vining Creek appears today?
A. Similar to that, certainly, yes.
Are you done with this?
MR. BIRMINGHAM: I move for the admission of

0063

L.A. DWP Exhibit 165.
HEARING OFFICER DEL PIERO: Any objection? So ordered.
(L.A. DWP Exhibit 165 was admitted into evidence.)
HEARING OFFICER DEL PIERO: Are we going see more slides, Mr. Birmingham?
MR. BIRMINGHAM: No more slides, at least not that I'm aware of. No more slides. And, in fact, I don't think I have any further questions of Dr. Stine at this moment.
HEARING OFFICER DEL PIERO: Thank you very much, Mr. Birmingham.
Mr. Roos-Collins -- I'm sorry. Ms. Cahill?
MS. CAHILL: No.
HEARING OFFICER DEL PIERO: Mr. Roos-Collins?
MR. ROOS-COLLINS: Mr. Del Piero, could we take a

few-minute recess before my cross-examination?
HEARING OFFICER DEL PIERO: That's a good idea. We'll take ten minutes.
(A recess was taken at this time.)
HEARING OFFICER DEL PIERO: Ladies and gentlemen, this hearing will again come to order.
Mr. Roos-Collins?
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CROSS-EXAMINATION BY MR. ROOS-COLLINS

Q. Dr. Stine, good afternoon.
A. BY MR. STINE: Good afternoon.
Q. You know, there's an old story about two blind men touching an elephant. One blind man says, you know, "This is a tail." The other blind man says, "No, it's a trunk."
Are you familiar with that story?
A. Yes, I am.
Q. Now, Dr. Beschta and you look at the same 1929 photographs, and you don't appear to describe the same reality.
Would you agree that you and Dr. Beschta see different things in the 1929 photographs?
A. Yes, I believe so, though I'm getting the impression, as time goes on, that our views are becoming somewhat convergent.
And I would point out the fact that on his transparencies, he points to a canal which he identifies as an irrigation canal, and he apparently is no longer calling that an irrigation channel.
He points to another place that says, "Relic channel unused in 1929," but in his testimony now, he's saying that, indeed, there was water in there.
So I think that as time goes on, our views are,

perhaps, converging, and maybe the elephant is turning out to be a more like a round ball.
HEARING OFFICER DEL PIERO: I don't know this story of the round ball.
(Laughter.)
DR. STINE: Let me tell you.
MR. BIRMINGHAM: I don't know the story of the elephant. Is somebody going to tell me?
HEARING OFFICER DEL PIERO: Not in this record.
Please proceed, Mr. Roos-Collins.
MR. ROOS-COLLINS: For Mr. Birmingham's benefit, I will stipulate that it has something to do with seeing the parts and not the whole.
Q. BY MR. ROOS-COLLINS: In any event, Dr. Stine, having reviewed Dr. Beschta's written and oral testimony in this proceeding, do you understand the method that he used to interpret the 1929 photographs?
A. BY DR. STINE: The physical and logistical method, yes. He looked at it with a magnifying stereoscope just as I did, and I think he was probably looking for certain things. I got the impression, and it's only an impression, from Dr. Beschta's testimony that he went out there and looked at particular controversial questions.
For instance, I had mentioned several years ago in

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publication that the meander bend had been cut off, and that was from having tried to understand the entire bottomland system and the way it worked, top to bottom, side to side, and through time, because I have a record that goes back thousands of years of the bottomlands.
And I think what Dr. Beschta did, which might be what I would do if I was in a similar position to Dr. Beschta, coming in without a lot of time to try to understand an entire system, I think what Dr. Beschta did was say, "All right. Let's concentrate on the meander. Okay. Let's concentrate on the one channel over here. Dr. Stine says that's such and such a way. It isn't that way."
I think he did it, by his own admission, without the benefit of having talked to the early residents of the time, and I'm sure he did it without the benefit of having spent hundreds and hundreds of hours on the ground in the bottomlands.
I get the impression from his testimony that only after he had formulated his decisions that he voiced in here in, I guess it was, November or December, only after that, did he go out and actually check out on the ground some of the things he had stated in here. And it was after that visit, that he seems to have changed his opinion on whether something was a irrigation
0067
channel or relic channel, et cetera.
To answer your question, yes, I think I understand what he did.
Q. And your understanding you just stated?
A. Yes.
Q. Let's discuss your method. Specifically, as used to develop Cal Trout Exhibit 13, which is your September 1992 report entitled "Past and Present Geomorphic, Hydrologic and Vegetative Conditions on Rush Creek."
A. Yes. That has been introduced and, I think, discussed not under that number but, rather, under NAS/MLC 122.
Q. Dr. Stine, it's been discussed under both numbers, and I used the Cal Trout number because I have it marked on my cover.
A. Okay.
Q. That report refers to your review of 1929 and 1940 photographs?
A. It does.
Q. And it also refers to your review of old timers' reports?
A. Anecdotal evidence having interviewed some of these people. In a few cases, it's written. In other cases, it's stuff I have gleaned through conversations
0068
with them.
Q. It also refers to your field inspection of the relic channels?
A. It does, yes.
Q. It refers to your field measurement of the relic channels?
A. Yes, it does.

Q. Would it be fair to say that your method for interpreting pre-1941 conditions combines these different analyses?
A. Yes.
Q. Anything else?
A. Lots else, but not in relation to that question.
Q. Let's discuss the key features of the Rush Creek Reach Five to bottomlands prior to 1941.
A. Okay.
Q. In the course of discussing the pre-1941 features, I will also ask you questions about how those features have changed between 1941 and the present.
On page 23 of Cal Trout Exhibit 13, first paragraph, you state that, "Even a moderate amount of flow; i.e., approximately 30 cubic feet per second, created relatively deep water, say, 2 to 4 feet deep and more depending on channel bottom efficacies. At these moderate flows, water reached depths exceeding 2

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feet along thousands of linear feet of channel through the bottomlands."
That is your opinion today?
A. Yes, it is.
Q. Do you have an opinion how Rush Creek today in the same reach compares?
A. Yes. Although, I should clarify that the same reach of the stream today is not necessarily Rush Creek in the same location.
Q. Understood.
A. And so that the stream is, in many places, in actually a different location.
First of all, I'd like to point out that it's more difficult to have thousands of feet of channel within certain reaches of Rush Creek, because these multiple channels no longer have water in them. So we've immediately done away with about, I believe it's 15,000 linear feet of channel in the bottomlands, because we not longer have multiple channels watered.
I would also point out that along much of the stream course that still does have water in it, we don't have as much deep water as existed previously. And I would point to, for instance, the upper 1800 feet, or so, of channel through the bottomlands.
If we look at that on the ground today, we can go

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back and reoccupy the channel that used to have water in it, and we can see how narrow and deep that channel was. It is not at all like the present-day channel which I refer to as the "Gun Barrel." It's much wider. A Gun Barrel is much wider, and it's just a shallow run the whole way down.
Q. Dr. Stine, on page 28 in paragraph 5 of Cal Trout Exhibit 13, you state, "Narrow channels with steeply sloping banks are rare. As a result of these changes in channel width and bank steepness, the same flow volume that previously created 2 to 4 feet of water depths creates only approximately 6 inches to approximately one foot of depth along most of the modern waterway."
Is that your opinion today?

A. Yes, it is. Though, what I'm talking about there is Rush Creek from The Narrows down to well below The Ford, down to where we got to that lower, say, Clover Ranch area.

So when I say "most of the stream," I'm taking that entire reach into consideration. And we've become focused and almost fixated here on certain parts of the Rush Creek bottomlands largely because of what the video covered.

The video stops at approximately, what we called

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The Ford today, which is a slightly different location than the old Ford, but there's still all that other area down below The Ford between The Ford and Clover Ranch House. And that down there, too, is much, much wider as is the area above the first 1800 feet of channel below The Narrows.

Q. Do you have Dr. Beschta's written rebuttal testimony in front of you?

A. Not handy.

Q. Are you familiar with Figure 2 in that written rebuttal testimony, the Rush Creek thalweg profile dated January of 1994?

A. Yes, I am.

Q. Are you familiar with the area covered by that profile?

A. Yes, I am.

Q. Does that area roughly correspond with the area described in paragraph 5, page 28, of Cal Trout Exhibit 13?

HEARING OFFICER DEL PIERO: Do you have Dr. Beschta's testimony in front of you?

DR. STINE: I do. And I think I understand the question regarding paragraph 5, page 28, did you say, of 13?

No. Actually, it doesn't, because I was taking

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into consideration a considerably longer stream length here than exists on the thalweg profile. The thalweg profile starts approximately 1800 feet below The Narrows and goes down to The Ford, I believe.

I'm talking about the area from The Narrows down to considerably below The Ford where we have the multiple channels, and the standing water, and the narrow channels, and those kinds of things.

Q. BY MR. ROOS-COLLINS: Let's focus on the area actually addressed in Figure 2 of Dr. Beschta's rebuttal testimony.

A. BY DR. STINE: Yes.

Q. In your opinion, is that figure an accurate reflection of the thalweg profile today?

A. I have no reason to doubt that it isn't. I trust Mr. Tillemans went out there and accurately measured and recorded the thalweg of Rush Creek insofar as he did it here, 1800 feet below The Narrows down close to The Ford.

Q. Is that figure in any way inconsistent with your opinion that below The Narrows, the thalweg has grown substantially more shallow since 1941?

A. It is not inconsistent whatsoever. And, in fact,

to assess that, perhaps unbeknownst to you, I asked Mr. Vorster to run a histogram on the depths of the

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thalweg along Mr. Tillemans' profile there. And I believe at some point, this was going to be introduced as NAS and MLC Exhibit 258, which is labeled, "The Frequency Distribution of Tillemans' Thalweg Depths in the Rush Creek bottomlands at a Flow of 80 cfs."

Q. Dr. Stine, is it a good exhibit?

A. Darn good exhibit.

Q. Are there any typos in it?

A. Yes. And I don't think Mr. Vorster shows this. It's actually not on 258. It's actually on 259 --

HEARING OFFICER DEL PIERO: Excuse me, Mr. Roos-Collins. I know it's been a long time, and I've been sitting here for all of it, but I thought you represented Cal Trout.

MR. ROOS-COLLINS: I do. I'm prepared to have these marked as Cal Trout exhibits. I'm less inclined to do so if there are typos which have been attributed to Morrison Foerster.

HEARING OFFICER DEL PIERO: I just wanted to make sure I hadn't lost it entirely.

MR. ROOS-COLLINS: I would request that these be marked as --

HEARING OFFICER DEL PIERO: Mr. Birmingham, I'm anticipating that you're going to have something to say about this, right?

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MR. ROOS-COLLINS: -- Cal Trout next in order.

MR. DODGE: They're already marked as National Audubon Society 258. Why don't we just leave it?

MR. ROOS-COLLINS: I request that they be distributed as National Audubon Society 258.

HEARING OFFICER DEL PIERO: Okay. Do you have any objection to that?

MR. BIRMINGHAM: To them being distributed? No.

HEARING OFFICER DEL PIERO: Have you got copies of them, Mr. Birmingham?

MR. BIRMINGHAM: I'm not sure that I do.

HEARING OFFICER DEL PIERO: Could we arrange to have a representative of the Los Angeles Department of Water and Power copy them?

Fish and Game have a copy?

MS. CAHILL: Yes, we do.

MR. ROOS-COLLINS: Mr. Del Piero, I'm having National Audubon Society 258 and 259 distributed at this time.

HEARING OFFICER DEL PIERO: Fine. Any objection? None? Good.

Please proceed, Mr. Roos-Collins.

Q. BY MR. ROOS-COLLINS: Dr. Stine, what does National Audubon Society Exhibit 258 purport to show?

A. BY DR. STINE: This is a histogram that is labeled

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"Frequency Distribution of the Tillemans' Thalweg Depths in the Rush Creek bottomlands at a Flow of 80 cfs."

And what Mr. Vorster has done here, at my request, is to create an X and Y axis histogram that shows the

percent of the thalweg measurements that lie between zero and .5 feet, a half a foot and a foot, a foot and a foot and a half, a foot and a half and two feet, et cetera, in half-a-foot increments up to four and a half to five feet.

And what this shows, for instance, is that 35 percent of the Tillemans' thalweg measurements are less than a foot and a half deep. And 68 percent, approximately, of his thalweg measurements are under two feet deep. And 75, 76 percent of his thalweg measurements are under two and a half feet. And 85 percent or so of the thalweg measurements -- make that 95 percent, excuse me, of the thalweg measurements are under three feet in depth.

And I would point out here for clarification that the thalweg is not some average depth of a channel someplace. These are the deepest places on the channel.

So if we're talking about percent of total channel floor area that is less than three feet, it's going to

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be way, way up above 95 percent. It's going to be 99.99 percent of the channel floor that is under three feet deep.

This, I would also stress, is at 80 cfs. And if we took this down to the 25 to 30 cfs that I believe DWP is recommending on the stream, it would have the effect of taking every one of these bars and moving it one category to the left, so that we would not only have 95 percent of our thalweg depth less than three feet, indeed, if we lowered the flow, 95 percent of our thalweg depth would be less than two and a half feet deep.

And this represents the present-day condition 1800 feet below The Ford and 1800 feet below The Narrows, that is, and The Ford.

Q. Dr. Stine, what does National Audubon Society Exhibit 259 purport to show?

A. The same thing with one important modification. What we did was to take Stacy Li's data from the present day for the upper 1800 feet of the channel, and we looked at channel width -- pardon me. We looked at thalweg depth in that upper 1800 feet, then added an appropriate number of measurements that represented that 1800 feet to the total thalweg number that Mr. Tillemans had come up with.

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So that what we're doing here is simply creating a histogram that shows, that approximates now, that approximates the depth of channel from The Narrows down to The Ford.

And what that does very strongly is up the number of shallow water thalweg measurements and so tends to throw the histogram bars to the left.

We can play that same game, as I talked about on Exhibit 258 there, of knocking the flow from 80 cfs down to 25 to 35 cfs. When we do that, we find that 95 percent of the thalweg depths are less than two and a half feet, and 98 percent of the thalweg depths are less than three feet deep.

Q. Dr. Stine, in your opinion, do National Audubon Society Exhibits 258 and 259 show that Rush Creek, for the area addressed in Figure 2 of Dr. Beschta's rebuttal testimony, at any given flow, tends to be substantially shallower today than it was in 1941?
A. As a whole, yes, certainly. There are a very few places, there are a handful of places on Rush Creek today where there are, for instance, stacks of old wood that have built up in the channel. Flow going around those stacks of old wood are, as Mr. Tillemans has correctly pointed out, digging holes.
So in a handful of places on Rush Creek today, we

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have areas that are representative depth-wise of what used to be out there at a particular flow, but they're few and far between.
MR. ROOS-COLLINS: Before I proceed, I'd like to thank Mr. Dodge for his courtesy in allowing me to use these very helpful exhibits before he intended to have them being used today.
MR. DODGE: I didn't know I had any choice.
MR. ROOS-COLLINS: You didn't, but you didn't object, either.
HEARING OFFICER DEL PIERO: We all know Mr. Dodge is a decent fellow.
Q. BY MR. ROOS-COLLINS: Dr. Stine, let's turn to a related subject. The number of channels in the bottomlands of Rush Creek before 1941. And for this purpose, I need Dr. Beschta's testimony back.
Now, you missed that part of my cross-examination of Dr. Beschta where I attempted to use my pencil, a ruler, and other instruments of measurement to discuss the reliability of 1929 photographs to describe pre-41 conditions?
A. BY DR. STINE: I missed it, but I got the story from a number of different people including Mr. Birmingham. And Mr. Birmingham and I were whispering in one another's ear about that.

0079

Q. Suffice it to say, it confused everyone, including the witness. But it did produce one clear understanding between Dr. Beschta and myself.
Dr. Beschta testified that notwithstanding the 1-to-12,000 scale of the 1929 photographs, those photographs can be used to detect a two-foot wide channel or other object.
Would you agree with that testimony?
A. I do agree, and I would point out one misconception that lingers. These photographs are stamped 1-to-12,000. Every photograph there has a slightly different scale to it and, indeed, if you scale a whole bunch of it, what you find is that it's much, much closer to 1-to-17,000.
So that the estimated scale is not the actual scale on the photograph; nevertheless, even at 1-to-17,000, one can discern a two-foot-wide channel, largely because it's not just the channel that you see, but other features associated with the channel, shadows and whatnot from the topography that allows you to see that feature.

Q. Now, in Los Angeles Exhibit 125, Dr. Beschta indicated that a side channel in Reach 5-A was relic and unused in 1929.
Do you have LA Exhibit 125 in front of you?

A. Yes.
Q. Now, reviewing National Audubon Society Exhibit 213, which is a poster of the 1929 photographs, can you locate the relic side channel to which Dr. Beschta referred in LA Exhibit 125?
A. Yes. Though, as I've stated before, I disagree that it was unused at that time. One can see water in that channel coming right through here very, very clearly. It's a dark line, and as I say, if one wants to look and see what an unwatered channel looks like, one should look up here at this channel right through here and see how very light in color it is. The black line through here is a watered channel. We have two watered channels through here.
And I don't think --
Q. Dr. Stine --
A. If I understood Dr. Beschta, I don't think he thinks that it's an unwatered channel anymore.
Q. Understood. But you anticipated a line of questions which I haven't asked yet.
A. I'm sorry.
MR. BIRMINGHAM: He's been doing that all afternoon. I guess we shouldn't stop him now.
HEARING OFFICER DEL PIERO: He treats all of you guys equally.

DR. STINE: Deservedly.
Q. BY MR. ROOS-COLLINS: In your interpretation of National Audubon Society Exhibit 213, you call a dark area, a dark linear area, a channel. Dr. Beschta calls it a relic channel.
Now, what, in your opinion, distinguishes that area in that photograph such that you were confident it is a channel?
A. BY DR. STINE: It is linear, and it is dark, and it coincides or comports very nicely with those lines on here which I think even Dr. Beschta says is the main channel of Rush Creek.
Q. Couldn't the darkness be shading?
A. Shading is along the stream here. And once again, I would invite people to come up and look at this. We have a very low sun angle on these photographs, which is one of the things which makes them stand out and be wonderful, because they're wintertime shots when the sun is low.
What we end up with in shadows, even shadows cast by trees that themselves are in a line, is a very, very ragged edge. This is not a ragged edge. It is a very straight consistent width very much like the channels that Dr. Beschta maintains are channels.
Q. Are you testifying that the dark area, which

Dr. Beschta calls the relic side channel, is filled with water?
A. Yes.

Q. The darkness in that photograph is water itself?
A. Yes, it is.
MR. HERRERA: Excuse me, Mr. Roos-Collins. 20 minutes has expired.
MR. ROOS-COLLINS: I request an additional 20 minutes.
HEARING OFFICER DEL PIERO: Granted.
Q. BY MR. ROOS-COLLINS: Now, with that understanding, let me compare two statements. The first comes from Cal Trout Exhibit 13, page 24, first paragraph, where you discuss the bottomlands. You state, "This, and the many spring-fed tributary rurals that fed the stream, created a situation in which water flowed across the bottomlands in as many as five channels abreast."
Let me compare paragraph number 1 on page 1 of Dr. Beschta's rebuttal testimony. "On the 1929 aerial photographs, Rush Creek is a relatively visible stream that throughout most of its length, occupies a sinuous, single-thread channel."
Now, let's assume that that paragraph applies to the bottomlands as well as the remainder of Rush

0083

Creek.
When you look at National Audubon Society Exhibit 213, what gives you confidence that there are, in fact, or were, in fact, as many as five channels abreast through the bottomlands?
A. BY DR. STINE: I have a hard time accepting your assumption. I don't think Dr. Beschta meant to focus in just on the bottomlands. I think his statement was throughout most of its length. Rush Creek occupied a single channel. And I wouldn't disagree with him on that if we're talking about Rush Creek to Mono Lake.
But in the bottomlands it, indeed, did have multiple channels.
Q. Let's leave the comparison and my assumption out of it, and let's focus only on your opinion.
What gives you confidence that there were as many as five channels abreast through the bottomlands in Rush Creek prior to 1941?
A. Two things. First of all, the 1929-40 photographs and the 1940 photographs on the one hand.
And secondly, the fact that we can go back there today and find those very channels that are still intact. In some cases, sometimes full of cobbles and gravels from the quarry upstream. But we can go back and confirm on the ground today that there were

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channels there.
Q. Let's break that answer into two parts. You said that "we can go back and confirm those channels were there."
You yourself have gone back and have confirmed that those channels were there; is that correct?
A. Yes. And it was before any of this hearing business came up, because I was interested in how the bottomlands worked.
So I went back there actually in 1990 and in 1991, and we looked at all those channels. I walked every

single one of those channels then, and I've done so since.
Q. Now, in 1990 and, for that matter, today, many of the channels which you believe were occupied before 1941 with water are dry.
Today, what gives you confidence, when you walk those channels, that they were wet before 1941?
A. Well, we can see on the 1940 photographs, as well as on the 1929-40 photographs that there is water in these channels.
Q. Let's look at the 1929 photographs, National Audubon Society Exhibit 213. Can you point out an area of the bottomlands where there are as many as five channels abreast?

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A. Yes, I can. Two channels abreast here. Right in this area, there are five channels, I would say, right here where we have a channel --
Q. Dr. Stine, could you approximately describe where you are in the photograph?
A. Yeah. We're roughly a third of the way, maybe a little bit more than a third of the way between The Narrows and the Big Meander.
And perhaps we can refer again to the photographs which are, indeed, the 1929 photographs in NAS and MLC 122, which is Cal Trout 13.
Q. Yes.
A. Yes. There is a copy of the photograph there that's referred to as Reach B Upper. And Reach B Upper, indeed, shows one area there where there are five channels abreast. And it would be -- this is not now counting Indian Ditch.
Q. For the Board's benefit, can you locate that site on National Audubon Exhibit 213?
A. Yes. It's this area right in through here. There are many other places where there were four and three and two channels abreast.
Q. Thank you.
Let's move on now to the changes in the Rush Creek channel that have occurred since 1985. Let me show you

0086

now a frame, in Los Angeles Exhibit 139, the December 16th, 1993, videotape of Lower Rush Creek.
(The videotape was viewed at this time.)
Q. BY MR. ROOS-COLLINS: This is counter 309 on this tape. I will note for the record that the tape actually used by Dr. Beschta during his rebuttal testimony appears to have a longer leader on it, and therefore, this same frame was a different counter number on his tape. But it is the same frame that I previously discussed with Dr. Beschta on his rebuttal testimony.
Dr. Stine, let me summarize for you what I understood Dr. Beschta's testimony to be and ask you if you agree with that testimony as I understand it.
Dr. Beschta first said that the line of orange vegetation appearing to the right of the channel was or, rather, is the result of a deposit of seeds during a prior high-flow event.
He then testified that the channel between that

line of vegetation and the current channel -- excuse me.

He then testified that the channel had narrowed from that line of vegetation to its current location following that high-flow event.

Now, let's assume that my understanding of

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Dr. Beschta's testimony is correct.

Do you agree with that opinion with respect to that site?

A. BY DR. STINE: No, I don't agree with the opinion. And it was something that Dr. Kondolf and, I believe, Dr. Li, as well as Mr. Smith and I, discussed immediately after the video was first shown.

I agree that this line right here may very well represent a deposit of seeds from when the river flow through here was higher. But --

Q. So you agree with Dr. Beschta's first opinion, as I recounted it, regarding the --

A. Yes, I agree with that. I would not, however, agree with the sediment that lies to, as we're facing it here, the left of that vegetation line having accreted since the vegetation itself was seeded.

Q. Why not?

A. Not at all.

Well, first of all, we have data. We don't have to go out there and guess. We have Dr. Li's cross-sections that don't show anywhere near this much accretion of sediment in this short amount of time.

I would say probably the width of stream through here has changed relatively little based upon having looked at the data collected by Stacy Li. I see no

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reason why this has to have accreted here. After all, if we had more water in the channel, as we did in 1983, which is apparently one of the sets of aerial photographs that Dr. Beschta used in concluding that the stream had narrowed down, there was over 400 cfs in the stream at that time. And that probably would put the stream up to about that point.

We don't have -- the sediment could very well have been there at that time. There's no reason to believe that it has accreted and good data to indicate that it has not accreted over time.

Q. Are you saying that Dr. Li has transect data for the site depicted on counter frame 309?

A. I do not know if he has transect data from exactly this site. He has transect data from a great deal of the bottomlands, a number of different, maybe a couple of dozen or more spots through the bottomlands. And we see accretion like this occurring nowhere since 1987, when he first established those cross-sections.

Q. Now, in my questioning of Dr. Beschta regarding this video -- excuse me, not during my questioning. During his direct testimony regarding this videotape, he stated that in many locations, Rush Creek has narrowed by as much as 50 percent since 1985.

Do you agree with that opinion?

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A. I don't remember him saying 1985. All I

remember -- with all due respect to you, maybe you're remembering better than I -- for a while he was saying the last three years, and then he went back to 1983, which is basically the last ten years. And I was left confused as to exactly what time period he was talking about.

Now, you're mentioning 1985. I don't recall 1985. But certainly, since 1987, we have good data from 1987. Since 1987, there has been very, very little narrowing of the stream.

Q. And what's the basis for that opinion?

A. Data that was established first in 1987, cross-sections established first in 1987 for the express purpose of monitoring widening and narrowing of Rush Creek.

Dr. Li has now gone back and revisited those sites, and we can see there has been relatively little change in the stream, some widening, some narrowing. In most cases, a minor amount of widening or a minor amount of narrowing since 1987.

MR. BIRMINGHAM: May I ask the reporter to mark that, please?

Q. BY MR. ROOS-COLLINS: In your examination by Mr. Dodge this afternoon and also by Mr. Birmingham,

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you repeatedly used the phrase "old vegetation."

What is old vegetation in terms of decades?

A. BY DR. STINE: In terms of decades?

Q. More than ten years?

A. Oh, yes. Much more than ten years. Many of the sites we were looking at there, I believe I actually pointed out as we were going down the stream in our vicarious helicopter trip here, I said we can find this very patch of vegetation on the 1964 photographs.

And I believe Mr. Messick will be able to testify to the age of some of this material as well, at least in an approximate sense. It certainly is stuff that has been there longer than three years and longer than ten years by several times, at least.

Q. So ten years plus, depending on the site?

A. Yes. I would say much more than ten years plus.

Q. I just want to clarify the term as you use it.

A. I'm talking about vegetation that is at least several decades and perhaps many decades old.

Q. Now, Cal Trout Exhibit 13 describes the destruction of much riparian vegetation below The Narrows as a result of the City of Los Angeles' diversions and other events.

How did this old vegetation survive the diversions and those other events?

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A. The vegetation that survived exists in sort of a spotty way through the bottomlands. There are widespread areas where the vegetation died due to the incision of channels, widespread areas where the vegetation died due to the dewatering of channels.

And I would, by the way, point to NAS/MLC Exhibit 248 as an example of one of those channels that has been dewatered and that today has a huge amount of old, very large, dead wood associated with it.

There are, even today, persistent springs in the Rush Creek bottomlands. And very often, it is in these areas of the spring flow where we find vegetation persisting.

We have also, on and off, since the early 1970s, had flow going down through the Rush Creek bottomlands. And I asked Mr. Messick about this. He would be the one to address it better than I. But his opinion seemed to be, I don't want to put words in his mouth, but his opinion seemed to be that a lot of this vegetation had root systems that could have held on for a long period of time. Maybe the vegetation didn't do well, but it has sprung back to life with the recent watering basically since 1980.

Since 1980, most of the years, the Rush Creek bottomlands has had water in it.

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Q. Let's look at National Audubon Society 250, the photograph that was just distributed by Mr. Dodge. That photograph in the foreground shows what appear to be dead willows; is that correct?

A. That's correct. In the central part of the photo as well.

Q. And in this background, that photograph shows what appeared to be old trees; is that correct?

A. Yes. Willows as well as cottonwoods as well as some pines. And I would point out that that is a spring area right there and, in fact, it's at that point where you encounter the big, old wood there where you first encounter water in this channel, standing water, not flowing water, but just stagnant water there.

So this is one of the areas where spring flows persist and therefore the vegetation has persisted.

Q. Let's assume this Board orders that this particular channel be rewatered. Would you expect a narrow channel comparable to the pre-1941 channel at that location in the background where the old trees still stand?

A. Yes, I would. Absolutely, because the channel is still there. It's still narrow, and it's armored enough by vegetation today at least in that reach where

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there's no reason to think that it would widen. It exists today in its pre-41 condition, and if it were watered, it would continue to persist in its pre-41 condition.

Q. And what would you expect in the foreground?

A. Depending upon how it was rewatered, I would not recommend in any way, shape, or form, that 300 cfs be put down this channel, because without the protection of the riparian vegetation, we'd create quite a mess there by doing it.

But if we watered it with a few cfs, and then upped that cfs, that flow over time, I think what we would find there is riparian vegetation coming back along the margin. And as the riparian vegetation came back, as the bank sediments became better and better bound by root systems, we would find stable banks, and we could put an increasing amount of flow down that

channel.
Q. Thank you.
Let me turn to a different subject; namely, Mill Creek.
During your rebuttal testimony, you discussed the possibility of rewatering Mill Creek. You didn't refer to an exhibit which I believe the National Audubon Society has previously introduced showing water rights

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held on Mill Creek.
Are you familiar with that exhibit?
A. I am, though I'm not certain that it is, at this point, an exhibit with a number that has been introduced. I know that I have provided the Staff with a copy of that, but I'm not sure that it was ever put in. Correct me if I'm wrong.
MR. ROOS-COLLINS: Mr. Del Piero, may I have a moment?
MR. DODGE: National Audubon Society 254 has been passed out to all parties.
HEARING OFFICER DEL PIERO: Thank you.
MR. DODGE: Either last week or the week before last.
Q. BY MR. ROOS-COLLINS: And does National Audubon Society Exhibit 254 comport with your understanding of the water rights held in Mill Creek?
A. BY DR. STINE: Yes, it does. And I don't have a copy of that in front of me. Perhaps I could -- thank you.
Q. It does comport with your understanding of the water rights in Mill Creek?
A. Yes, it does. This is something that was actually prepared by the Department of Water and Power in 1977, and I would point out that there is one disparity

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between this and what exists today out there, the disparity being the priority nine water right there which is marked as claimant LW DeChambeau. Now, my understanding is that that is now held by the Forest Service.
And with that exception, I'll put it this way: I know of no other difference between what is stated here and what actually exists today. I would point out, if I could on here, that Los Angeles Department of Water and Power holds the greatest number of Mill Creek water rights, and there it's under this heading Present Claimant.
The greatest number of Mill Creek water rights, the largest total water right, and the largest single water right are held by the Department of Water and Power.
Q. Dr. Stine, do you have an opinion whether Mill Creek, in geomorphic terms today, corresponds to any reach of Rush Creek prior to 1941?
MR. BIRMINGHAM: I'm going to object on the grounds of relevance. The Department of Water and Power's rights for water in Mill Creek are not an issue in this proceeding.
We don't hold any license to divert water to Mill Creek and the basin. The rights that the Department of

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Water and Power holds to water for Mill Creek are pertinent to lands owned by the Department of Water and Power within the Mono Basin and simply not an issue in this proceeding.

HEARING OFFICER DEL PIERO: Mr. Dodge?

MR. DODGE: Mr. Chairman, mitigation is at issue in this proceeding. One suggested mitigation has been rewatering of Mill Creek, and in terms of remedies relative to Los Angeles who has certain waters rights on Mill Creek.

MR. ROOS-COLLINS: Mr. Del Piero, I would --

HEARING OFFICER DEL PIERO: I'm going to overrule the objection, because the nature of the question you asked was the comparison between the two water bodies in geomorphic terms.

However, I'm inclined to -- well. Go ahead and proceed, Mr. Roos-Collins. I'm inclined to have some degree of sympathy in terms of Mr. Birmingham's objection even though I'm overruling it.

And I want to make sure this does not get too far afield.

MR. ROOS-COLLINS: This is my only question on Mill Creek, and then I have one last question of Dr. Stine.

Q. BY MR. ROOS-COLLINS: Dr. Stine, do you have an

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opinion whether Mill Creek today compares in geomorphic terms with any reach of Rush Creek before 1941?

A. BY DR. STINE: Yes. Before and after 1941, and I think that's important given that Mill Creek, while water hasn't been diverted from Mill Creek, Mill Creek has been severely degraded by the City of Los Angeles having lowered Mono Lake. And as a result, Mill Creek has incised, and there is degradation on Mill Creek as a result of DWP's diversions.

I would also point out that DWP -- pardon me, that Mill Creek had a sinuous course, not unlike portions of the Rush Creek channel. And it had a very wide, in places, wide riparian vegetation, riparian forest, associated with it like Rush Creek did.

Q. Thank you.

Dr. Stine, my time is almost up. Let me take care of one housekeeping matter.

Cal Trout submitted as rebuttal Exhibit Cal Trout No. 42, which is a report by Northwest Biological Consulting entitled "Lee Vining Creek Subsegments 3-A, 3-B, and 3-C, 1993 Habitat Improvement Work."

Were you involved in the preparation of this report?

A. I was not, though I was consulted when that work was being completed. I'm familiar with the report, but

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I did not prepare the report itself.

Q. In your opinion, does the report accurately describe the work undertaken by the restoration consultant for those stretches of Lee Vining Creek in 1993?

A. Yes, it does.

MR. ROOS-COLLINS: Thank you. I have no further

questions.
HEARING OFFICER DEL PIERO: Thank you very much, Mr. Roos-Collins.
Mr. Valentine?
MR. VALENTINE: My name is Michael Valentine, for the record.

CROSS-EXAMINATION BY MR. VALENTINE

Q. I would like to first ask you a couple, what I think are clean-up questions, Dr. Stine.
You mentioned, in regard to NAS/MLC Exhibit 254, that it was prepared on behalf of the Department of Water and Power.
Do you recall that? 254 is the water rights on Mill Creek.
A. BY DR. STINE: Yes. I believe I said -- I tried to say that it was prepared by the Los Angeles Department of Water and Power, yes.
Q. Be that as it may, it is my understanding, for the

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record, that it was, in fact, prepared for Southern California Edison. I believe that's a mistake, probably not a material one, but --
Secondly, in regard to priority one water rights to Gladys Crosby, Pearl Silva, and R.D. Conway, those rights have been, in fact, transferred to the Conway Ranch Development Corporation, have they not?
A. You could be right there, yes.
Q. Thank you.
I now have a couple questions about sand tufa.
Dr. Stine, were you surprised that the photos that Ranger Carl previously alluded to, were you surprised those photos over a ten-year period showed little change in exposed sand tufa?
A. I wasn't surprised because I, too, have noted in the last ten to twelve years in the basin that there has been relatively little visible overt change in the sand tufa.
Q. As the DWP management plan was originally proposed, would it not, at its upper levels, have exposed -- would it not have destroyed sand tufa?
A. Yes, it would have destroyed sand tufa. It would have undercut sand tufa. And I believe it still will undercut a great deal of sand tufa, no matter whether the lake goes to 6383 feet or to 6386 feet.

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Q. Thank you.
You also mentioned prehistoric periods of drought. Periods of drought longer than that used by Jones and Stokes in the EIR. By "prehistoric," you're not talking about millions of years ago, are you?
A. Not at all. I'm talking about periods just before the Little Ice Age. I'm talking about a number of times during the last 900 to 1000 years when this occurred. In other words, between about 900 years ago and roughly 500 years ago are when these droughts occurred.
Q. You also mentioned that water is not flowing out of Rush Creek onto the flood plains due in part to the widening streams.
It's also due in part, is it not, to incision in

addition to the widening of the stream?
A. Yes. And thank you for correcting me on that. Particularly in the lower half or so of the bottomlands. Particularly the lower third of the bottomlands, and then all the way down to Mono Lake there has been severe incision of Mono Lake and that has been -- pardon me, the lower third of bottomlands, and then all the way down to Mono Lake, Rush Creek has undergone severe incision, and that is the main reason down there why it can't reach its old flood plain.

Q. There is also a reference to die off of vegetation in the '60s and '70s. You indicated that this was partly due to a stoppage of irrigation.

This was also due, in part, to incision. Which caused the water table to drop, was it not?
A. Yes, it was. And that particularly occurs after 1967 and 1969 when there was a great deal of incision.
Q. I'd now like to ask you a few questions about restoration, if I might.

You have proposed some active intervention on both Lee Vining and Rush Creek. Are you proposing active intervention to restore pre-41 conditions benefiting the fisheries throughout the whole length of Rush and Lee Vining Creeks?
A. No. I've stated that we should do it only where it's prudent and plausible. And we should, in those areas that can't do that in a reasonable way and in a reasonable amount of time and for a reasonable amount of money be brought back to the pre-41 condition, we should look elsewhere. And I have mentioned Mill Creek as a possible mitigation site there.
Q. I'm going to ask you to assume that the Board will conclude that it is desirable for whatever reason to restore the abandoned channels of Rush Creek and Lee Vining Creek, restore flow in those channels.

Will Rush Creek -- let's do it one creek at a time. Will Rush Creek reoccupy the abandoned channels, the currently abandoned channels, absent active intervention to restore them?
A. It will not occupy, reoccupy those abandoned channels absent active intervention. And, in fact, if the lake were brought way up, there would be -- "way up" meaning 6400 feet onto the existing delta plain, there would be a tendency over a long period of time for Rush Creek to once again build multiple channels. But the existing multiple channels would be the least likely place that the stream would build its new multiple channels, because they're currently filled with cobbles that would be very difficult for the stream to move.

And the idea that we have been pursuing, because it seems like the most reasonable idea to me, is to remove those cobbles from the existing now abandoned multiple channels and put water back into those channels again. We could very rapidly, then, have back the multi-channeled system that existed previously.
Q. At 6405, lake elevation of 6405 and above, how long would it take Rush Creek, by natural processes, to

develop a multi-channeled system?
A. My guess would be hundreds of years in addition to

the amount of time that it takes to get Mono Lake up to 6405 feet. There would have to be an awful lot of sediment in Rush Creek to get it to starts building forward. Only when it start to build forward, only when Rush Creek starts to prograde will it start to agrade and make multiple channels.
Q. And would a multiple channel system ever develop on Rush Creek on lake elevations below 6405, absent human intervention?
A. Ever? Not in the millenial scale. I'm not talking here about braids. I'm talking about deltaic processes making multiple channels.
Q. And are your answers to the questions you just answered on Rush Creek essentially the same for Lee Vining Creek?
A. Lee Vining Creek is somewhat different in that the multiple channels there are not clogged by quarry cobbles, by quarry debris from the Marzano Quarry, so they're much easier to occupy. We don't have to take a bunch of debris out of those channels to reoccupy them. From that standpoint, it's somewhat different and somewhat easier on Lee Vining Creek.
Q. You've testified that you don't believe that, at least in recent years, there's been any significant narrowing on Rush Creek.

Absent intervention by humans, how long do you think it will take Rush Creek to narrow to its pre-1941 widths?
A. I think that there will be a tendency for that stream -- for Rush Creek in the bottomlands to narrow down as we get more and more big and old vegetation with well-established root systems there. And I think that's evident from the video.
We have a narrow stream where we have old vegetation. I think it takes vegetation decades to build up, to grow up, to thicken, to die, to fall into the stream.
It's going to take many decades, half a century to century scale before we start to see an interaction between the stream and newly grown old wood.
Q. And would that process be appreciably sped up by planning, as opposed to waiting, for colonization?
A. On Rush Creek, yes, there are places there which I think it could be sped up appreciably. There are also places where vegetation is indeed coming in rapidly. Not everywhere, and I would point out as one example, that 1800 feet immediately below The Narrows where vegetation could be planted there, I think things could be speeded up appreciably there.
If we go over to Lee Vining Creek. I think there

are large areas of Lee Vining Creek where planting could go on and be very effective, because there are vast areas of Lee Vining Creek that used to be more or less continuous riparian woodland that are today not being colonized.

And if one were to go back through the L.A. DWP video on Lee Vining Creek, one would see that, indeed, right along the stream margin vegetation is it coming in many areas. But on the old flood plain where there used to be a gallery forest of riparian vegetation, vegetation is very, very slow to come back there except where it has been planted.

Q. Thank you.

You additionally referred to restoration of the west wall springs on Rush Creek. Could you explain how this could be done?

A. Yes. Prior to 1941, there were springs emanating from the west wall of Rush Creek from approximately Parker Creek, which is above The Narrows, on down through the upper third or so of the bottomlands. It was certainly tied to some extent to the irrigation that was going on on the Cain Ranch lands.

I believe it was also tied to the fact that all the natural distributaries of Parker and Walker Creeks were wetted during those early years. Particularly,

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high on the fans where those multiple channels were, where those distributary channels of Parker and Walker Creek were, the material there is very, very course and it provides a conduit down underneath the lake silts that exist at lower elevations on the Parker and Walker Creek fans.

So my sense is that an awful lot of water that was creating the west, what we call the west wall springs, was indeed due to natural processes. And I would suggest that those distributary -- if we're interested in rewatering those west wall springs, that those distributary channels be rewatered again. And I think we would see an increase in the flow of the west wall springs if we did that.

Q. Is there any evidence that suggests absent intervention that those springs will be restored under natural processes?

A. I'm not sure what you mean by "natural processes." The natural processes would be to, indeed, rewater those distributary channels. Left the way it is today, I see no reason why the springs should become any different than they are today. Today, of course, those distributary channels are not watered.

Q. And could you briefly state what your understanding of the benefit of those springs are?

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A. Yes. I've testified to this before --

MR. BIRMINGHAM: I'm going to object to the question on the grounds that it's vague.

HEARING OFFICER DEL PIERO: I'm going to sustain the objection.

Be more specific, Mr. Valentine.

Q. BY MR. VALENTINE: Can you testify as to what the ecological benefits of those springs were to the stream system of Rush Creek?

MR. BIRMINGHAM: I'll object to the question that it goes beyond the scope of Dr. Stine's expertise.

HEARING OFFICER DEL PIERO: I'm going to sustain that objection, too.

Be more focused. Dr. Stine didn't testify to the entire ecology of Rush Creek.
Q. BY MR. VALENTINE: Would, in your opinion, the restoration of the streams increase the channel length available to brown trout?
A. BY DR. STINE: I believe you're talking about the restoration of springs now.
Q. Yes, I'm sorry.
A. And, indeed, it would. And this is based upon observations documented and written by Mr. Vestal in the 1940s and early 1950s where he talked about trout actually being in the thousands of lineal feet of

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spring-fed rills associated with those springs.
And from that standpoint, one has to think that if those spring-fed channels, spring-fed rills were restored and a connection was made between that water coming out of the springs and present-day Rush Creek, that trout would then have access as they once had to those springs rills, thousands of feet of springs rills.
Q. Would restoration of the springs also provide additional cover for juvenile fish?
A. Again, these are things that I've written about in the auxiliary report to the DEIR, auxiliary report number one, as well as this NAS/MLC 122, Cal Trout 13.
There was a great deal of cover in there according to Mr. Vestal, cover for young fish, food for young fish as well, scuds as he calls the invertebrates.
Q. Would the restoration of these streams also tend to moderate the temperatures in Rush Creek?
A. Yeah, the spring water, as Mr. Vestal described it, the spring water was a fairly consistent temperature through the year, warmer than the stream in the wintertime, cooler than the stream in the summertime. So it did tend to create thermal stability that is lacking in the absence of the springs.

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Q. And finally, would spring restoration tend to increase conductivity to the benefit of brown trout in Rush Creek?
MR. BIRMINGHAM: I'm going to object on the grounds it goes beyond the scope of Dr. Stine's expertise. Dr. Stine is not a fisheries biologist and has testified to as much.
(Whereupon the record was read as requested.)
MR. VALENTINE: I'll be happy to withdraw the question or rephrase.
HEARING OFFICER DEL PIERO: It's not a fisheries question. I think it deals with the chemical constituents of the water.
MR. BIRMINGHAM: I think at the end of it, Mr. Valentine did include the words "to the benefit of the fishery." If he withdraws or strikes that portion of question, then I think you're correct. But I believe he does include the words "to the benefit of fishery."
HEARING OFFICER DEL PIERO: Perhaps you are correct. That's why I wanted it read back.

Do you wish to have that last portion deleted from your question?

MR. VALENTINE: That was the purpose of my request.

HEARING OFFICER DEL PIERO: Dr. Stine, do you understand the question?

DR. STINE: I do. And the answer is yes. I don't pretend that it would help the fish, but it would increase the conductivity based on conductivity measurements that were made by Dr. David Herbst of the Sierra Nevada Aquatic Research Lab. He measured conductivities of very close to 90 micromhos. I believe were the units he used, 90 micromhos in the existing spring water that's coming out of those west side springs. This is approximately twice, maybe a little less than twice the conductivity of the Rush Creek water immediately below The Narrows.

Q. BY MR. VALENTINE: Thank you.

A. BY DR. STINE: That's not to say the conductivity of Rush Creek would double, but it would add conductivity to Rush Creek.

Q. You have mentioned in the past, I believe, that gravels, at least, certainly on Lee Vining Creek and possibly on Rush Creek are in low supply.

Would you agree with that characterization?

A. I think that gravels along much of Lee Vining Creek and much of Rush Creek are in shorter supply than they were prior to 1941, yes.

Q. And the causes of this low supply?

A. Well, for instance, on Lee Vining Creek, there has been a huge amount of sediment that was washed from the system and out into Mono Lake during 1967 particularly 1969 on Lee Vining Creek. That occurred after the riparian vegetation had been destroyed through desiccation.

It later burned, but the destruction of the riparian vegetation occurred on desiccation, the dewatering of the stream. When these large flows came down Lee Vining Creek in 1969, a huge amount of material was washed out into Mono Lake.

If we look at the material that constitutes the Lee Vining Creek bed today, what we find are lots of cobbles and lots of boulders, relatively little gravels. I've talked to Mr. Vestal about this, and his opinion of what things used to be like comports to what we see in the abandoned channels today.

The abandoned channels on Lee Vining Creek today, gravels of the sort of thumbnail-to-thumb size are far more abundant than in the existing Lee Vining Creek channel.

Q. Among the solutions which have been mentioned for the gravel recruitment problem are that the streams should be pressed against the canyon walls.

First, could you explain what you mean by that?

MR. BIRMINGHAM: Excuse me. I'm going to object to this whole line of questions, not on any rules of evidence, but on the Board's own regulations. The

Board's regulations permit the introduction of any relevant evidence which, quoting from the regulations, is not repetitive.

And Dr. Stine has testified on this subject and the subject of the last few questions on at least three occasions during the course of the hearing.

And the testimony is simply repetitive, and I would object to it on that ground.

MR. VALENTINE: And the response I would say is that I don't believe Dr. Stine has repetitively testified about this topic. I'd also say that the last time Dr. Beschta was here, he was scathing in his criticism of proposals to press the stream against canyon walls.

And third, I find this ironic that Mr. Birmingham seems to think that any question worth asking is worth asking three or four times, which makes an objection at this point --

HEARING OFFICER DEL PIERO: Enough. Enough. Enough, please.

Thank you.

Is there a question that has been asked? Would

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you be kind enough to read it back?

(Whereupon the record was read as requested.)

HEARING OFFICER del PIERO: I'm going to overrule your objection.

I'm going on admonish you not to be argumentative.

And I'm going to ask you, Dr. Stine, to answer the question just as simply as possible.

DR. STINE: I will. This is listed as point C on page 11 of my rebuttal testimony. It's the first time I've used the word "pressed," and I haven't used it in any of my testimony.

What I was talking about there -- in fact, let me read it, if I could. "Where prudent, the streams should be," quote, "pressed," unquote, "by stream narrowing against gravel rich walls of channels and canyons. This occurred naturally prior to 1941, but is rare today due to channel widening."

What I'm suggesting there is that we simply, in places where it's prudent, and certainly not everywhere, put the channel, make the channel, again, narrow and make it abut the gravel sources that were supplying the gravel naturally to the channel under the relatively undisturbed condition of 1941.

HEARING OFFICER DEL PIERO: Proceed, Mr. Valentine.

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Q. BY MR. VALENTINE: And on short-term, at least, can gravels be added to the streams?

A. BY DR. STINE: Yes. And my basis for saying that is that I've been told by the fisheries people that this would be beneficial to the fish. I have no expertise there, but I can say that it would no way hurt the streams to add gravel.

So to the extent that it is beneficial to the fish, I would say that it would not hurt the streams, and that perhaps we should proceed with that.

Q. Finally, on the video, which has been labeled as

DWP 139, let's talk for a moment about what the video does not show.

The video doesn't show the abandoned channels adjacent to the existing channel of Rush Creek, does it?

A. That's correct. It only shows the existing main stream which has braids but not multiple channels today.

Q. It doesn't show the former flood plain?

A. Incidentally, it does, but it certainly doesn't show large areas of what was once a very, very large extensive wetland wooded marshland that was the flood plain, no.

Q. It doesn't show extensive former wetlands?

A. That's correct.

Q. If these were shown, the abandoned channels, the former flood plain, the former wetlands, would they be seen to be recovering at the present time?

A. They would be changing at the present time, but they would not be returning to the previous state, to their pre-41 condition, simply because the channels are not watered and the marshlands are not marshlands. But the vegetation is changing there somewhat.

MR. VALENTINE: Thank you.

HEARING OFFICER DEL PIERO: Thank you very much.

Mr. Dodge?

MR. FRINK: Mr. Del Piero.

HEARING OFFICER DEL PIERO: Excuse me, Mr. Frink. Tomorrow I will have remedied that problem.

MR. FRINK: Good.

CROSS-EXAMINATION BY THE STAFF

Q. Dr. Stine, what is the date of the photo of the Rush Creek bottomlands that is labeled as National Academy of Science/Mono Lake Committee Exhibit 213?

A. BY DR. STINE: It's actually National Audubon Society/Mono Lake Committee, and it is either December 1929 or January 1930.

Q. Okay. I believe you mentioned the flows that you believed were occurring at the time the photo was shot. How did you determine those flows?

A. I asked Dr. Vorster to look through the record of the flows at The Narrows, which was this point right here on what I called Biggest Bend -- pardon me, not The Narrows, The Ford, excuse me.

And beginning in 1930, we have a record of flows at that site. I believe I'm stating this correctly. In any case, Mr. Vorster looked at the record that existed there and determined that over this period of time, there was fairly consistently 35 or so cfs flowing by The Ford.

Q. And you mentioned a flow upstream that I believe you referred to as being 7 cfs. Did Dr. Vorster also determine that from looking at the hydrologic records?

A. It's actually 7 to 10 cfs, and that was determined through conversations with Mr. Vestal and, more importantly -- here's The Narrows right here -- through descriptions by a Los Angeles Department of Water and Power consultant in the early 1930s, Charles Lee, who

described the springs and gave us a very good and accurate description of where the springs were coming from immediately above The Narrows, where the streams were coming from immediately below The Narrows, and he estimated the stream flow through The Narrows there.
And he also made very clear that that was all

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spring water at the time, that there wasn't water coming down Parker Creek or Walker Creek, stream flow coming down Parker Creek or Walker Creek, but that was the spring flow contribution coming down The Narrows. 7 to 10 cfs was his estimation.
Q. And there wasn't any flow from the main channel of Rush Creek at that time?
A. Not only at the -- yes, you're correct. There was no flow at the time that Charles Lee made his observations, which I believe was 1932 and, in fact, there's no flow on the 1929-30 aerial photographs coming down the main stem of Rush Creek nor water coming down Parker and Walker Creek.
Q. What would be the reason for that absence of flow in the upper reaches of the mainstream of Rush Creek?
A. That is due to, as I've pointed out in NAS/MLC 122, water was being taken out for irrigation and put on adjacent lands so that -- at least during the irrigation season, it was.
So DWP -- pardon me, Cain Ranch was exercising control over the flow, and they had a series of gates at A ditch and B ditch, and they could control the amount of water that was moving down the main part of Rush Creek.
Q. Was that water being diverted in December and

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January?
A. It appears actually on the aerial photographs as if there is some water that's being put out onto those lands. It doesn't look like it's a lot of water that's being put out onto the lands.
In other words, being put down the ditches towards the lands on both A and B ditch, but no water is getting by the B ditch diversion, which is the lowest of the irrigation diversions on Rush Creek at the time these photographs were taken.
MR. FRINK: Okay. Thank you. That's all the questions.
HEARING OFFICER DEL PIERO: Mr. Satkowski?
MR. SATKOWSKI: No questions.
HEARING OFFICER DEL PIERO: Mr. Smith?
MR. SMITH: I have a couple of questions for Dr. Stine.
Q. BY MR. SMITH: Did you say there were some stumps as the evidence of the prolonged drought in Mono Lake today?
A. BY DR. STINE: Yes. Not only in Mono Lake today, but they were still in the water when the lake was three feet lower than it is today.
Q. Could you tell us about what period of time that was, approximately what years?

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A. Yes. It's approximately 850 years prior to 1950

A.D. that the stumps were killed by a rise in Mono Lake. So the drought had gone on prior to that date, 850 years prior to 1950 A.D., and the reasons for that is that's how we calibrated radio carbon dates.
Q. And you say the drought for that period was approximately how long?
A. The lower most stumps have 12 rings in them. But, of course, as you go higher and higher out of Mono Lake, you encounter larger and larger stumps, the outer wood of which, the depth year all date at virtually the same as the small stumps in the lake.
So we know that Mono Lake has to have been very low for somewhat more than 12 years, but it has to have been moderately low and maybe very low for 60 years because those larger stumps have 50 or 60 rings in them.
And then if we go to these other sites, we find that we get the same depth year date on all of the stumps, some of these stumps have 140 and in the case of the West Walker River, over 200 rings in them.
Q. Could you give us an approximation of how low you think the lake got?
A. I think there's very strong evidence that the lake go to 6368 feet at the time of that drought. And in

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rising from 6368 feet, it planed a big surface. And that's why the nickpoint today exists at 6368 feet. From 6368 feet on up, the lake has planed over the surface giving us a relatively gently sloping surface.
At 6368 feet, it drops off into deep water. That's why the nickpoint is there. Had the lake dropped to 6360 -- say, 6360 feet and then risen, the nickpoint today would be at 6360 feet.
Q. Thank you.
One other question. In terms of measuring groundwater, would you think it would be useful to have some groundwater testing holes, and if you think that would be useful, why?
A. I'm all for measurements. Sure. The more measurements we could make out there, the better. I think it would be fabulous, from a scientific point of view, to be able to monitor climatic vicissitudes on water levels, on lake levels fluctuations, on water levels, withdrawal of the water from the streams on groundwater levels. It would provide some invaluable insights into the way that whole system works.
I think as time goes on, we'll be modifying LAAMP, modifying the Vorster model to better approximate exactly what we see the lake doing out there, and understanding the groundwater level would go a long

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distance in helping us explain why these changes are going on, why the lake is acting the way it is in response to certain diversions scenarios and in response to certain climatic scenarios.
MR. SMITH: That's all I have.
HEARING OFFICER DEL PIERO: Mr. Herrera?
MR. HERRERA: Yes.
Q. BY MR. HERRERA: Dr. Stine, I'd like to discuss a little bit your presentation regarding rewatering the

various channels in Rush Creek.
To start with, is there somewhere in your testimony that you've presented, over the course of these proceedings, that delineate out those particular channels that you feel are prudent to be rewatered?
A. BY DR. STINE: No, there isn't. We had hoped to have a report ready on the feasibility of rewatering channels. But my understanding now, I've been issued a stop-work order by Trihey and Associates in response to their having been told by the Los Angeles Department of Water and Power that no money is available to do those feasibility reports.
So we're well along with that. And I think I have a pretty good understanding of which ones can very easily be rewatered by removing gravels, et cetera.
Q. So, again, your answer here is no, that you have

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not delineated that out; is that correct?
A. I have not delineated it in a report that is today available. But yes, I have delineated it.
Q. Let me ask you --
HEARING OFFICER DEL PIERO: Mr. Dodge?
MR. DODGE: Yeah. When we started, I thought our last day was going to be tomorrow.
HEARING OFFICER DEL PIERO: It is going to be tomorrow, Mr. Dodge. I'm giving up sleep for lent.
MR. DODGE: But that brings me back to a point that Mr. Roos-Collins was raising before. I think we somehow have to deal with how the State Board wants to address the point that there are planning team reports that are nearly done, but are not done, and won't be done by tomorrow.
HEARING OFFICER DEL PIERO: Mr. Herrera, you want to finish your question, please?
Q. BY MR. HERRERA: Again, what I was looking for is in these proceedings, have you presented that material, and my understanding is no?
A. BY DR. STINE: I'm sorry. I forgot the gist of your question, and you're correct. The answer is no.
Q. I'm going to ask the same question regarding Lee Vining Creek?
A. And once again my answer is no.

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Q. And to further that answer along, you are in the preparation of that particular endeavor on Lee Vining as well?
A. No. Because Lee Vining is a much simpler situation, and we've already demonstrated that on Lee Vining Creek, we can rewater channels. So we're not doing the same thing for Lee Vining Creek, only on Rush Creek.
Q. And again, on rewatering these channels, the same sort of information we're discussing regarding narrowing of streams, that sort of thing, is all contained in this particular element that you're proceeding with, or are you just talking about rewatering?
A. Simply talking about the feasibility of rewatering the abandoned channels.
Q. One other question. Again, in all of the

materials you presented, is there a delineation of the historic channels that are either presently watered or rewatered?
A. Yes, there is. And that is in NAS and MLC 122, Cal Trout Exhibit 13, and I have there the 19 blowups at approximately the same scale as NAS/MLC 213.
Q. The 1-in-17,000?
A. Pardon me?

Q. The 1-to-17,000?
A. The 1-to-17,000, but they are blown up to a much smaller denominator. And I don't know, the denominator's in here. I don't remember what it is.
In any case, I have laid out in here those channels that used to exist versus those channels that exist today for the entire Rush Creek, Grant Lake, all the way to Mono Lake.
Q. I have one further question. Again, in these channels, just as a rough percentage, would you suggest it's prudent to rewater, say, 50 percent of those channels or a greater number or a smaller number?
A. Rather than talking about numbers of channels, perhaps I can talk about lineal feet of channel. And it's probably -- can I look one second here?
Q. Certainly.
A. I would say that keeping in mind that the upper third of the bottomlands is where some multiple channels are, the middle third did not have multiple channels, and the lower, roughly quarter or something like that, or that doesn't add up to one, but the bottom quarter had multiple channels. I would say that probably 60 to 70 percent of the multiple channels could be rewatered. That is, those in, roughly, the upper third of the bottomlands.

Those in this lower quarter to a third of the bottomlands, I think would be very difficult to rewater, because there's such an elevation difference between the existing channel and the now elevationally stranded abandoned channels.
Q. Rewatering these channels assumes what kinds of stream flow?
A. Well, I think that that's yet to be determined. But I don't see any reason why we would have to put large amounts of water into those channels.
I think the channels are such that we can probably put anywhere from 5 to 10 to 15 cfs in some of these channels, and we would get huge benefits, riparian benefits, deep water benefits, lots of shade benefits, still water benefits, cover. All of these things, by putting relatively small amounts of water in these abandoned channels. And it would vary from channel to channel.
Q. You mentioned large flow. Would you tell me what a large flow is, and where would that be measured at?
A. I would say that there is no need to put the 80 to a hundred to a hundred and 20 cfs, that we say the 80 cfs that we see in the mainstream today, the main channel today, there's no reason to have to put that anywhere in any of these abandoned channels. And I

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guess that's what I was thinking of in terms of a large flow.
In relatively small flows, we could go ahead and rewater some of these abandoned channels.
MR. HERRERA: That concludes my questions. Thank you, Dr. Stine.
HEARING OFFICER DEL PIERO: Mr. Canaday?
DR. STINE: May I ask that we take a very brief break?
HEARING OFFICER DEL PIERO: And after that very brief break, Mr. Canaday, you will question, and then we'll take an hour break.
(A recess was taken at this time.)
HEARING OFFICER DEL PIERO: Ladies and gentlemen, this hearing will again come to order.
When last we left, Mr. Canaday, questions of Dr. Stine.
MR. CANADAY: In the spirit of the Olympics, I thought I could provide Dr. Stine with these cards that he could hold high above him, and we could get through his answers more quickly.
HEARING OFFICER DEL PIERO: 40 years from now, no one is going to know what you're talking about.
MR. CANADAY: They don't now.
HEARING OFFICER DEL PIERO: We didn't want to say
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anything, Jim.
MR. ROOS-COLLINS: Mr. Vorster is suggesting that Mr. Canaday hold the cards up to judge the attorneys' questions.
MS. CAHILL: You weren't here the day we were threatening if we weren't interesting, we'd loose our audience.
Q. BY MR. CANADAY: Dr. Stine, you've read the Draft EIR prepared by Jones and Stokes?
A. BY DR. STINE: Yes, I have.
Q. And you've, in particular, read the chapter on riparian vegetation?
Do you recall in that chapter Jones and Stokes prepared a fairly detailed map of the historical channels for Lee Vining Creek?
A. I believe I recall it, but I'm having a hard time remembering whether I'm remembering my map or their map. But I remember that they did do that, and Mr. Messick and I conferred on that.
Q. Are you aware of a similar type map for the Rush Creek bottomlands?
A. I believe that they also prepared a similar map for the Rush Creek bottomlands, yes.
Q. So there is evidence in the record, then, that identifies various channels, historic channels of
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Lee Vining Creek and Rush Creek?
A. Yes, there is, there, and in my riparian report and in the NAS/MLC 122, as well.
And I'm sorry if I misunderstood your question. I was thinking feasibility study, Mr. Herrera.
MR. HERRERA: Thank you. You got it.
Q. BY MR. CANADAY: You discussed in your testimony

or identified in your rebuttal testimony, various different potential restoration treatments.

Now, there's two that have already occurred, and that's been the rewatering or water put into the main channels of Lee Vining and Rush Creek, and there's been the removal of livestock; is that correct?

A. BY DR. STINE: That is correct.

Q. You identified in your the various different opportunities, rewatering historic channels, riparian vegetation, planting, and localized instream treatments for Rush Creek.

How would you prioritize those?

A. I think that rewatering the channels should be highest priority. I think that the sooner we get water back into those abandoned channels, the sooner we're going to get the benefits of all that water, which is riparian vegetation, shade, and all the bugs and all the nutrients and everything that comes with it. I

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think we've got to rewater those channels as soon as possible.

Q. And the next in priority?

A. I guess the way we've been going about this, we've been always viewing this in the context of fish habitat. So I think I would probably leave the next priority up to the fish people. If, indeed, we could only do one thing at a time, I would want to confer with the fish people on that. I'm not trying to weasel out. Fish are driving this to some extent.

Q. Is there any reason why these could not be simultaneous treatments?

A. In a broad sense, no. There are certain places where you would want to do one thing before something else, but there's no reason to think many months or many years have to separate these individual treatments.

Q. In your testimony, you talk about the development of a multi-channel system with a rise in lake level.

Can you point or describe on NAS/MLC 213 where you're referring that would occur with a rise in lake level?

A. Yes. I think it would occur ultimately throughout the whole bottomlands if you got Rush Creek -- pardon me, Mono Lake up to a level -- it wouldn't have to be

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as high as this exhibit, the exhibit you just mentioned. If it was on the surface of the delta plain, what would happen is that the stream would start to prograde, and as it prograded, it would start to agrade. It would start to fill its channel.

And as it filled its channel, the stream would tend to sweep out of its existing channel and create new channels along the side. And that's what deltas do, whether it be the Walker River into Walker Lake, Mississippi River into the Gulf of Mexico, or any other stream. That's how they create these bottomland environments that are so often multi-channeled by agrading due to progradation.

In answer to your question, it would occur throughout here, but it would start at the mouth, and

it would proceed then upstream for a long period of time.
Q. And that long period of time is multi-centuries?
A. Multi-centuries, yes, once the lake is up.
Q. I feel that I understand your suggestion is that the active intervention in some of the existing channels in the bottomlands is at least an interim intervention that could take place to shorten the time period for that type of activity to occur naturally?
A. It would very definitely shorten the time period

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that would be required to get multiple channels out there. Basically, it would not be in a sense foretelling the future. It would be putting us back to the past 50 years. And it would be a way of getting multiple channels in a very short period of time.
MR. CANADAY: That's all I have. Thanks.
THE COURT: Thank you very much.
Mr. Dodge?
MR. DODGE: In the hopes of setting a precedent here, I'm going to be brief.
REDIRECT EXAMINATION BY MR. DODGE
Q. Dr. Stine --
HEARING OFFICER DEL PIERO: Hope springs eternal, Mr. Dodge.
Q. BY MR. DODGE: Couple questions about Mill Creek.
As I under your testimony, you're proposing that below the SCE powerhouse that water be returned to the natural channel of Mill Creek and then flow into Mono Lake, correct?
A. BY DR. STINE: That is correct.
MR. BIRMINGHAM: Excuse me. I'm going to interpose the same objection that I interposed as far as relevance.
HEARING OFFICER DEL PIERO: Your objecting to --
MR. DODGE: Relevance.

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HEARING OFFICER DEL PIERO: Relevance? From a legal standpoint? From a standpoint of water rights? From the standpoint of his expertise as a --
MR. BIRMINGHAM: From a legal relevance point of view. Again, we're not here debating the water rights of the City of Los Angeles to water on Mill Creek. The licenses that are the subject of this hearing are licenses that divert water from Rush, Lee Vining, Walker, and Parker Creeks.
MR. DODGE: Well, this particular cow is long out of the barn. We've heard for four months testimony on the possibility of one mitigation measure being the rewatering of Mill Creek, and I'm just trying to follow-up and ask a couple of follow-up questions on that possibility.
If it's irrelevant, I'm sure Mr. Birmingham will point that out in his closing briefs, but we've had evidence on this subject.
HEARING OFFICER DEL PIERO: Dr. Stine, you've been asked questions about Mill Creek before.
Mr. Dodge, in terms of your questions, I want you to make sure that they don't go into the realm of the water rights that are held by the Los Angeles

Department of Water and Power or, for that matter, anybody.

MR. DODGE: Fine.
HEARING OFFICER DEL PIERO: Okay.
MR. DODGE: Actually, I just have a couple questions.
Q. BY MR. DODGE: The proposal is to take the water from below Southern California Edison, return it to the Mill Creek waterway, and thence the water would go down to Mono Lake, correct, down the historical Mill Creek channel?
A. BY DR. STINE: Correct.
Q. I want you to simply -- you've indicated you walked these stretches -- take the two stretches, going from Southern California -- below Southern California Edison over to the historical Mill Creek channel, and then take the Mill Creek channel down to Mono Lake.
Would you tell the Hearing Board how much work would be necessary on those two channels in order to accomplish that little bit of water?
A. I think very little work would be required to do that simply because the diversion ditch that would be required to put water from the Southern California Edison tail race of the power plant back into Mill Creek is already in place. And it's already capable of holding perhaps 20, 25 cfs. And I think it could carry that without further modification.

Then the water goes down that ditch and into Mill Creek, to a reach of Mill Creek that has already carried seepage water for a long period of time. So it has already been watered with a small amount of water for a long period of time. So vegetation is already in place.
So it would be a matter of allowing water to flow in to Mono Lake. We would probably want to redo the road crossing to allow permanent flows to go under the Mill Creek Road.
Other than that, I don't know of a single site that would need modification to get water from the Southern California Edison tail race to Mono Lake.
Q. New subject matter. In response to questions by Mr. Herrera, you talked about historical channels in the bottomlands, and you said it would be difficult to rewater historical channels in the lower one-third because of quote, elevation differences, end quote.
Do you recall that testimony?
A. I do.
Q. Now, does the degree of difficulty, sir, depend on the level of Mono Lake?
A. In the short-term, no. It's very difficult no matter where Mono Lake is.
In the longer term, once we do get Mono Lake up

and over some period of time where the stream channel now incised is capable of filling itself with sediment, then this elevation difference basically disappears because Mono Lake has come up. But that's many, many decades in the future, not only to get Mono Lake up,

but to then get the channel filled with sediment.
Q. So to what elevation does Mono Lake have to rise in order to take care of this problem of elevation differences?
A. To at least 6400 feet. But if the lake was taken to higher elevations, there would be less and less time involved because it would be a narrower and smaller trench that we would need to fill with sediment. So there would be less time involved.
Q. Were the lake at 6400 feet or higher, this problem of elevation differences could potentially disappear?
A. Over some number of decades, yes, that's right.
Q. Well, and also in terms of simply going in and physically rewatering the historical channels, if Mono Lake were at 6400 feet, that could be done, couldn't it?
A. Not until the channel is filled up with sediment. Not until Rush Creek -- pardon me, not until Rush Creek agrades up to the level of those abandoned channel mouths, then they could be rewatered, yes.

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Q. You mentioned, in response to a question by Mr. Canaday, that if Mono Lake were on the delta plain, that channels would start to propagate.
And I just want you to refresh the Board's recollection at what level does Mono Lake start to be on the delta plain?
A. Mono Lake reaches the delta plain of Rush Creek at very close to 6400 feet. And then as the channel agrades -- as it progrades, it agrades, and it will eventually centuries scale, multi-centuries scale, start moving into a multi-channeled system.
Q. Now, you talked about the amount of water you would suggest in the presently dry channels, and you said it would not need a large amount of water, 5 to 15 cfs in each.
Do you recall that testimony?
A. Yes, I do. And 5 to 15 in each, I think that there are probably some channels out there that would -- no, I'll stick with 5 to 15. I think 5 to 15 would do a great deal of good in all of those channels.
Q. That would mean less water in the main channel, correct? Potentially could mean less water in the main channel?
A. Yes, it could.
Q. Hypothetically, if it did mean less water in the

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main channel, to what extent would rewatering historical channels interfere with the work the water is doing in the main channel in terms of affecting the stream channel?
A. I think it would have a minor impact given that during the snow melt period, there still would be a large flow in the main stream, and that's when the work would actually be done.
The amount of work that could be done in the low-flow months would probably be less, but that amount of work is minor. And it has so far had a very, very minor impact on the channel, as Dr. Li will be pointing out through his cross-section.

The work will continue to be done during those heavy snow-melt months. The amount of water that we put into the channels would not cut back those snow-melt month flows very much at all.

Q. In response to questions from Mr. Birmingham, you talked about the "Little Ice Age."

Did I write that down correctly?

A. Yes.

Q. And that was from what period of time -- this is in California, sir, or generally?

A. It is both generally and in California. We have some dates on glacial advances in the Sierra Nevada

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that happen to coincide with the Little Ice Age as it has been studied in New Zealand and in the Alps and in the Pyrenees, and over large areas of the earth. And that starts at approximately 1550 A.D., and it goes through approximately 1850 A.D.

Q. And I believe you testified that based on analysis relating to the Little Ice Age, that it is the Department of Water Resources that had suggested a six- to seven-year drought was appropriate?

A. Not so much appropriate, but this is the drought they continued to find not only in the period of instrumental record, but going back to 1500 to 1550, something like that. They found periods in there that suggested six- to seven-year droughts occasionally.

Q. And I wrote this down fairly carefully. You said that in your opinion, "We should not use the Little Ice Age as a criterion for a drought analysis."

Can you tell us why?

A. During that period of time, water was remarkably abundant in California. And we shouldn't be looking to that period of time as a criterion for what California can expect in the future in terms of its droughts.

We should look at past dry times, not at past wet times, and that period, the Little Ice Age, was an abnormally wet time. And as I say, Mono Lake was high,

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glaciers were advancing in the Sierra Nevada.

Q. And pre-1550, I take it there were dryer periods of time; is that right?

A. Yes. Pre-1550, we were into a period referred to as the little optimum or medieval warm epic. And during those times, we had these severe droughts in California; likewise, severe droughts in other places in the world.

Q. Last question, sir. You talked about in Rush Creek the historical channels now dry being full of cobbles.

What is the source of those cobbles?

A. The source of the cobbles is the Marzano Quarry that exists even today along the west side of Rush Creek very close to Parker Creek. It is not to be confused with the Parker Plug.

But there's a gravel operation there. And between 1960 or so and 1967, the Marzano operation had pushed huge amounts of quarry gravel out into Rush Creek, 60 to 70,000 cubic yards of material, if I calculated correctly, and I think that's a gross estimate, but not

an unreasonable estimate. That material was carried down during the big flood of '67. And it clogged channels as it went causing Rush Creek to cut new channels and to abandon channels, et cetera.

In a sense, it's a pain to get these things out. But on the other hand, it's exactly those cobbles that preserved the abandoned channels and prevented those abandoned channels from being blown out, so in many ways, it's a blessing.

Q. You talked about the Gun Barrel earlier today. Was the Gun Barrel section of the channel created in 1967?

A. Yes, it was. The Gun Barrel was cut as a result of Rush Creek clogging its own existing channels with cobble, and with the Marzano Quarry cobble. And it lost access to its channels by clogging these channel with quarry cobble, and so it cut a new channel straight down out of The Narrows.

Q. And generally speaking, it's a wide and narrow channel?

A. Consistently wide and consistently shallow with very little complexity, to use the wildlife biologists' term.

MR. DODGE: No further questions.

HEARING OFFICER DEL PIERO: Thank you very much, Mr. Dodge.

Mr. Birmingham?

RECROSS EXAMINATION BY MR. BIRMINGHAM

Q. Dr. Stine, during questions put to you by Mr. Herrera, you made reference to a series of feasibility reports that you've been working on; is that correct?

A. BY DR. STINE: That's correct.

Q. And you said you'd been given a stop-work order by Mr. Trihey?

A. That's correct.

Q. Because the Department of Water and Power had informed him that the funding had terminated; is that right?

A. That's correct.

Q. That's your understanding.

When were you given the assignment to work on those feasibility reports?

A. I believe it was about the same time we started working on this hearing.

Q. Isn't it right that the Court, El Dorado County Superior Court, ordered that those feasibility studies be done in December of 1992?

A. I don't know. That's possible.

Q. And isn't it correct, Dr. Stine, that funding to finish those feasibility reports existed through December 31, 1993?

A. That could be. I don't know when this was cut off.

Q. But in any event, Dr. Stine, there was funding available in 1993 for the completion of these feasibility reports that you were referring to to

Mr. Herrera?
A. That's correct.
MR. ROOS-COLLINS: Objection. Asked and answered.
HEARING OFFICER DEL PIERO: Please proceed.
Q. BY MR. BIRMINGHAM: Now, throughout a lot of your testimony, you talked about -- in response to questions by Mr. Roos-Collins, you talked about the effect of old and new vegetation and the fact that, in your opinion, the vegetation is not causing Rush Creek to narrow.
Do you recall that testimony?
A. BY DR. STINE: Yes, I do.
Q. I've put on the easel a photograph that's labeled Figure 3 from the direct testimony of Robert L. Beschta. It purports to depict the Rush Creek fish hatchery study site July 1976.
You're familiar with this site, aren't you, Dr. Stine?
A. I am, and I would point out it's below the area that we were talking about. It's below the Rush Creek bottomlands. It's in the area where there has been rather extreme stream incision and huge amount of volcanic material highly erodible, much, much more

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erodible than what we can see upstream.
Q. In this particular segment of Rush Creek in July 1976, would you agree with me that this is a wide stream channel?
A. I would agree that it's a wide braided stream channel at a time when there was lots and lots of water in the channel, yes.
Q. I'm going to put up another photograph, and this is Figure 4 from the direct testimony of Robert Beschta.
And it's correct, isn't it, Dr. Stine, that Figure 4 depicts the same area as Figure 3?
A. That's correct.
Q. In fact, if you examine the two photographs very carefully, you can see the same pieces of dead wood in Figure 3 and in Figure 4; is that correct?
A. Yes, it's the same spot, definitely.
Q. Now, you would agree, wouldn't you, Dr. Stine, that there's significantly more vegetation that appears in Figure 4 than in Figure 3?
A. Absolutely.
Q. And, Dr. Stine, isn't it correct that as fine sediments are deposited into the vegetation which is emerging, as depicted in Figure 4, that this stream channel will narrow?

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A. Yes. But let's be very clear on the amount of water that we have on the one photo versus the other photo.
What we've done here between July of 1986 and August of 1993 is diminish the flow probably by a factor of, I'm guessing here, 3 to 5. And if that's what's required to narrow the stream, then you could probably argue that if we drop the stream down to 1 cfs, we've narrowed it tremendously.
Q. Dr. Stine, isn't it correct that as the stream evolves, that the channels that are cut through the

area depicted in Figure 4, ultimately will be able to carry a flow which is comparable to the flow depicted in Figure 3, without doing any damage to those stream channels?
A. I don't want to get into damage. You would certainly do less damage on your Figure 4 right here if damage is stream erosion. But if you put, today, if you put the same amount of water as is shown on Figure 3 here into the conditions that exist here on channel 4, you're going to have the stream in exactly the same position on Figure 4 that you have in Figure 3. You'll be drowning vegetation, but the stream itself will be occupying the same area here that it did on one photo and on the other.

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Q. Let's talk about 20 years from now, or 20 years from August 1993. Isn't it correct that if the vegetation depicted in Figure 4 continues to develop as Dr. Beschta has described it, that channels, narrow channels, will evolve that will be capable of handling the high flows that occurred in July of 1986 without the erosion that you just described?
A. Without the erosion? There will definitely be less erosion going on on these vegetated surfaces. That is not to say, however, that the stream won't be on those surfaces, and it doesn't speak at all to changes in stream width or numbers of channels.
Q. Isn't it correct, Dr. Stine, that you agree with Dr. Beschta that after a stream has evolved and is a functioning stream system that is connected to a healthy riparian corridor, that the high flows that are depicted in the photo in July of 1986 will actually be very beneficial to the stream?
A. I agree. And that's why I advocate high flows in the Mono Basin streams. After vegetation has become established, I think that the streams will be able to carry quite high flows, and it would be very beneficial. And I further add that the more channels we have with healthy vegetation on them, the more the system will approximate the 1940 system.

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Q. I'd like to talk about NAS/MLC Exhibit 258 and NAS/MLC 259. Do you have copies of those in front of you, Dr. Stine?
A. I do.
Q. Now, you indicated that these histograms were prepared by Mr. Vorster?
A. I did.
Q. And you said that, These histograms indicate that for the segments of Rush Creek that are depicted in the exhibits, pools with depths in excess of two feet are few and far between."
And I wrote down those words pretty carefully. Those were your words, weren't they, Dr. Stine?
A. Yes. And are you referring now to Exhibit 258 or 259 when I said that? I said that in relation to which one?
Q. You said that in relation to Exhibit 258, I believe. Is that your opinion?
A. Yes. I guess that's correct. I would say that

they are fewer and farther between on Exhibit 259, which takes the entire stream length from Narrows to Ford into consideration.
Q. Now, you would agree with me, Dr. Stine, that a synonym for the words "few and far between" is the single word "scarce"?

A. It's close, yes.
Q. Generally, "few and far between" connotes scarcity?
A. Sure, sure.
Q. Now, you've read Mr. Vestal's 1954 paper on Rush Creek?
A. I have.
Q. I believe it's in evidence as Cal Trout Exhibit 5-T, I believe, but don't hold me to that, but it is in evidence as a Cal Trout Exhibit. I believe it's also in evidence as a DWP exhibit.
Now, the portion of Rush Creek that was the subject of Mr. Vestal's study was the same portion of Rush Creek or included that portion of Rush Creek that is depicted in Exhibits NAS and MLC 258 and NAS and MLC Exhibit 259; isn't that right, Dr. Stine?
A. Yeah. With the one proviso here that the stream isn't necessarily in the same place, and we're dealing with fewer stream channels. But in the sense that it is from The Narrows to The Ford, yes.
Q. Now, if Mr. Vestal's report describes different types of stream segments as follows, "Riffles containing excellent spawning gravels make up the bulk of the test stream, pools are comparatively scarce," you would agree that Mr. Vestal is saying that

pools are comparatively few and far between; isn't that what Mr. Vestal is saying?
A. I think he saying that they're comparatively scare, and you've asked me this exact question before. What I said is yes, in comparison to the riffles and runs, that is indeed the case. I think they are fewer and farther between today than they were before, and that's based upon my re-occupying the channels that used to exist out there.
And you can go into those channels, and you can see the kinds of conditions that existed. And they are very much different from those conditions that exist today. And I should say I've walked those channels with Mr. Vestal and he agrees.
MR. BIRMINGHAM: I would ask for an instruction that Dr. Stine answer my question. I won't move to strike the last response, but I would appreciate if he'd respond.
MR. DODGE: I think in that particular case --
HEARING OFFICER DEL PIERO: Wait a second, Mr. Dodge.
Dr. Stine, I want you to answer the questions that are asked. I want you to answer the questions that are asked.
DR. STINE: I will try.

HEARING OFFICER DEL PIERO: However, I need to

point something out. You're the one that raised the issue of Mr. Vestal.
MR. BIRMINGHAM: I did. But my last question --
HEARING OFFICER DEL PIERO: That's enough. Proceed.
MR. BIRMINGHAM: I'll have to go back and look at my question and see if it asked Mr. Vestal's opinion as opposed to --
HEARING OFFICER DEL PIERO: Please do.
Q. BY MR. BIRMINGHAM: Dr. Stine, you said Exhibits NAS and MLC 258 and 259, if we reduced the flows from the 80 cfs that was in the stream at the time of Mr. Tillemans' study was conducted to 35 cfs --
A. BY DR. STINE: I believe I said 25 to 30 cfs.
Q. Excuse me, 25 to 30.
-- that the percentages would just shift one column to -- the histograms would shift one column to the left?
A. Yes. The bars would shift one to the left in an approximate sense. Certainly.
Q. What's the basis for that?
A. The basis for that is my talking to Dr. Li about the IFIM data and what would happen to stream depths, all other things being equal, if flows were taken from

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80 down to 25 or 30 cfs.
And I believe Dr. Li is in fairly close agreement with what Dr. Beschta said that it would be approximately a half a foot. And that's why I'm approximating this with one half a foot interval to the left here.
Q. So that half a foot is what Dr. Li indicated to you?
A. As well as Mr. Beschta, yeah, or Dr. Beschta, excuse me.
Q. One question. Hypothetically, let's say a pool was exactly two feet deep. In which histogram or what bar would that appear? The bar from 1.5 to 2.0 or from 2.0 to 2.5?
A. You'd have to ask Mr. Vorster that. I don't know. I don't remember. It's going to the rare hole that's exactly that, and so I hope that that isn't a problem in too many places here.
Q. Mr. Roos-Collins asked you some questions about this report. This is the December 16, 1993, Lee Vining Creek Segments 3-A, 3-B. 3-C, 1993 Habitat Improvements submitted by Northwest Biologic Consulting prepared for the Restoration Technical Committee. I believe that if you'll find an exhibit number, Cal Trout 42?
MR. ROOS-COLLINS: Yes.

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MR. BIRMINGHAM: Cal Trout Exhibit 42.
Q. BY MR. BIRMINGHAM: Now, you indicated that you were not involved in the preparation of Cal Trout Exhibit 42?
A. BY DR. STINE: That's right. That was prepared by Mr. Scott English and Ms. Charlotte English.
HEARING OFFICER DEL PIERO: Dr. Stine, you want some water?
DR. STINE: I'm fine, thanks. It's too much

water.
Q. BY MR. BIRMINGHAM: Now, have you reviewed the report, Dr. Stine?
A. BY DR. STINE: I've briefly -- I've gone through it. I have not read it, but I've thumbed through it to see what was covered in it.
Q. There's a memorandum that is attached that is part of an appendix to the report. It's a memorandum from Woody Trihey to the RTC members. Have you reviewed that memorandum?
A. I have not reviewed it.
Q. Would you take a moment and review it, please?
MR. DODGE: Objection. Beyond the scope of any questions that's been asked to date. I think we need to confine ourselves to rules here.
HEARING OFFICER DEL PIERO: How much longer do you

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have?
MR. BIRMINGHAM: I can cut to the chase on this one.
Q. BY MR. BIRMINGHAM: Dr. Stine, it's correct, isn't it, that the work that was proposed by Mr. Trihey in 1993, not all of the work was carried out. Isn't that right?
A. BY DR. STINE: That's correct. I don't have a copy, but that's correct.
Q. So just because Mr. Trihey's report suggests that he was recommending work in 1993, it doesn't mean that that work was done?
A. The work recommended for 1993 was not necessarily done in 1993. That's absolutely correct.
Q. The RTC rejected some of Mr. Trihey's suggestions that he wanted done?
A. That may be. I don't attend the RTC meetings anymore.
Q. Now, let's talk about Mill Creek for a minute. I hesitate to do this, since I objected to it, but there were some questions, and I'd like to follow-up on them.
Mill Creek, the water that is diverted from Mill Creek ultimately makes its way to Mono Lake; is that right, Dr. Stine?
A. I would say most of it makes its way to Mono Lake.

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There's probably -- there's undoubtedly some water that's lost to evapo-transpiration and root because it's spread out on lands for irrigation. The rest of it, though, goes down into the ground and presumably gets into the Mono Lake.
Q. What's the name of the channel that takes water from the diversion of Mill Creek and ultimately conveys that water to Mono Lake? Is it DeChambeau Creek?
A. By surface flow?
Q. Yes.
A. Well, there's DeChambeau Creek, and there's also Wilson Creek.
Q. Wilson Creek. Wilson Creek. Wilson Creek is a man-made channel, isn't it, Dr. Stine?
A. No, it's not. It was a natural, though ephemeral, channel under natural conditions that has been widened and deepened at the expense of Mill Creek.

Q. The current condition of Wilson Creek is an artifact of the diversions out of Mill Creek?
A. That's correct, yes.
MR. BIRMINGHAM: Excuse me, one moment.
Q. BY MR. BIRMINGHAM: Dr. Stine, I'm showing you a memorandum that's dated February 21, 1993, and I'd ask you to just review that memo for a moment.
After you've had a chance to review it, would you

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please tell me if your recollection as to when you were asked to start working on the feasibility reports is refreshed?
A. BY DR. STINE: Okay. I wrote this, indeed, on February 21, 1993, and I guess at this point, we were starting to discuss the feasibility report. This was in winter, and I think it was generally agreed that it would be non-winter conditions before we got out there and were able to reoccupy the channels and what not. But we were talking about it at the beginning of 1993.
MR. BIRMINGHAM: Thank you. I have no further questions.
HEARING OFFICER DEL PIERO: Thank you very much.
Miss Cahill?

CROSS-EXAMINATION BY MS. CAHILL

Q. Dr. Stine, with regard to the question of the pools in The Narrows back in Mr. Vestal's time, were there pools at that time in the side channels that were deeper than three feet?
A. BY DR. STINE: Yes. The pools below The Narrows, I think you're talking about.
Q. Yes.
A. And, yes, in those sides channels, there were, indeed, pools that were deep, three feet -- two and a half to three and a half feet deep.

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Q. Were there, at that time, pools below what is now The Ford?
A. Yes, certainly there were. And, in fact, we have shown photographs as exhibits of some of those pools in standing water areas.
Q. And they're beyond the thalweg profile that was submitted by L.A. DWP?
A. That's correct. The thalweg profile only goes to The Ford, and there were deep areas down below The Ford, between The Ford and the Clover Ranch.
Q. And you indicated that pools were comparatively scarce. I've lost the exhibit number. On the NAS/MLC Exhibit -- was it 258?
This would show that in that area, pools of three feet deep or greater constituted approximately 5 percent of the measurements; is that right?
A. Yes. Thalweg measurements of greater than three feet you're asking?
Q. Yes.
A. Yes. Perhaps 5 to perhaps 6 percent of the thalweg measurements.
Q. And you would consider that to be relatively scarce?
A. I would, yes.
Q. Compared to the other depths?

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A. Compared to the pre-41 depth, yes, definitely.
MS. CAHILL: Thank you.
HEARING OFFICER DEL PIERO: Thank you very much.
Mr. Roos-Collins?
RECROSS EXAMINATION BY MR. ROOS-COLLINS
Q. Good evening, Dr. Stine.
A. BY DR. STINE: Good evening.
Q. Let's return briefly to Cal Trout Exhibit 42, the December 1993 report by Northwest Biologic Consulting regarding the 1993 habitat improvement work in Lee Vining Creek.
A. Yes.
Q. Do you recall Mr. Birmingham's questions to you on his recross examination?
A. Yes.
Q. His questions concerned a memorandum by Mr. Trihey regarding recommended follow-up work after 1993 high flows.
A. They may have. I think the question that he asked me was whether or not all the work recommended for 1993 had been done in 1993, and I agreed with him that it hadn't.
Q. Let me ask you to look at the table of contents in this exhibit focusing on pages 6 through 32, beginning with, quote, summary of work, and then proceeding
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through descriptions of individual treatments 1 through 36-B, and ask you if that portion of this report describes work actually done in Lee Vining Creek in 1993?
A. My recollection is that that's, indeed, what's described there, and if I could look for just a second.
Q. Please take your time.
A. Yes. I remember looking at this and, indeed, this was the work that was done, pages 6 through 32.
Q. And then following the pages we just discussed appears an appendix which is Mr. Trihey's recommended follow-up to the work actually done; is that correct?
A. That's correct.
Q. Thank you.
Let's return now to Mr. Vestal's 1954 article. You don't have that article in front of you, do you?
A. I don't, no.
Q. This is Cal Trout Exhibit 5-T, as Mr. Birmingham suggested.
He read you part of a paragraph from page 92 of the article. Let me read you a preceding paragraph on the same page.
Quote, Lower Rush Creek formally averaged 20 feet in the width during the trout season with the depth of some seven inches on the riffles and four or five feet
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in the long delta pools. By 1951, however, these dimensions had been reduced by more than two-thirds, unquote.
Is that description of Lee Vining Creek -- excuse me, Rush Creek, prior to the commencement of L.A.'s diversions consistent with your understanding of Rush Creek?

A. Yes, it is. Of course, my understanding of Rush Creek comes, in part, from long conversations, including field trips, with Mr. Vestal, too.
Q. And do you agree with Mr. Vestal's opinion regarding the impact of L.A.'s diversions from 1951 on the depths of riffles and on the depths of the pools?
A. Yes, I do agree. And I should say this is not due to some channel change. It's simply due to a drop in the quantity of water moving down the channel.
Q. Thank you.
Now, in answer to a question by Mr. Dodge on his redirect, you referred to the biologist term, "habitat complexity."
Let's assume this Board determines that habitat complexity comparable to what existed before 1941 is a desirable goal for its order. Let's discuss two scenarios.
Under scenario one, the existing channel is

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watered with whatever flow regime the Board establishes.
Under scenario two, same flow regime, historical channels are reopened. Under which scenario would the resulting habitat complexity be most comparable with what existed before 1941 on Rush Creek?
A. By a large factor, scenario two.
Q. Please explain why.
A. There's already a great deal of habitat complexity waiting in these abandoned channels. Once they're reopened, immediately that habitat complexity in lots of places returns.
Over the period of time that it takes vegetation to recolonize those portions of the abandoned channels where the vegetation has been destroyed by dewatering, that amount of habitat complexity will increase.
MR. ROOS-COLLINS: Thank you.
Mr. Herrera, how many minutes did I take?
MR. HERRERA: Five minutes and 25 seconds.
MR. ROOS-COLLINS: And how many minutes did Mr. Dodge take?
MR. HERRERA: 15.
MR. ROOS-COLLINS: Thank you. No further questions.
MR. BIRMINGHAM: Mr. Herrera, how many minutes did

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I take?
MR. HERRERA: I don't know.
HEARING OFFICER DEL PIERO: Mr. Valentine?
MR. DODGE: You know what President Eisenhower said about that.
HEARING OFFICER DEL PIERO: No, I don't.
MR. DODGE: One swallow doesn't make a summer.
RECROSS EXAMINATION BY MR. VALENTINE
Q. Dr. Stine, I have just a couple questions on one relatively minor point.
You were asked a little while ago about lake depths to which -- let me start over.
You were asked a little while ago about elevations to which Mono Lake descended in droughts in the prehistoric period, and your answer, I believe, was

6368, was the low stand?
A. BY DR. STINE: That's correct and, in fact, that's the lowest stand that I can document in the last 35,000 years.
Q. The 6368 stand was how long ago?
A. It ended approximately 850 years prior to 1950 A.D.
Q. That would have been there previous to the appearance of Paoha Island in the lake?
A. Yes. Paoha Island, I believe it would date Paoha

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Island based on a number of different lines of evidence. Paoha Island emerged somewhere between 1650 A.D. and about 1695 A.D.
Q. Therefore, a drought brings the lake to a prehistoric level to 6368. The volume of water would have been much, much greater than with the same lake elevation today?
A. Yeah. I don't know what you mean by "much, much greater," but the lake held more water per given lake level and was therefore less saline prior to Paoha being in the lake than after Paoha emerged in the lake.
In other words, while we've seen lower lakes prehistorically than we've seen in historic times, we have not seen as low a volume of water in Mono Lake in prehistoric times as we have seen in historic times. This is as low a volume of lake -- water in Mono Lake as we've seen, I think, any time in the last 35,000 years.
MR. BIRMINGHAM: Mr. Valentine, this is how Mr. Dodge responds to Mr. Vorster's questions.
MR. VALENTINE: It wasn't Mr. Vorster's question. He's off the hook, whatever faults there may have been.
MR. ROOS-COLLINS: Mr. Del Piero, Mr. Birmingham has previously indulged in that joke. I wish that my response to his prior indulgence is repeated in the

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record; namely, that Mr. Vorster's records are pearls.
HEARING OFFICER DEL PIERO: The shape of a pearl. Okay. Mr. Frink?
MR. FRINK: I have no questions.
HEARING OFFICER DEL PIERO: Mr. Satkowski?
MR. SATKOWSKI: No questions.
HEARING OFFICER DEL PIERO: Mr. Smith?
MR. SMITH: One brief question. I think I can make it loud enough.

RECROSS EXAMINATION BY THE STAFF

Q. BY MR. SMITH: If we put 20 cfs in this Mill Creek, as has been suggested, what does that do generally to the flows in Wilson and DeChambeau?
A. BY DR. STINE: I don't think it would do too much to DeChambeau Creek because DeChambeau water is taken out above the Southern California Edison power plant, so it would have very little effect on there.
What it would do on Wilson Creek is lessen the flow in Wilson Creek, which I don't think would have much of an ecological impact at all, because there's so little riparian vegetation associated with Mill Creek.
Mill Creek is an on-again-off-again stream at the whims of irrigators. And there hasn't been a chance

there for Wilson Creek to really develop any riparian system or any geomorphic integrity in the sense that

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the stream is interacting with riparian vegetation.

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

HEARING OFFICER DEL PIERO: Mr. Herrera?

Q. BY MR. HERRERA: Dr. Stine, I have just a few brief questions. One of them relates to the high-flow discussions we had earlier, and we were discussing 80 cfs as being a high flow in regards to rewatering various channels.

And then further on in various cross-examinations, there was a discussion about high flows being detrimental in some cases to channel maintenance, or in some cases, necessary to deposit fines for vegetation to re-establish itself.

The question I'm getting at is: These high flows, if we were allowed to put these high flows in there, will they be detrimental in some cases to prudent rewatering of these channels?

A. BY DR. STINE: I would not suggest that we put a large amount of water down presently abandoned channels. I would like to see it kept at, say, 10 to 15 cfs, something like that, down these channels at least initially, during the first 5 years to 10 years, something like that.

As these channels toughen up with riparian

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vegetation, as their banks become better bound with riparian root systems, I think we can walk away from the system and just let it be itself, and I don't think we're going to get any erosion at all. But initially, I think that we should limit the flow down these streams until they're allowed to get back to some semblance of strength and integrity.

Q. In essence, then, you're saying that the high flows initially are not appropriate to be released into Rush Creek for whatever reason, because they would be detrimental to certain rewatering characteristics. On the other hand, they may not be necessary for deposition of sediments or fines?

I'm trying to get -- the point here is whether or not you need high flows. You need high flows to do certainly things, but you don't know high flows to do others.

And initially, are you suggesting that we limit these flows irregardless?

MR. DODGE: Objection. Vague as to, quote, "high flows."

HEARING OFFICER DEL PIERO: Mr. Herrera, I counted three questions, so I'm going to sustain Mr. Dodge's objection. You need to be specific as to which question you want to ask him first.

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Q. BY MR. HERRERA: First of all, I'll ask you again, high flows being, as you suggested earlier, is 80 cfs and above; is that correct?

A. BY DR. STINE: Yes. Insofar as it relates to the now abandoned channels. That's not a high amount for

the existing channel of Rush Creek, but I wouldn't want to see 80 cfs put down the abandoned channels.
Q. And you suggested 5 to 15 for the abandoned channels?
A. Yes.
Q. And no more than that?
A. I would say no more than that until the riparian vegetation in those channels, all the way along those channels become re-established.
Q. Do you have a suggestion as to how to limit flows to 5 to 15 cfs on these channels if, indeed, the flows in the main stem of Rush Creek exceed the 80 cfs we've discussed or maybe it's higher?
A. Yes. And I don't pretend to be an expert here, but limiter logs, as they're called, are often used for this purpose, to allow only a certain amount of water into a particular channel. And there are people who do this for a living and are quite good at it.
Q. So subsequently, it's your suggestion, then, that the high flows are necessary for the main channel but

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are to be limited for the rewatering of these adjacent channels?
A. I would say that they should be limited in the abandoned channels.
Then you had another part of the question which related to the flows in the main channel. What was that, I'm sorry?
Q. Let me maybe get to the quick, as they were saying.
What I'm looking at is if we had a high flow, hypothetical, in Rush Creek of, say, 300 cfs --
A. Okay.
Q. -- and that has some characteristics that are appropriate for the re-establishment of various things in the main stem, but they could be, if allowed to flow, as you said, naturally, into the side channels, detrimental to those channels.
A. I would agree for the first some number of years until those banks become bound.
And I hope I've made myself clear that in lots of those reaches, vegetation is already in place, but there are other reaches of the abandoned channels which will require some time to get the vegetation back.
Q. So essentially, for the first -- until the vegetation does get established, then the high flows

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should be limited to those channels?
A. I would agree with that, yes.
MR. HERRERA: That concludes my questions. Thank you.
HEARING OFFICER DEL PIERO: Mr. Canaday?
Q. BY MR. CANADAY: Dr. Stine, you discussed some of these prehistoric drought occurrences. Is that the word you used, "prehistoric"?
A. BY DR. STINE: Yes. With "historic" being defined as the first written record, European written record from a particular area. Historic in Mono Basin is pre-1854.
Q. Have you analyzed the statistical probability of

the occurrence of that drought period?
A. No, I haven't. Because to do something statistical, I would need more droughts. And we only really have three droughts, so it's difficult to deal with statistics on these droughts.
Where we have a tree-ring record or an instrumental record, then we've got lots of data. But for these droughts, we really don't have -- we've got lots of data that the droughts occurred, but there were only three droughts in this period of time that we're dealing with. So it's difficult to deal with it statistically.

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Q. So it would be difficult for us to determine the likelihood of occurrence of a drought of 20 years plus, then?
A. Yes, it would be very difficult, yes.
MR. CANADAY: Thank you.
HEARING OFFICER DEL PIERO: Mr. Brown, do you have any questions?
MR. BROWN: No, sir.
HEARING OFFICER DEL PIERO: I'm going to bite, Mr. Valentine.

CROSS-EXAMINATION BY THE BOARD

Q. BY HEARING OFFICER DEL PIERO: Dr. Stine, with the appearance of Paoha Islands, what year approximately?
A. BY DR. STINE: Somewhere between 1650 and about 1690.
Q. Black Point?
A. 13,500.
Q. Is Black Point a lava flow?
A. Black Point is a big cinder cone called a Guyot, G-U-Y-O-T. And it's a cinder cone that formed under Mono Lake when Mono Lake was about 700 feet above where it is today during the last ice age.
Q. Any magma come out of there?
A. Not so much magma, cinder. Cinder that's today quarried and spread on roads in Mono County.

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Q. Paoha Island, any magma appear at the time?
A. Paoha Island, a little bit of a lava flow on the northeast corner, a plugged dome on the southeast corner where there are today femorals.
Q. Was the magnitude of the lava flow on the northeast corner significant?
A. If you were standing there, it sure would have been. It's about a couple thousand feet long.
Q. Significant from the standpoint of impacting the lake?
A. Oh, it probably created some steam. I think it probably did impact the lake in that there was probably a lot of sulfur injected in the lake, maybe some chlorides as well at the time of that subla cluster interruption, sure.
Q. Increase the salinity of the lake?
A. Probably did.
Q. Okay. What year was that?
A. Somewhere between 1650 and 1690. It doesn't have the 300-year-old shoreline on it, but it does have a tree on it that was established in 1690.

HEARING OFFICER DEL PIERO: Thank you. You're excused, sir.

MR. DODGE: Dr. Stine, if you would just stay there.

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DR. STINE: Higher authority?

HEARING OFFICER DEL PIERO: I tried to let you go, Scott.

DR. STINE: Thank you, I appreciate it.

MR. DODGE: Dr. Li, if you would join Dr. Stine.

DR. LI: Marc, do I look the same as these guys? If I am, they're in trouble.

HEARING OFFICER DEL PIERO: Do you know how many days I've been here? You're starting to look like F. Bruce Dodge.

MR. DODGE: I want to make it clear to everyone that I'm calling Dr. Li on one subject in surrebuttal and that is the recent changes, if any, in the width and depth of Rush Creek.

DIRECT EXAMINATION BY MR. DODGE

Q. Now, Dr. Li, let's try to get through this fairly quickly.

Did Dr. Stine ask you to take certain measurements?

A. BY DR. LI: Yes, he did.

Q. And what measurements did he ask to you take?

A. He asked me -- Dr. Stine asked me to resurvey the transects that were first established in 1987 in relation to the Rush Creek instream flow studies.

Q. And the transects were set up in 1987; is that

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right?

A. Yes, they were.

Q. And they still exist?

A. Yes, they do.

Q. And did you do this resurveying?

A. Yes, I did.

Q. Tell us what you did, exactly.

A. Using standard surveying techniques, I measured relative elevations at 20 of the 22 transects that are located in Rush Creek between The Narrows and The Ford. These 22 -- these 20 transects represent 13 of the 14 sites that were established in 1987, and they represent 4 different habitat types, 4 pools, 3 runs, 3 rock gardens, and 3 riffles.

Q. Now, you say 20 of 22. So I assume that you did not remeasure 2. Can you tell the Board which ones you did not remeasure and why?

A. There was one transect in a pool that was not remeasured because I could not relocate one of the pins and ascertain the alignment of that transect.

The other transect was located in the armored bend, the infamous armored bend, and the reason I did not measure that one is that that thing looked like a porcupine with rebar quills in it. I could not figure out which pins were mine. So after a period of an hour

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and a half, I gave up.

Q. When did you do this work?

A. I measured three transects on Columbus Day 1993,

and the remainder between January 25th and January 27th.
Q. Of what year?
A. 1994.
Q. Did you get hardship pay for that?
A. I like going out there.
HEARING OFFICER DEL PIERO: Nope, you don't look anything like F. Bruce Dodge.
Q. BY MR. DODGE: Can you explain to the Board, physically, how you went about getting depth and water elevations?
A. BY DR. LI: The relative elevations, we established the known elevation of the scope that you use to survey, and that's done by measuring a known location. In the case of these transects, it is either the benchmark that was established or one of the four rebar pins that were used to establish a transect.
We measured all the tops of those pins and the bases of those pins to -- and compared those elevations with the historical data.
Q. Now --

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A. Then --
Q. Do you go across the stream and measure depth; is that what you do?
A. Yes. You connect a measuring tape to the pins first confirming that the pin distances are identical to the original survey. And then you simply, using the stadia rod and the auto level, measure the relative elevation.
Q. At what intervals?
A. In these surveys, they were generally one-foot intervals.
Q. Okay. How about wetted width? How did you go about measuring that?
A. Wetted width is simply the widest extent of the stream channel that is wet, and you simply look down perpendicular from the tape that you've strung across the transect and mark those locations.
MR. DODGE: Before we go on, Mr. Del Piero, I have this tendency to forget. I would offer Dr. Stine's rebuttal testimony, National Audubon Society and Mono Lake Committee Exhibit 1-A-F and the exhibits related thereto, National Audubon Society Exhibit 246 to 254, 258, 259, and 265.
MR. BIRMINGHAM: Subject only to my prior objection that rebuttal testimony ought to be rebuttal

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testimony, I have no objection.
MS. CAHILL: Since we're on the subject --
HEARING OFFICER DEL PIERO: Ms. Cahill, you want to object, too?
MS. CAHILL: No. But since Mr. Dodge did it, I would, at this time, move admission of DFG 164.
HEARING OFFICER DEL PIERO: Those that have been offered by Mr. Dodge will be entered into the record. That which was offered by Ms. Cahill will be entered into the record.
Do you have any?

MS. SCOONOVER: No.
HEARING OFFICER DEL PIERO: Mr. Roos-Collins?
MR. ROOS-COLLINS: No objections.
(NAS/MLC Exhibits Nos. 1-A-F, 246 to 254, 258, 259, 265 were admitted into evidence. DFG Exhibit No. 164 was admitted into evidence.)
Q. BY MR. DODGE: Now, Dr. Li, is National Audubon Society and Mono Lake Committee Exhibit 264 a summary of the result of your measurements that you've testified to?
A. BY DR. LI: Yes, they are.
Q. Briefly, can you take us through Exhibit 254?

A. First, I would like to establish a couple things. These sites were initially randomly selected based on the initial habitat map that was made. The locations within these randomly selected sites were also randomly selected in this way. This was the only way that we could make samples of the stream and not inject personal bias so that these sites would be representative of the Rush Creek bottomlands.
Before you are a set of 20 pictures. They reflect the relative water -- relative elevations of -- that were made in 1987, which is the dotted line, and the survey that was made in 1993, slash '94, which is the solid line.
I've also put on these figures the measured water surface elevation for the 1994 survey, and I put on the water surface elevation estimated from the IFG4 hydraulic model so that you can see the relationship of 80 cfs in relation to the 1987 profile and the 1994 profile.
HEARING OFFICER DEL PIERO: The water surface elevation in 1987 corresponds with the 1987 level; is that correct?
DR. LI: Yes. So, for instance, if we take the first one, which is labeled Transect 49 Riffle --
HEARING OFFICER DEL PIERO: Okay.

DR. LI: -- the water surface elevation that is higher is the water surface elevation for 1987. The dotted line below that one is the measured water surface elevation of 1994.
HEARING OFFICER DEL PIERO: Okay.
DR. LI: This transect, we are going from upstream to downstream. I will be brief on some of these in that the pools generally had three transects placed in them, and the other habitats had one transect placed in them. And since the transects for the pools were placed in close proximity, it would be unfair to characterize them equally with the other transects.
HEARING OFFICER DEL PIERO: Okay.
DR. LI: Transect 49 is in what Dr. Stine calls the Gun Barrel, approximately a hundred meters downstrean of The Narrows. The 1994 survey reveals a stream channel that's slightly wider than the 1987 survey.
Transect 50 is about 300 meters downstream of

transect 49. It is a rock garden, and I see no discernible differences in terms of channel width in between the two surveys. However, the 1994 channel is slightly deeper. It's slightly deeper by about an inch.

Dr. Stine is pointing out to me something that you should be aware of. There is a vertical exaggeration in these figures in that, for instance, in transect 51, the abscissa, or the X axis, is a hundred feet wide, whereas you're only talking about the five feet of difference on the ordinate, or Y axis.

Transect 51 is about 800 feet downstream of transect 50. It is narrower by about three inches at the water surface elevation, but it is about the same below that point.

The narrowing in width I attribute to the dry banks being sloughed off into the channel as the high flows came up.

Riffle 52 is about 500 feet downstream, and there is this -- the differences between the surveys are negligible, and I call it a wash.

Transect 53 is a run. We are looking upstream at these transects, so the right-hand bank is actually on the left-hand side. There is a narrowing of this channel of about five feet in the top six inches in the channel. There is no differences in the remainder of this channel.

The cause for this narrowing is material that came out of Parker plug, and that can be discerned in that the rock material from the plug was crushed rock, and no riparian vegetation was involved in this narrowing.

Transect 54 was a rock garden and the stream channel is slightly wider.

Q. BY MR. DODGE: Today, you mean?

A. BY DR. LI: Slightly wider in 1994.

Transect 55 is a run. There has been significant scour on the left-hand side of about two feet throughout the profile. On the right-hand side, as you can see, the channel profile is approximately the same.

Dr. Stine points out that it's two to four feet wider.

Q. When?

A. With the present -- with the recent survey.

Transect 56 is a riffle. It is narrower by about a foot in the top three to four inches, otherwise, it is approximately the same. It may be slightly deeper, but the differences that are seen in this depth may be due to being on or off a rock. So I'm calling it a wash.

There is a series for the first pool, transect 57, 58, and 59. And for illustrative purposes, I'm simply going to be discussing transect 57.

There is four channels that are watered in this figure, and the only thing that's significant is the left-hand facing channel has migrated approximately four feet and has widened by about approximately a foot.

If we go to the next series of transects, transects 60, 61, and 62, these represent a series in the pool, the first one being the head of the pool. It is slightly narrower in transect 62. It is about two feet narrower within the top six inches and not much difference thereafter. And in 62, it's slightly narrower.

Q. Today?

A. Today.

All the narrowing, with the exceptions of that transect that I mentioned, the Parker plug materials, the narrowing is not due to riparian vegetation, but it is due to dry-bank material that has sloughed down causing the slight narrowing in the upper six inches or so of the transects.

Transect 64 has that phenomenon, and otherwise the surveys are identical.

Transects 65 and 67 represent the same pool. I could not get the 66. That's the one where I lost the monument markers, so I could not align the tape across the transect. But these show a widening of the channel below the first six inches or so, and it is significant in the tail end of the pool, which is transect 67, where the channel is both deeper and wider.

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And the last set, transects 68 through 70, represent a single pool. The head of the pool, transect 68, there's really not significant changes here. It may be slightly wider in the present survey rather than the 87.

HEARING OFFICER DEL PIERO: What happened to 69?

DR. LI: In 69 and in 70, there is a slug of sediment that is passing through the pool. It happens to be a long, wide bench.

It also -- there has been scour that has moved the pool more to the right.

HEARING OFFICER DEL PIERO: Is that why 70's got that deep spot?

DR. LI: Yes. And transect 69 is significantly wider than the earliest survey.

Q. BY MR. DODGE: You've taken us through them all, Dr. Li, and you've talked about some widening and some narrowing.

I take it, again, the time frame we're talking about is 1987 to early 1994; is that right?

A. BY DR. LI: That's correct.

Q. In terms of widening and narrowing, did you notice any trend as you went through this material?

A. No. I should add that I was assisted in this surveying project by Mr. Doug Parkinson who assisted me

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also in 1987, and upon getting out of the field, we asked each other on the way home whether -- what our impressions were. And we both agreed that for all intents and purposes, the cross-sections that were there in 1987 are essentially the same in 1994.

There are some changes, but those changes are more reflective that the stream channel is active and some change is to be expected.

And if anything else, the remarkable appearance of

the stream in the video should be attributed that there it's approximately four times the flow in that video than was there in 1987.

MR. DODGE: No further questions. Thank you.

HEARING OFFICER DEL PIERO: Mr. Birmingham, how long are you going to be?

MR. BIRMINGHAM: Oh, I'm going to be at least 20 minutes.

HEARING OFFICER DEL PIERO: Let's take a ten-minute break, then.

(A recess was taken at this time.)

HEARING OFFICER DEL PIERO: The hearing will again come to order.

Mr. Birmingham?

CROSS-EXAMINATION BY MR. BIRMINGHAM

Q. Dr. Li, are you a fluvial geomorphologist?

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A. BY DR. LI: No, but I am Chinese.

Q. The answer to the question is no, you're not an fluvial geomorphologist?

A. That's correct.

Q. Now, you said that from your review of the data collected in 1977 and compared to the data you collected in 1993 and 1994, that there has been no change in terms of channel width and channel depth at the transects measured; is that correct?

A. That's correct.

MR. DODGE: I believe counsel meant to say 1987 instead of 1977.

HEARING OFFICER DEL PIERO: Yes.

MR. BIRMINGHAM: Yes. I did mean to say it. Thank you, Mr. Dodge.

Q. BY MR. BIRMINGHAM: And you said that any change could be attributed to the fact that a stream channel changes over time?

A. BY DR. LI: Yes.

Q. It's a dynamic system?

A. That's correct.

Q. Now, you do have a lot of experience with respect to fisheries biology; is that correct, Dr. Li?

A. Yes, sir.

Q. I'd like to go back to the pool that is

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represented by transects 65 and 67.

A. Yes.

Q. Now, I believe it was your testimony that at an elevation below approximately two feet, this pool has gotten deeper and wider; is that correct?

A. In 65, it is clearly wider but not deeper. But in 67, it is clearly deeper and wider.

Q. Now, as I understand your testimony, transect 65 and transect 67 are transects of the same pool?

A. They represent the head and the tail of the pool.

Q. Now, in terms of fishery biology, fish habitat, this deepening and widening of this pool at a depth below approximately two feet, that's a good thing for fish?

A. Depending -- you know, it depends on other attributes such as cover and other things, yes. But in general, it's better.

Q. Now, we have 22 transects; is that right?
A. You have 20 of 22.
Q. Excuse me. Now, these 20 transects, 20 of the 22, they only represent what has occurred at these specific locations between 1987 and 1994; isn't that correct?
A. They only represent those locations.
Q. And the stream at other locations may have changed?

A. May have.
Q. And that change wouldn't be represented by this data?
A. That's correct.
Q. Excuse me, these data.
Now, just thumbing through the individual pages that make up Exhibit 264, there are a number where the transect appears to have gotten deeper, for instance, transect 56?
A. I believe I said this one may have been deeper.
Q. Well, from the survey data, it appears that it's about a foot deeper; is that correct, the thalweg?
A. No. The main difference is about almost 2/10ths, 2.4 inches, something like that.
Q. Now, the thalweg, as I understand, the thalweg is the deepest part of the stream; is that correct?
A. That's correct.
Q. And the thalweg in 1987 was in the area slightly to the right of the 30-foot mark; is that correct?
A. That's correct.
Q. And the thalweg in 1994 is about that same spot; is that correct?
A. That's correct.
HEARING OFFICER DEL PIERO: Excuse me. Am I looking at the right one? Are we looking at

cross-section 56?
MR. BIRMINGHAM: Yes.
HEARING OFFICER DEL PIERO: The thalweg is on the left-hand side of 30, not on the right? For 1987? Am I reading this wrong?
DR. LI: Tom, I would also point out that --
MR. BIRMINGHAM: Excuse me, Dr. Li. I think Mr. Del Piero is confused.
HEARING OFFICER DEL PIERO: Is that not correct?
DR. LI: I'm sorry. I didn't hear you.
HEARING OFFICER DEL PIERO: The deepest portion of the stream in 1987 is to the left of the 30 on the horizontal axis.
DR. LI: It's about 28 foot.
HEARING OFFICER DEL PIERO: Yes.
DR. LI: And it's about at 31 feet in 1994.
HEARING OFFICER DEL PIERO: Mr. Birmingham, I think you misspoke.
MR. BIRMINGHAM: I did misspeak. I beg your pardon. Thank you.
Q. BY MR. BIRMINGHAM: Now, the difference in depth between those two points is how much, Dr. Li?
A. BY DR. LI: The trick to this is if you want to talk about depth, we also have to take into consideration the differences between the two different

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origins.
Q. All right. Just one of the few non-leading questions I've asked.
A. It appears to be slightly deeper at the thalweg in 1994.
Q. Can you tell us approximately how much deeper?
A. Four inches or so.
Q. Now, the water surface elevation represented for 1987 is an estimated surface elevation; is that correct?
A. That's correct.
Q. In 1987 when you measured the transects, what was the flow in the stream?
A. 1987 was between 13 and 100 cfs.
Q. Did you take three measurements at three different flows?
A. There were four different flows, two different measurements. In terms of the measurements that you're interested in, we took four different measurements.
Q. And what were the flows during those four different measurements?
A. 13, 19, 60 and 100.
The reason why I feel relatively comfortable with the estimated water surface elevation is it's between the 60 cfs measurement and the 100 cfs measurement.
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Q. Now, Dr. Li, were you involved -- Mr. Smith was here last week, Mr. Smith of the Department of Fish and Game, and he presented testimony in response to testimony submitted by Dr. Hardy.
HEARING OFFICER DEL PIERO: It's starting to look like a forest with all the people standing up behind you Mr. Birmingham, I feel it.
MR. DODGE: Mr. Del Piero, we have called Dr. Li in surrebuttal to Dr. Beschta to talk specifically about depths and widths of Rush Creek between 1987 and 1993.
What Mr. Birmingham wants to do now is to talk to Dr. Li about whether or not segment three should have been included in the Lee Vining Creek IFIM. And I think that is beyond the bounds of surrebuttal. He's had his opportunity to talk to Dr. Li on that subject. He has done so, and we ought to stop.
HEARING OFFICER DEL PIERO: Ms. Cahill?
MS. CAHILL: Mr. Del Piero, yes. I would point out that Dr. Li is here as a surrebuttal witness on surrebuttal, the agreement of the parties, as memorialized in my letter to you in December, was written testimony need not be filed for such witnesses, but their testimony will be limited to the subject matters covered by the testimony to which they are
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called to respond.
Dr. Li was on our Rush Creek panel. He was here parts of three days. Mr. Birmingham, in fact, has already quizzed Dr. Li on the Lee Vining Creek report including Rush Creek. I can cite the transcript, if necessary, and I believe it would be improper to allow that line of questioning when Dr. Li is called by

another party on another subject in surrebuttal.
HEARING OFFICER DEL PIERO: Mr. Birmingham?
MR. BIRMINGHAM: We had testimony -- the sole subject of Mr. Smith's testimony here last week was why Dr. Li changed his mind between the draft IFIM report on Lee Vining Creek, and the final IFIM report. That was the sum and substance of Mr. Smith's testimony.
I asked Mr. Smith questions that established that the reason that information was contained in the final report that wasn't contained in the draft report, why the Reach Three data were included, was because Dr. Li changed his mind.
Now, the Hearing Officer has many times correctly pointed out that hearsay is certainly admissible in this proceeding, and Dr. Smith's testimony amounted principally of hearsay testimony: Why Dr. Li changed his mind.
Dr. Li is here today, and I think it would be most

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enlightening if we could ask Dr. Li questions about why he changed his mind.
HEARING OFFICER DEL PIERO: Ms. Cahill?
MS. CAHILL: Mr. Del Piero, I would point out that in the transcript of this hearing, Volume 19, December 7th, 1993, Dr. Li testified, "Reach three is the steepest reach on Lee Vining Creek. And at the time I wrote that, I was putting greater credence in the amount of entrained air in the creek at different flows. And based on that, and knowing that very steep reaches are difficult to simulate; i.e., for a lack of discipline, I removed that data. Upon rethinking that, I felt it was more responsive by those data and final report."
Mr. Birmingham has already quizzed Dr. Li on this. We already had his direct testimony on this. It would corroborate any hearsay of Mr. Smith, but most basically, this is not a proper subject when he was provided as a surrebuttal witness by Mr. Dodge to respond to Dr. Beschta. We will never have an end of it.
HEARING OFFICER DEL PIERO: Mr. Dodge?
MR. DODGE: I just want to point out that Mr. Birmingham, in all of his justification for this line of questioning, never once suggested as to why

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this was proper cross-examination on surrebuttal. All he did was say, "I'd like to ask these questions."
HEARING OFFICER DEL PIERO: Mr. Birmingham, last comment.
MR. BIRMINGHAM: To date, no party has been restricted on the areas of examination on cross-examination of a witness.
HEARING OFFICER del PIERO: Actually, that's not true, Mr. Birmingham, but I can cite you at least two occasions that's happened.
MR. BIRMINGHAM: With only two exceptions of which I'm now aware, no party has been limited.
Again, if Dr. Li adequately explained why he changed his mind when I examined him, there was absolutely no reason for the Department of Fish and

Game to waste all of our time in bringing Dr. Smith here -- or Mr. Smith here to explain why Dr. Li changed his mind.

Dr. Li is here today, and I've got some specific questions of Dr. Li about why he changed his mind and whether or not his original opinion was, as a matter of fact, the appropriate opinion. And I think that is entirely proper.

HEARING OFFICER DEL PIERO: Mr. Frink? Mr. Frink, there was a reason for you to be here for the last

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40-odd days.

MR. FRINK: I appreciate that.

HEARING OFFICER DEL PIERO: I have an opinion, but I'd like to know yours.

MR. FRINK: In theory, I agree with Mr. Dodge's objection, and I would hope that the cross-examination on all the witnesses at this point in the hearing would be restricted.

But the problem that I have is that it has been very, very broad up until now and in most instances.

If you do allow questions of Dr. Li in this area, I would hope that they could be relatively few and quick and that everybody in the future could try to restrict their cross-examination to the subject of the rebuttal or surrebuttal.

HEARING OFFICER DEL PIERO: How many questions do you have of this nature?

MR. BIRMINGHAM: I can do it in ten minutes.

MS. CAHILL: Mr. Del Piero, can I make one last comment?

Although, on the original direct, to examine on any topic, although Dr. Stine was here today on regular rebuttal as well as surrebuttal, the parties, by their own agreement, have indicated that on surrebuttal, the witness would be strictly limited to the subject on

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which he was called. That's why this case is different.

Dr. Li is the first purely surrebuttal witness, to my knowledge, that this has come up on, and that's the difference. The difference is this was a surrebuttal person. We had limited what we were going to ask surrebuttal people.

HEARING OFFICER DEL PIERO: Mr. Birmingham, you want to respond to that issue specifically to the letter?

MR. BIRMINGHAM: I don't have a copy of the letter here. May I?

HEARING OFFICER del PIERO: As some of you will recall, I had hoped to not have to deal with this issue.

MS. CAHILL: I would point out --

MR. BIRMINGHAM: I think, actually, Mr. Del Piero, what this agreement relates to is that the party calling the witness will be limited to asking questions on the subject designated in the notice to the Board that that party will be calling the witness.

The letter says that, "Written testimony -- that by 5:00 p.m. on Monday, January 10, the names of

witnesses who will testify on subjects listed by any other party. Written testimony need not be filed for such witnesses, but their testimony will be limited to the subject matters covered by the testimony to which they are called to respond."

And I believe that was intended to limit the ability of the party calling that witness as a surrebuttal witness, not the ability of other parties to examine that witness.

HEARING OFFICER del PIERO: Mr. Frink, was that your understanding?

MR. FRINK: I didn't write the letter. Ms. Cahill wrote the letter.

HEARING OFFICER DEL PIERO: I didn't ask you if you wrote the letter, Mr. Frink. The letter is a summary of a consensus among the individual --

MR. FRINK: I don't believe that the question of what would be the scope of cross-examination of a surrebuttal witness was ever addressed.

I think what the letter went to is what would be the scope of the direct examination of a surrebuttal witness.

So the question is open. I'm not sure that there's a big difference between what the Board should rule regarding the scope of cross-examination of rebuttal witnesses, and scope of cross-examination of surrebuttal witnesses.

HEARING OFFICER DEL PIERO: You have ten minutes, Mr. Birmingham.

Mr. Herrera, Mr. Birmingham has ten minutes.

Proceed.

MR. BIRMINGHAM: Thank you very much.

Q. BY MR. BIRMINGHAM: Do you have a copy of the draft report which is in evidence as State Board Exhibit 2?

A. BY DR. LI: I believe you placed it before me.

Q. Dr. Li, I'd ask you to look at page 24 of the draft report, and for the record, we're referring to the draft report on Lee Vining Creek.

Now, is there a reference to Reach Three on page 27 -- I'm sorry, page 24 of the draft report?

A. Yes.

Q. It states, doesn't it, that in Reach Three, four habitat types were sampled: pool, riffle, run, and cascade; is that correct?

A. I don't see that on page 24, counsel.

Q. I'm sorry, you have a different draft report.

Excuse me, Mr. Del Piero, may I ask for a time out?

MS. CAHILL: No. Really, no time out.

HEARING OFFICER DEL PIERO: We established at the beginning of this process that Mr. Herrera keeps time, Mr. Birmingham.

MR. BIRMINGHAM: Thank you very much.

Q. BY MR. BIRMINGHAM: I'm showing you my copy of the draft report that is dated August -- I'm sorry, July 1992; is that correct?

A. BY DR. LI: Yes.
Q. And there's a reference, Dr. Li, to Reach Three, and it states, "In Reach Three, four habitat types were sampled." Is that correct?
A. That's correct.
Q. Pool, riffles, runs, and cascades; is that correct?
A. That's correct.
Q. You state further that sampling the cascades was limited to portions with the lowest gradient?
A. That's correct.
Q. Does that mean you put the transect in which you were sampling the cascades actually in the tail pool?
A. Tom, do you know what a cascade is?
Q. Yes, I do.
A. Tell me what it is.
HEARING OFFICER DEL PIERO: Wait a second, Dr. Li. Dr. Li, if you believe by the nature of the question Mr. Birmingham has a misunderstanding of what a cascade is, you need to define it so we can move this

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along.
DR. LI: The reason why they were placed there is in terms of IFG4, you're wasting money by putting it anyplace else.
Q. BY MR. BIRMINGHAM: So the answer to my question is yes, in the cascade --
A. BY DR. LI: Cascade has significant vertical components to it.
Q. And when you placed the transects in the cascade reaches, you actually placed them in the tail out pool of the cascade reach; isn't that correct?
A. No.
Q. I'd like you to look at page 32 of the draft report, my copy of the draft report.
HEARING OFFICER DEL PIERO: Mr. Birmingham, in order to facilitate this, pull a chair up, grab the microphone, and then we don't have to loose time with you moving back and forth. Okay?
Q. BY MR. BIRMINGHAM: Now, Dr. Li, looking at this, it states that -- I'm looking at page 32 of the draft report. It states, "We believe the overestimation of habitat is due to the inability of IFG4 habitat model to recognize the turbulent super critical flow and air entrainment as not suitable for trout habitat."
"Another factor which may have affected habitat

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estimation was the location of transects within cascades. They were placed in the plunge pools, the only place where the IFG4 hydraulic programming could perform."
Is that what you did?
A. BY DR. LI: Then you misspoke earlier.
Q. Did you place the transect in the plunge pools?
A. I placed the transect in the plunge pool portion of cascade.
Q. So, in reality, rather than sampling pools, riffles, runs, and cascades, as reported on page 24, you sampled pools, riffles, runs and plunge pools; is that correct?

A. Plunge pool is a portion of cascade. So I'm still sampling a cascade.
Q. Isn't it correct, Dr. Li, that generally in the top of a cascade, there will be water which trout will avoid because of entrained air?
A. I can't speak to that directly. I've dove in many plunge pools, but I have not observed fish there.
Q. Now, on page 28 of the report you say, "However," and again, we're referring to Reach Three; is that correct, Dr. Li?
A. Yes.
Q. Let me start at the second to the last paragraph

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on page 28. It says, "For Reach Three, weighted usable area stream discharge relationships were similar to Reach Two except the estimated amount of habitat exceeds Reach Two, Figure 12."
That surprised you, didn't it, Dr. Li?
A. And that's the reason why I went off on this wild tangent.
Q. You say, "However," further in the next paragraph you say, "This habitat model of Reach Three is unrealistic based upon our experience delineating habitat on the creek and collecting physical data for PHABSIN?
A. But upon reflection, I felt that was incorrect.
Q. Isn't it correct, Dr. Li, that the IFG4 model cannot accurately determine weighted usable area in the head of a cascade?
A. I don't know what you mean by a "head of a cascade."
Q. Excuse me.
Now, would you agree, Dr. Li, that the plunge pool where you placed the transects is not the main feature of a cascade?
A. It depends. Plunge pool cascades are a combination of high-gradient riffle and plunge pools. And so it depends on the proportion of plunge pool to

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high-gradient riffle.
Q. I'm going to draw a stream channel which is exaggerated, and I'll represent this is the bottom of a stream, Dr. Li, the bed of a stream channel, and water is flowing this direction.
Now, as water flows down here, if there is a lot of turbulent water where I'm indicating, this would represent a cascade; is that correct?
A. It would be in a location such as that.
Q. Now, when you measured the weighted usable area of these cascades, you measured it in the area that you referred to as a plunge pool, which would be in this location, approximately, or further drown stream; is that correct?
A. No. It depends on the configuration of any particular cascade. It could be located on the upstream, and it could be in the middle. It could be at the bottom, depending on where the hydraulic control's on.
Q. But it's at that point where the water calms down out of the cascade; isn't that right?

A. It's where there is less vertical component than the other portion.
Q. Now, is it right, Dr. Li, that if all of the measurements of weighted usable area that you have for

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cascades are in this plunge pool area, the estimated weighted usable area for the entire cascade is going to be overestimated?
A. Depends on what the depth and velocities are in the other portions. All we can say is those areas are unaddressed.
Q. Are -- excuse me?
A. Are unaddressed.
Q. And, in fact, the IFG4 model is inaccurate in these areas; isn't that right?
A. It's very difficult to get those calibrated.
Q. So the answer to my question is yes, as you report in the draft report, the IFG4 model will not accurately predict weighted usable area in that portion of cascade with a large vertical element?
A. Yes.
Are you really interested in why I put it back in rather than keeping it out, rather than prolonging this thing?
Q. Well, Dr. Li, I will ask you, despite my rule: Why did you decide to put this back in?
A. It happens to be the basic rule that when you have data, you don't throw it out, because when you throw it out, you're subject to the criticism that you're being arbitrary and capricious.

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Now, in reviewing the data that I had, I took a look at the hydraulic calibrations, every detail, and everything else other than my own personal bias, led me to believe that it was unreaslistic. I could not technically throw it out for reasons of model performance.
Therefore, rather than throw away all the information, I preferred to include that information, however flawed I might have thought it was.
MR. HERRERA: Your ten minutes has expired.
MR. BIRMINGHAM: Thank you.
Q. BY MR. BIRMINGHAM: Dr. Li, what was your experience -- and this will be the last question I have.
When you wrote "this habitat model of Reach Three is unrealistic based upon our experience in delineating habitat on the creek," what experience were you referring to?
A. BY DR. LI: In my mind's eye, simply looking at the difference in weighted usable area between Reach Two and Reach Three is largely due to the fact that Reach Three is longer than Reach Two. I did not take that into consideration.
It simply surprised me that the weighted usable area peaked at a higher flow in Reach Two than in Reach

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Three.
MR. BIRMINGHAM: Thank you.
HEARING OFFICER DEL PIERO: Ms. Cahill?

MR. BIRMINGHAM: I didn't realize all my time was up.
HEARING OFFICER DEL PIERO: Oh?
MR. BIRMINGHAM: Actually, I have no more questions.

CROSS-EXAMINATION BY MS. CAHILL

Q. Good afternoon, Dr. Li.
A. BY DR. LI: Good evening, Ginny.
MR. FRINK: Mr. Birmingham --
HEARING OFFICER DEL PIERO: Actually, Mr. Birmingham, did you want that marked?
MR. BIRMINGHAM: We'll mark that next in order.
HEARING OFFICER DEL PIERO: Next in order.
MR. SMITH: Okay. It's 166.
HEARING OFFICER DEL PIERO: You need to have Mr. Birmingham sign that and appropriate copies made for all parties.

(L.A. DWP 166 was marked for identification.)

MR. DODGE: Mr. Del Piero, can we put on the rest of our witnesses tomorrow?
MR. BIRMINGHAM: I'll have very few questions for Mr. Messick.
HEARING OFFICER DEL PIERO: Yes, sir. 8:30 tomorrow morning.
Q. BY MS. CAHILL: Dr. Li, can you tell us again what the habitat types were in Reach Three?
A. BY DR. LI: Pool, riffle, run, and cascade.
Q. And there's no doubt that there is habitat in pool areas?
A. That's correct.
Q. And there is habitat in riffle areas?
A. Yes, there is.
Q. There is habitat in run areas?
A. Yes, there are.
Q. And there is habitat, at least in plunge pool areas of the cascade habitat type?
A. Yes, there is.
Q. It's fair to say there is habitat on Reach Three in Lee Vining Creek?
A. Yes, there is.
Q. When you did your electrofishing, did you, in fact, find some fish in Reach Three on Lee Vining Creek?
A. Yes, I did.
Q. With regard to the --
MR. DODGE: Mr. Del Piero, do we have a running understanding that these questions beyond surrebuttal are limited to ten minutes for all parties?
MS. CAHILL: It will be.
HEARING OFFICER DEL PIERO: Fine. We now have that understanding.
MR. DODGE: And could I send the bill to these people who are going beyond the rules for Dr. Li's time? They're wasting my client's money.
MR. BIRMINGHAM: I suspect that they will be sent to the Department of Water and Power, in any event.
Q. BY MS. CAHILL: With regard to the fact that WUA

seemed to be increasing with discharge, was it true that it was increasing with discharge more in Reach Three than in Reach Two? This was something that was in the draft.

Let me -- don't bother to look, Dr. Li.

Whether the weighted usable area was increasing faster in Reach Two or in Reach Three, it wouldn't mean that either one was necessarily inaccurate, would it?

A. BY DR. LI: That's correct.

Q. And at the time you wrote your draft report, you had -- well, let me withdraw that.

It was your decision by the time you issued the final report in the Lee Vining Creek study, that it was preferable scientifically to include the Reach Three

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data than to exclude it?

A. After detailed discussions with some of my subs and with my client, I came to realize that what I was doing was indefensible in removing Reach Three.

In reviewing that data, all the data appeared to be reasonable, and I was not considering that the state's discharge relationships that I based the hydraulic model on were under conditions where air entrainment, which was one of my greater concerns, was not a factor.

Therefore, the estimate of flow above the highest flow would not have been affected by those sorts of considerations.

Q. Okay. So in the end, it was your decision, as Mr. Smith stated the other day, that it was better to include that data?

A. Yes.

Q. Have you, in fact, reviewed the transcript of Mr. Smith's testimony?

A. Yes, I have.

Q. And do you disagree with anything that he said about the Rush -- about the Lee Vining Creek study?

A. No, I don't.

MS. CAHILL: Thank you.

HEARING OFFICER DEL PIERO: Mr. Roos-Collins?

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CROSS-EXAMINATION BY MR. ROOS-COLLINS

Q. Good evening, Dr. Li.

A. BY DR. LI: Good evening, sir.

Q. I have no questions about the IFIM on Lee Vining Creek.

A. Thank you.

Q. Instead, let's turn to your transect, specifically transect 56, in National Audubon Society Exhibit 264.

Do you have that transect in front of you?

A. Yes, I do.

Q. Now, during his cross-examination, Mr. Birmingham asked you several questions about this transect. One of the questions went to whether changes elsewhere would be reflected in the transect data, and you said no.

Was that your answer to that question?

A. Yes, it was.

Q. Let's explore that a little bit. Let's assume that the channel immediately upstream of transect 56

had substantially narrowed and deepened between 1987 and 1994. Are you with me so far?
A. Yes.
Q. Would that narrowing and deepening of the channel immediately upstream of transect 56 change the hydraulic force entering transect 56?

A. Yes.
Q. Would you expect the change in hydraulic force entering the transect to work a change on the transect itself?
A. Yes.
Q. So if this transect in 1994 is comparable to the transect in 1987, wouldn't that suggest that the hydraulic force entering the transect does substantially change during that period?
A. It would.
MR. ROOS-COLLINS: Thank you, no further questions.
HEARING OFFICER DEL PIERO: Mr. Valentine?
MR. VALENTINE: No questions.
HEARING OFFICER DEL PIERO: Mr. Dodge?
MR. DODGE: No questions. I offer Exhibit 264.
HEARING OFFICER DEL PIERO: Mr. Frink?
MR. FRINK: I have no questions, but I believe some of the other Staff does.
HEARING OFFICER DEL PIERO: Mr. Satkowski?
MR. SATKOWSKI: No questions.
HEARING OFFICER DEL PIERO: Mr. Smith?
MR. SMITH: No questions.
HEARING OFFICER DEL PIERO: Mr. Herrera?
MR. HERRERA: I have one question.

CROSS-EXAMINATION BY THE STAFF
Q. BY MR. HERRERA: In Mr. Birmingham's cross-examination, he indicated that the version of the draft Lee Vining report was different than the one he had. Was there more than one draft?
A. BY DR. LI: Yes, there was.
Q. So, apparently, I've got a different draft because Mr. Birmingham was utilizing my draft report, so essentially there was one more than one Lee Vining draft report?
A. Yes, there was.
Q. Was there different dates or different notations?
A. There were different dates on the front, and I would have to go back to my help to determine which ones you had.
Q. Do you know if both of these drafts were submitted to the Water Board?
A. I --
Q. Or do you need to discuss that with Fish and Game?
A. I don't know, Steve. What started this stuff was the draft that you apparently received was intended for internal review and not meant to be released as a review at that time.
Q. What was the date on your draft that you were referring to this evening?

A. July 1992 -- yeah, July 1992.

Q. And the version I have is dated December 1992?
MR. BIRMINGHAM: Excuse me, Mr. Del Piero. The version you gave me last week, Mr. Herrera, is the same version that I have here. So apparently you have both versions.
MR. FRINK: And both of those versions would be included in the Staff files on this matter, which if they weren't otherwise identified, were included as SWRCB Exhibit 2.
MR. BIRMINGHAM: Let me state the basis for my saying that. Last week when I was asking questions about this report, I referred to the statements that are contained on page 28 of the draft report that I currently have, and those statements do not appear on page 28 of the report that Mr. Herrera has today. So apparently he has both reports.
HEARING OFFICER DEL PIERO: Further questions, Mr. Herrera?
MR. HERRERA: I have no further questions.
HEARING OFFICER DEL PIERO: Mr. Canaday?
MR. CANADAY: None.
HEARING OFFICER DEL PIERO: I have one question, Mr. Dodge.
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CROSS-EXAMINATION BY THE BOARD

Q. BY HEARING OFFICER DEL PIERO: Dr. Li, is it common when preparing a report for drafts to be circulated for comment by one's peers and colleagues?
A. BY DR. LI: Yes, it is.
Q. It is common for comments to be made based on those comments?
A. Yes, it is.
Q. Have you ever written a draft report or changed one based on comments?
A. I don't think I've written anything that I haven't changed.
HEARING OFFICER DEL PIERO: Mr. Dodge?
MR. DODGE: I want to know whether Exhibit 264 has been received.
HEARING OFFICER DEL PIERO: If it has not, it is now.
(NAS/MLC Exhibit No. 264 was admitted into evidence.)
HEARING OFFICER DEL PIERO: Ladies and gentlemen, we will see you at 8:30 tomorrow morning.
Mr. Canaday, do you have any comment, sir?
MR. CANADAY: Just to make sure we understand who the witnesses tomorrow will be.
Mr. Dodge, you will call in the morning --

MR. DODGE: We'll start with Tim Messick. We'll go to Peter Vorster, and Patrick Flinn has a person he's going to call. His name I've forgotten Bahman, or something like that, and I think in terms of our witnesses, that will wrap it up.
HEARING OFFICER DEL PIERO: Okay. Mr. Birmingham, Dr. Beschta and Mr. Hasencamp?
MR. BIRMINGHAM: Mr. Hasencamp will instruct me in the morning.

HEARING OFFICER DEL PIERO: Okay. We are scheduled into the evening tomorrow evening in the event it takes longer than I hope.

(Whereupon the proceedings were adjourned at 7:55 p.m.)

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REPORTER'S CERTIFICATE

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STATE OF CALIFORNIA)
) ss.
COUNTY OF SACRAMENTO)

I, KIMBERLEY R. MUELLER, certify that I was the official court reporter for the proceedings named herein; and that as such reporter, I reported, in verbatim shorthand writing, those proceedings, that I thereafter caused my shorthand writing to be reduced to typewriting, and the pages numbered 1 through 209 herein constitute a complete, true and correct record of the proceedings:

PRESIDING OFFICER: Marc Del Piero
JURISDICTION: State Water Resources Control Board
CAUSE: Mono Lake Diversions
DATE OF PROCEEDINGS: February 17, 1994

IN WITNESS WHEREOF, I have subscribed this certificate at Sacramento, California, on this 1st day of March, 1994.

_____
Kimberley R. Mueller
CSR No. 10060