STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

HEARING ON WATER RIGHT APPLICATION OF THE El SUR RANCH

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<u>INDEX</u>

EXHIBITS

	MARKED FOR IDENTIFICATION	RECEIVED INTO EVIDENCE
APPLICANT		
55 - Curriculum Vitae of Jon Philipp	4	
60 - Video of PT11 as of July 4, 2011	16.	
62 - Article - Froese, R. 2006	69	
63 - McLaughlin, K. D. 2009	71	
64 - Data of Dr. Melissa Foley	80	
81 - Dr. Hanson's PowerPoint	81	
ESR-55 through ESR-65		175
FISH AND GAME		
DFG-T-25 - Dr. Titus's rebuttal testimony	188	188
CENTER FOR BIOLOGICAL DIVERSITY		
113 - USGS study for Soquel Creek	176	176

PROCEEDINGS

HEARING OFFICER DODUC: Good morning, everyone. Welcome back to this fourth and last day of the hearing on Water Right Application 30166 of the El Sur Ranch.

The hearing is being held in accordance with the Notice of Public Hearing dated December 20th, 2010, and subsequent notices.

Since it's a brand-new day, I have to once again give you the evacuation procedures, because I'm sure you've forgotten.

In the event of a fire alarm, we are required to evacuate this room immediately. Please look around now and identify the two exits closest to you, in case they have changed. Please take your valuables with you and do not use the elevators. Exit down the stairway and go to our relocation site, which is across the street at Cesar Chavez Park. If you cannot use the stairs, you will be directed to a protected vestibule inside a stairwell on this floor.

A couple of other notes. We are broadcasting this hearing on the internet and recording by both audio and video. So please speak into the microphone as you are providing your comments and testimony.

Also, please take a minute right now and make sure that your cell phones and other noise-making electronic devices are on silent or vibrate.

Just a reminder, we're continuing with the rebuttals today, starting with El Sur Ranch and then the other parties. As was on Friday, I'll limit initially the rebuttals to ten minutes and cross-examination to 30 minutes as a panel, ten minutes per witness and cross-examination 30 minutes as a panel. And there will be no redirect of rebuttal witnesses.

Are there any other procedural items that we need to discuss?

Okay. Not seeing any, for those witnesses who have already taken the oath in this proceeding, I will remind you that you are still under oath if you testify today.

Are there any witnesses present today who plan to testify and have not already taken the oath?

MR. HILL: Yes. He's outside.

HEARING OFFICER DODUC: Could you get him in?

So the other parties' rebuttal witnesses have taken the oath?

Mr. Lazar.

MR. LAZAR: Good morning, Madam Chairperson.

Based on the activities on Friday, we had anticipated having longer than ten minutes per rebuttal speaker.

HEARING OFFICER DODUC: Based on the activities on Friday. On Friday, I started everyone off with ten minutes per witness and allowed them to continue if it proved to be relevant.

MR. LAZAR: Thank you.

HEARING OFFICER DODUC: Okay. And the same went for cross-exam.

Thank you. Could you please raise your right hand?

(Whereupon all prospective witnesses were sworn.)

HEARING OFFICER DODUC: Thank you.

I guess we will go ahead and continue with El Sur Ranch. And I believe you had three more rebuttal witnesses.

MS. TEETERS: That's correct.

HEARING OFFICER DODUC: Good morning, Ms. Teeters.

MS. TEETERS: Good morning.

HEARING OFFICER DODUC: No Ms. Goldsmith today?

MS. TEETERS: I seem to wear a lot of hats.

Good morning. I'm Daniel Teeters. I represent the El Sur Ranch.

And first witness this morning will be Mr. Jon Philip.

REBUTTAL

BY MS. TEETERS:

Q Mr. Philip, could you please identify yourself and spell your name for the record?

A My name is Jon Philip. J-o-n. Last name, P-h-i-l-i-p.

Q And will you briefly describe your education and professional background and experience in hydrogeology?

A Yes. I got a Bachelor's degree in geology in '94, a Master's degree in geology in 1996. Started my environmental history working as a hydrogeologist since 1998 and specifically working for The Source Group for nine years as a hydrogeologist. I'm a professional geologist registered in California and also a certified hydrogeologist in California.

MS. TEETERS: At this time, I'd like to mark Exhibit ESR-55, which will be Mr. Philip's CV.

(Whereupon the above-referenced document was marked for identification ast ESR-55.)

BY MS. TEETERS:

Q And you've looked at what I'm calling ESR-55, that's your CV; correct?

A Yes.

MS. TEETERS: At this time, I'd like to request this Board accept Mr. Philip as an expert in hydrogeology.

HEARING OFFICER DODUC: Any objections?

Not hearing any, we'll do so.

MS. TEETERS: Thank you.

BY MS. TEETERS:

Q What is your current position with your employer?

A I'm a hydrogeologist working for The Source Group.

Q And how long have you been involved in the studies for the El Sur Ranch?

A Since late spring/early summer 2004.

Q And since then, how many hours or days have you spent on the Big Sur River?

A Thousand hours. Maybe a hundred days.

Q And I've also heard rumor that you spent some nights there.

A Yeah. During our first year of study, we actually camped in Andrew Molera State Park.

Q Rough job.

A Someone's got to do it.

Q And the most recent date you visited the river?

A July 4th of this year.

Q And prior to that?

A It was -- actually, I was out there June 15th of this year as well.

Q What was the purpose of your visit on July 4th?

A I was out there to -- Mr. Custis had a claim that the river was shifting its course. So I went out there to take pictures and to follow the trace of the path that he took.

Q And did you also take a look at some of the passage transects while you were there?

A Yeah. I also looked at Passage Transect 4 and 11 in response to some of the testimony that Mr. Dettman had submitted.

Q And what portions of the river did you actually visit relevant to the question of whether the river may be returning to its 1994 channel?

A Well, I visited the trace of the old 1994 channel, including its connection upstream and downstream connection with the current course of the Big Sur River.

Q Are you familiar with Exhibit DFG-C-60?

A Yeah. That's Mr. Custis' map that he took showing where he took these photographs.

Q Did you have a copy of that when you went down on July 4th?

A I did.

Q Did you document your visit on July 4th photographically?

A Yes.

MS. TEETERS: Mr. Lindsay, at this time, could you put up the first PowerPoint, please?

BY MS. TEETERS:
Q And it's a little light, but can you tell me what this is shown on the slide -- what's showing?
A What's shown here is this is the current trace of the -- at least it was in 2009, the path of the Big Sur River. And these little photographic marks are where I took photographs. This is the upstream. This is the trace of the 1994 channel. And this is the upstream end and this is the downstream end.
Q Now, looking at that photo of the slide, there is a date bar in the upper left-hand corner.
A That one?
Q Yes. And it says I believe September 29th, 2009?
A Yeah. That's correct.
Q And why did you use this aerial photo?
A It was the latest one available from Google Earth.
Q And there is not a later one?
A Not that I've found, no.
Q Let's scroll through the photographs very briefly. Can you give me a brief description of what you saw there?
A This is just a series of photographs that show the old trace of the channel. The trace while I was down there was completely dry from one end to the other.
The other thing I noted, there was a bunch of woody debris throughout what they call the triangle, which

indicates that at certainly higher flows the water has moved through here recently and that has brought some large trees along with it.

Q So does the area essentially look the same as compared to when you first started studying it in 2004?

A In terms of the old channel, it looks relatively the same. The only difference is there is a lot more vegetation in the area.

Q And you had mentioned that when there are high flows that course water passes through the floodplain where the old channel used to be; is that what you said?

A Yeah.

Q Now is there any indication at all that there is channel movement at the upper end of the former 1994 channel?

A Yeah. Yeah, there is a little bit.

Q And what direction is it going in?

A Well, it's not necessarily a direction. It's just sort of reoriented. I have another set of slides that he could put up that you can sort of see.

Q The second.

A That's it.

So this is just a slide showing -- well, it's just showing the cobble bar and the big pile of woody debris that's over the upstream trace of the 1994 channel which is off to the right-hand side of the picture.

The channel movement that you were alluding to is that up through about 2009 this small section of the river right here, the cobble bar that you see on the right-hand side was actually on the left-hand side. And the river moved around it from right to left. It recently -- it seems that the actual river is moving slightly away from the old 1994 channel. The cobble bar is on the right-hand side, and there is a woody pile there.

If you could get to the next slide.

--o0o--

MR. PHILIP: In 2009, you could see that my picture was actually -- this is the GFS measurement -- that the cobble bar is actually on the left-hand side as you look downstream. This is now that reconfigured with the river has now shifted over a little bit to the left.

BY MS. TEETERS:

Q And just to make a clear record, you're talking about the cobble bar that's just right downstream of the letter J looking at the camera?

A That's correct.

Q Okay. Now, changing focus, did you assist in taking transects of the river with Dr. Hanson or members of his team?

A I have.

Q How many times?
A Hundred times, plus.
Q So you're familiar with the methodology and technique for taking such measurements?
A Sure.
Q Have you reviewed the testimony of Mr. Dettman concerning measurements and transects in the vicinity of PT4?
A Yeah.
Q And did you visit that area when you went down on July 4th?
A Yes, I did.
Q Did you take any photos?
A Yes, I did.
MS. TEETERS: Mr. Lindsay, if you could put up PowerPoint 3.

--o0o--

BY MS. TEETERS:
Q While you were down there, did you take photos of the transect locations?
A Yeah.
Q Did you take any measurement in the area where Mr. Dettman took his measurements?
A Yes, I did.
Q And at that time, were there two main channels?

A Yes.
Q Now did you draw a sketch showing a schematic plan view of the river at PT4 as you found it on July 4th?
A Yes. That's being shown.
Q It's on the screen.
Is this the same sketch shown to Mr. Dettman as ESR-47 as his direct testimony?
A Yeah. I think there were a few slightly different numbers on it, but the basic step was the same.
Q Did you also take video of the area while you were down there on July 4th?
A Yes, I did.
Q Can you describe how this slide and sketch of the area indicates the path you took recording your video?
A Yeah. Basically, I did -- when I took the video, I think about two to three minutes long, I simply walked from point one over to two to three to four to five and then ended up at six. Just sort of to try to get an idea of what the area looks like.

MS. TEETERS: Mr. Lindsay, there is a video that goes along with Mr. Philip's testimony. It would be the PT4 video. This will only take about three minutes.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Should there be sound with this?

MR. PHILIP: No.

(Whereupon a video presentation was made)

BY MS. TEETERS:

Q Can you give us an idea what we're seeing here with the cobble, very little water?

A Yeah. This is the portion of the river -- it's kind of tough to describe without the map next to it. But this is sort of the large cobble bar that does have some water flowing through it, but not a whole lot. The vast majority of the water flowing down at least this arm of the river is right through here.

Q And you're just following the path that you described earlier?

A More or less, yeah.

CHAIRPERSON HOPPIN: Mr. Philip, now that I nearly have vertigo from watching this film, what portion or what number of the previous slide are we looking at here? Can you correlate that back?

MR. PHILIP? Yeah. This is approximately area five.

CHAIRPERSON HOPPIN: Okay. Thank you.

MS. TEETERS: Thank you.

BY MS. TEETERS:

Q And just for clarification, why was the person in the video wearing a Tyvek suit?

A Because there's a lot of poison oak down there.

HEARING OFFICER DODUC: How much more time do you need for this witness, Ms. Teeters?

MS. TEETERS: With Mr. Philip, probably just two or three minutes.

HEARING OFFICER DODUC: Thank you.

MS. TEETERS: We also have another -- can we continue with the PowerPoint Number 3? Thank you.

--o0o--

BY MS. TEETERS:

Q Are the photographs -- there are three photographs that are coming up. Are those the photographs that you took images, while you were down there, of PT4 on July 4th?

A Yes.

Q What is Photo A? What is it showing?

A It's just a location of the water passage transects.

Q Is this the right-most channel?

A Looking upstream, yes, it's the right channel.

MS. TEETERS: And Photograph B, Mr. Lindsay, next photo.

--o0o--

MR. PHILIP: This is the passage transects that we took of along the left looking upstream.

MS. TEETERS: And the next slide.

--o0o--

BY MS. TEETERS:
Q And what is this photo of?
A This is a photo taken in approximately the same place that Mr. Dettman took his photo of his passage transect that he took along this trace.
Q And so you compared his photo and you attempted to take one just like it?
A I attempted to.
Q Did you check the USGS gage as to the flows that were going when you were out there on July 4th?
A Yeah. I did have reception down there. It was 60 cfs. I think it may have been revised to 58 or 59 right now, but approximately 60.
Q Can you tell me anything about the flow that's going across that cobble bar right there?
A Yeah. It's pretty minimum relative to the two side flows. The cobble cfs, it's water trickling through cobble.
Q Great.
Can we go to slide five?
--o0o--
BY MS. TEETERS:
Q Please describe what this slide is.
A It just simply shows the configuration of the Passage Transect 4 area. In green are the two transects that we

took. And in red are approximately what we believe Mr. Dettman took for transects.

Q Did you match up the photos and the features that were there when you visited on July 4th?

A Yeah. To the best of our ability.

Q Did you measure the transects?

A We measured our transects, yes.

Q What methodology did you follow measuring the river depths in transects you took across the river channel at PT4?

A We installed rebar stakes on either side of the river of the flow we were going to measure, stretched the tape across it, and measured depth at every half a foot.

Q Did you measure depths at more than one transect?

A Yeah, two.

Q Why is that?

A There's two channels.

Q What designations did you give those transects?

A The one looking on the right channel looking upstream was PT4-A and the one on the left channel looking upstream is PT4-b.

MS. TEETERS: And can we go to slide six, please?

--o0o--

BY MS. TEETERS:

Q Is slide six a record of the depth measurements you

took?
A Yep.
MS. TEETERS: Slide seven, please.
--o0o--
BY MS. TEETERS:
Q And is slide seven a map location of a visual depiction of the stream depths you measured at PT4?
A PT4-A, yes.
Q And slide eight stream depths measured at PT4-B?
A That is correct.
Q Now do you recall that Passage Transect 11 was identified as problematic for the first fish passage in 2007?
A I do recall that.
Q Did you revisit Transect 11 in the July 4 visit?
A I did.
MS. TEETERS: We have another video. It will take about 30 seconds.
(Whereupon a video presentation was made.)
MS. TEETERS: We'd like to have this marked. I have a couple other intervening ones, so I'll clean it up. Thank you.
(Whereupon the above-referenced exhibit was marked for identification.)
BY MS. TEETERS:

Q Just to be sure, this is Passage Transect 11?
A That's correct.
Q Now did you conduct the velocity tests at VT1?
A Yes, I have.
Q Is it correct the purpose of the test was not related to doing a wetted parameter analysis?
A No. When I conducted the test in 2004, '06 and '07, they were not.
Q What were they measured for? Velocity?
A Velocity.
Q To do the velocity test, now do you have to return to the same exact spot every time?
A Not necessarily.
Q And isn't it a fact that the spots where you took your measurements vary from year to year?
A Yeah, they do.

MS. TEETERS: Thank you. I'm done with Mr. Philip.

HEARING OFFICER DODUC: Thank you. Please go on to your next witness.

MS. TEETERS: Thank you.

EL SUR RANCH REBUTTAL

BY MS. TEETERS:
Q Good morning, Mr. Horton.
A Good morning.

Q You testified previously; isn't that correct?
A I believe so.
Q Mr. Horton, were you present at the July 17th, 2011, hearing before this Board?
A Yes, I was.
Q Did you hear the testimony provided by the Department of Fish and Game's hydrologist, Mr. Kit Custis?
A Yes.
Q Did you also have an opportunity to review a transcript of his testimony?
A I did.
Q And based on your review of Mr. Custis' testimony regarding his SDF model of residual depletion, his opinion regarding sustained pumping water balance and flow rates related to lagoon closure, do you have rebuttal testimony to offer this Board regarding those issues?
A I do.
Q Do you have a slide presentation covering it?
A Yes, I do.

If we go to the first slide. Second slide.

--o0o--

MR. HORTON: So there's been a lot of testimony about the responsiveness of the aquifer and residual depletions and accumulated drawdowns that occur over the pumping season.

In my original testimony, I presented this slide which shows data from 2004 prior to any pumping average groundwater elevation in the area marked in the blue circle, April 15th river flowing 50 cfs, 5.85 feet. And then post-pumping in October of 2007, the same set of wells and average groundwater elevation of 5.89 feet.

I use this to demonstrate we do see a very responsive aquifer recovery after pumping season. I'd like to go further into that based on testimony that's been presented since I showed this.

If we go to the next slide.

--o0o--

MR. HORTON: Actually, back up one.

--o0o--

MR. HORTON: ESR-3 here is a monitoring well that we have instrumented in all of the years. And 2004, it's pretty much midway between the new well, the old well.

This boundary, which is our no-flow boundary in the river, and this is very well suited to document the stresses on the aquifer from our pumping, as well as the effect of the river and the no-flow boundaries we have.

Now if I can go to the next slide.

--o0o--

MR. HORTON: In 2004, El Sur Ranch started pumping in April 21st. I had been out to the ranch on

April 15th and collected a round of pre-pumping groundwater levels. And for some reason that I can't remember, we instrumented the wells in June of that year.

This is the record of the pumping for the entire pumping season in 2004. On the far left, we have the date. We started on April 21st. On the far right, we end I believe on October 14th.

The blue bars here represent pumping from the old well and the total rate, the scale on the left, and cfs. And green bars represent pumping from the new well. And this graph, they're stacked on top of each other when they're both pumping. And you can see the total cumulative pumping rate on a given day.

This was 177 days of pumping continuously, with the exception of two days when pumping did not occur. You can see those on this graph. This single day right here where there is no bar and this single day right here.

Over this pumping season of 177 days, this pumping rate averages out to 3.3 cfs. And you can sort of visually determine that just by looking at this photograph. It's the number that comes out. When the wells were pumping together in the season, the average combined rate is just under five, at about 4.95 cfs.

Go to the next slide, please.

--o0o--

MR. HORTON: This is a graph which shows two things. On the left-hand scale is groundwater elevation. And the right-hand scale is combined pumping rates.

My red dashed squiggly line -- and you know we like to look at graphs with squiggly lines -- is the actual pumping rate day-to-day across the bottom. You would correlate that to the right side. You can see we go up to 6 cfs in the early part of the pumping season. And the red varies quite a bit over the season.

The top blue line is the groundwater elevation in well ESR-3 that I just showed you. Starting here in late June, we got the transducer in and we monitor the groundwater elevation.

On the very far left, you see a blue dot, and that is our pre-pumping groundwater elevation. This is after the winter before any pumping that has occurred and the river again is flowing fine. So we have a fully recharged situation.

The green line just extends that elevation across for reference. There is a lot of stuff going on here. Just say during the period between this data point and the start of our monitoring here, continuously, the average pumping rate was 4 cfs.

BY MS. TEETERS:

Q If I could interrupt you, Mr. Horton. You're talking

about the dates 4/15 through June 24th, that's what the average cfs was?
A 4/21, correct.
Q Thank you.
A So at this point you can see the affects on the aquifer from a couple months of pumping already at a sustained rate. And as you correlate this drawdown with the turning on and off of the old well pump, and as you watch, you can see as I've demonstrated in earlier graphics the incredible responsiveness of this aquifer. Here it's a good peak. We shut off the old well. We step down. We get below two cfs of pumping. We're just pumping the new well. Aquifer responds right up to half a foot. We kick -- and as we continue in this, you'll see the aquifer responds almost back to pre-pumping levels here.
Pump -- old well kicks on again. We kick down. We turn it off because we only pump it two days. And pumping rate goes down again below two. And we recover all the way back to pre-pumping level here in mid-July.
As we cycle on/off when we have opportunities to pump the old well, you can see the water level move around.
In August -- late August, lagoon was closed, and we see the shift in the graph. Everything shifts up,

because the groundwater levels respond to the change in the surface water elevation in the lagoon and the curves are shifted.

Here, in September, we had an extended bout of pumping both wells. I believe this is over twelve days. You can see the accompanying drawdown occur. As we turn them off, we have a day off and back to the new well. We get recovery, rebound and so on, and fluctuate.

And finally, we stop pumping here in October 14th. Couple days later, the lagoon opens, and we are restored back to our pre-pumping groundwater levels.

This is the behavior we've seen in all three years of study. It just so happens in 2004 we're instrumented in our monitoring wells for this longest period of time. But the point is that because of the unique characteristics of this system, it recovers very quickly. It does not sustain residual drawdowns in response to our pumping. And I don't know how many more times I can measure it and make that point.

If we could move to the next slide.

--o0o--

MR. HORTON: I'll cover that residual drawdown a little bit more.

Mr. Custis has used his own modeling to conclude that all of the particles of water pumped by the pumping wells must originate in the surface flow of the river as it flows by the pumping wells.

And part of the reason is the use of this SDF model. And the big problem with this model and what this is -- and just a little quick background, if I may -- is a simple analytic model that was actually built as a screening tool to be used when you have no data whatsoever about what's happening at a river, but you'd like to get an idea of when pumping impacts near the river might impact the river.

In other words, it's more of a timing model about how long does it take to deplete the storage in the cone of depression in relationship to the characteristics of the river.

What this model has done in this application, it ignores all of the local conditions that we have detailed information about. And it also violates all of its own assumptions in this application here.

I'd like to go to the next slide.

--o0o--

MR. HORTON: Try to relate this picture to reality. I'm showing a little pencil sketch. This would be the river.

Here is the well. This ground would be ground surface.

We have water in the river. The blue line represents water here.

The triangle is the elevation of water surface.

And as we pump water, we draw down the water table.

In this model, the river is always higher than the water table or the groundwater elevation. Groundwater is slow here. When you build a simple analytical model, the mathematicians have to make assumptions to make it simple so they can make a non-complex model.

In this case, the assumptions they made in the Jenkins model is the aquifer is infinite in all directions. I think you already heard Dr. Harvey talk about that.

Another key one in the SDF model is that the river fully penetrates the aquifer. Now, in physical space, what that would mean is at the location of the river you would excavate it and trench it and held its vertical wells and it went to the bottom of the aquifer. And it was full of water.

It also doesn't include any boundaries of inflow or of no flow, no upgradient inflow of groundwater occurs in the model calculations.

What does this mean? If you ask this model, does the water that I'm pumping come from surface water? It can only give you one answer: Yes, it does. The answer is only a matter of when and to what degree does that cone of depression develop and move towards the river.

I believe Mr. Custis testified that he's run this model hundreds of times and gets the same answer. That's because it's engineered to only give one answer, which is all of the water comes from surface flow of the river. In this case, when we're trying to look at the impact of pumping on the surface flow, this is a very important distinction.

If we go to the next slide, please.

--o0o--

MR. HORTON: In order to get around some of the limitations of this very simple analytical model, Mr. Custis also ran a version of the model modified by Dr. Hunt, I believe, to try to deal with the fully penetrating river simplification. And this is a graph from that paper by Hunt. It includes all of the same assumptions we had in the Jenkins model, with the exception of the river does not fully penetrate it, and it has a colmation layer which we measured and demonstrated in our studies.

But it also includes the fact that the river always remains higher than the groundwater elevation and there is no inflow and no recharge boundaries. And regardless of the fact of that full penetration, this fact also makes the model engineered to answer only one answer to the question of where do these particles of water come from locally? They come from surface flow.

This is because in groundwater hydraulics as the river remains higher than the groundwater elevation in the model, it is the recharge boundaries that determines all the flow to the river.

So the calculations that are presented regarding these SDF models really are useful for determining timing of potential impacts in the ideal situation on pumping into the river.

But our question is more complicated than that. And our question is about how does the pumping relate to real impacts in the river in its zone of influence.

I'd like to move to the next slide, please.

--o0o--

MR. HORTON: Summing up the SDF model application here requires that all water eventually pumped come from surface flow adjacent to the wells. It ignores all these other boundaries that I think you've heard us talk about before.

Moving to the next slide.

--o0o--

MR. HORTON: One of the biggest important boundaries that ignores is the recharge boundaries or the constant head boundary I believe as called by Dr. Harvey in his testimony last week of the ocean interface. And what happens, as you know, as the groundwater in the subterranean stream and the underflow approaches the ocean, we have an effective barrier there. And you can think of this barrier as stacking up the water as well as we have tidal conditions that constantly change and get higher in the summertime with high tides.

What the effect of this is that you have an effective constant head source for recharge boundary not considered in any of these models.

Let's go to the next slide, please.

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MR. HORTON: This slide is a little complicated. I'll take a second, if I may, to explain it.

This is a cross-section. This is a map view down here low in the middle. And we show this is the mouth of the river, the beach.

My Cross Section A, which moves up the side of the lagoon to the Navy well and to the old well -- the lagoon is shown here at the very top left. Here's the Navy well.

Notice that it goes beside the lagoon, not across it. But the actual extent of the lagoon very nearby goes all the way up to the Navy well in reality.

This is a cross section of the bottom of the aquifer here. And this is along the deepest channel of the subterranean stream.

And then here is the saline wedge shown in red with the mixing zone as it approaches the saline water. And the groundwater underflow is moving from right to left in this picture.

What happens as groundwater moves here and approaches the ocean, some of it is forced into the lagoon and exits as surface flow. And some of it is forced up and exits through the beach in the mixing zone here.

How do I know this occurs? Well, I know exactly the dimensions of this subterranean stream through both physical and geophysical measurements. I've also along this beach here in our studies at low tides, come out and measured freshwater seeping through the interface of the beach, not only physically measured with instruments but tasted it, as a taste test.

Additionally, what you may remember, if you read my reports in detail, in 2004, we did a geophysical survey of electrical conductivity across the beach and up the lagoon. We measured the presence of freshwater lens moving under the beach as well as the presence of the saline wedge as it extends under the lagoon underneath the aquifer.

It's been opined by counsel last week that I've stated that pumping cannot impact the saline wedge. That is not what I've stated. What I've stated is pumping cannot induce the flow of the saline wedge such that it comes up into the freshwater of the lagoon and impacts the water quality of the lagoon. We verified that through measurements of our three studies here.

What happens is the tide goes up and down in the interface of dense saline water and the freshwater moves in and out. What this does, it props up and unprops the water as it tries to get out. This is the effect -- is one we see in the wells. And I'm going to show you further effectively on the graphs that we get to next.

But what's key here is as you understand this cross-section, as all of our subterranean flow is moving towards this area, it's coming up on a wall. This is literally a wall because the higher densities of the saline water and this must mix and climb out over this well. And that forces naturally the underflow into the lagoon and also forces it out under the beach.

Can I go to the next slide, please?

--o0o--

MR. HORTON: So when I talk about the water balance, I want to relate all this together. We've had many people up here testifying where does the water come from and it seems to be a mystery. It's really not a mystery. Hopefully I can clarify that.

Where does it come from? It's sourced by the river locally. It's sourced by both the river and the underflow. On a global sense, of course, it's all sourced by the river as it flows across this aquifer and recharges it upgradient of our zone of influence.

The big distinction on does the water come from the river or come from the surface flow of the river locally within our zone of influence?

Go to the next slide.

--o0o--

MR. HORTON: This is a geologic map with information on top. The yellow represents the aquifer that we're talking about. Sand, gravel, cobbles that is placed in the carved-out bowl in the Franciscan bedrock. These sides, the terrace deposits contribute some flow into the system, about 0.6 cfs. The Franciscan is negligible; essentially, impermeable boundary. And we have the ocean out here.

So let me review the water balance information. We know -- before I say that, we know the dimensions of this aquifer. We have measured the bottom of this aquifer and the entire study area. We have measured it both with the geophysical methods and coring. And we've measured these water flows across the zone. These are not estimates. These are measured values I'm talking about here.

What I'm going to show here is a water balance. Where does the water come from on the condition of a 10 cfs flow at the USGS gage located in the Pfeiffer State Park? What we saw in 2007, again the critically dry year, at the driest portion of the year when we monitored was the average losses between that gage and PT1 right here in the upper right was three cfs.

So if I have ten at the gage, in the river surface flow when I come around this corner, I have seven cfs on average. We saw -- again I've testified Labor Day weekend included in that average losses up to 4 1/2 cfs at the gage, but the average was three.

Across this zone, we know the cross section. We've measured the hydraulic connectivity of these materials. We can reasonably estimate the grade, and we know our underflow within the subterranean portion is around 3 1/2 cfs.

Q And you're pointing --

A Pointing to the VT1 cross section or it was labeled AA cross section in my original 2004 report.

So for water balance, when I combine these, I have 10 1/2 cfs coming into the system. How can I have more than the gage? Well, there's a lot going on between the gage and this location. There's streams also entering the river. There's people pumping out. Clearly, we still have a total increase over the six miles where we're getting some groundwater inflow along that course and some still flowing stream.

As we move from the VT1 gage down to the top of this, my zone of influence -- I'm showing here my calculated zone of influence in this dark line. And Mr. Custis has indicated he thinks that the zone of influence might extend a little further out, and this dashed line represents what I believe he has stated in his testimony.

At any rate, between these two zones, we've measured the average loss again in 2007, a critically dry year, when you think things were going to be the worst, of three cfs that came out of surface flow and went into underflow. So it's exited the stream.

The key thing about this part of the river is it's outside of our zone of influence. We cannot change what the river is doing. This exchange is natural. As Dr. Harvey indicated in his testimony, the zone of influence is exactly that. It's where we're drawing down the water table so that we can change the rate at which water exchanges. I can elaborate on that further.

So coming onto my water balance, as I move into my zone of influence now, I've reduced flow in the river by three cfs. I'm down to four. And my groundwater flow is up to 6 1/2 cfs.

Well, why does the river drop this flow here? It does it because as it comes around this corner -- if I could show you the big map, which I don't have -- the aquifer, as you can see, widens out and it actually thickens up as it moves downstream. It's a natural infilling of this porous water body that's occurring every day all the time in response to the fact that the aquifer expands when we come around the corner.

So now when I get back to my zone of influence, I've got 6 1/1 cfs in groundwater now, and I've got four in the river, still 10 1/2 total water balance is adding up.

I also have an estimated .6 cfs coming into the groundwater system from these terrace deposits. They're not totally impermeable, but relatively so. Now I have a total of at this point in time 11.1 cfs that's got to move out through this system right here. When we're pumping the average pumping rate of El Sur Ranch, that's 2.9 cfs going out. And so what does that leave me? That leaves me 8.2 cfs that is getting out to the ocean in this case. How was it getting out? It's getting out through the surface flow in the lagoon itself and under the beach through the sand and gravel and cobble deposits as underflow. Again, I've measured this and I've measured this.

Why are they variable? Because the tide varies, as we know. And when it's directly -- when the tide varies, the lagoon water comes through and picks up with the ocean. And this entire lagoon is then directly hydraulically connected to the ocean. So the hydraulic system, that directly translates to changes in tides over this entire area, not just at the interface.

Going to the next slide, please.

--o0o--

MR. HORTON: This is a graph again -- sorry, apologize for graphs -- of the vertical gradient in Peizometer 7 lagoon in 2007. On the bottom, we have times. We've marked the periods when we're both wells pumping, new well pumping, the old well pumping, both wells pumping.

And this is a vertical gradient indicating if it's positive, then groundwater is flowing into the lagoon. And if it's negative, the water is reversed and the lagoon is supplementing groundwater. We see this big scatter. That's when the lagoon came up and submerged one of our transducers and made it go crazy for a little bit. What you see is zero gradient. So as we come across a pumping period, you see this just moving up and across from positive to negative in response to tidal conditions, staying basically neutral. And we see a general shift as we go into old well pumping prior to begin pumping and remaining predominantly positive through the rest of our test.

I don't have a graph for this, but the same transducer location in 2006 we also measured behavior similar. We have a net positive flow over this pumping period into the lagoon. Again, that groundwater has to get out of the system. Part of it goes into the lagoon.

And in 2006, we have the same thing. We saw a little more fluctuation in 2006. What it correlates to exactly is the average daily tide. What we determined in 2006 that this exchange between the lagoon surface water and the underflow system, regardless of pumping, responds to the average daily tide condition. That determines the direction of flow. And this again is because the hydraulic affect of the connection of the lagoon with the ocean transmits that hydraulic affect across that entire lagoon area.

What this is showing you here in the late stages of this graph were pumping both wells at 5.03 cfs in 2007. You can possibly interpret a slight reduction in this vertical gradient here, which makes sense if we are pumping a lot of this underflow, but largely not very correlative to our pumping. And again, it's because it responds to average daily tide condition.

Move to the next graph, please.

--o0o--

MR. HORTON: This is actually a map. I'm simply showing the same water balance information where we have 10 cfs at the gage. I believe this is the rate at which the proposed permit would cease pumping. And we're going to pump at maximum of 5.8 cfs.

These all stay the same. This system is pretty static in that as long as the river is flowing into here and across here, this aquifer is filling with the same amount of water and the same amount of water is coming into the system.

BY MS. TEETERS:

Q Just to stop you. You're talking about the area from VT1 down through VT3?

A Correct. Yes, VT1 down to VT3.

Now relating that back to questions that I saw on Friday for Dr. Harvey, in his graph of water balance, he said Delta I equals zero. That means incoming flow, the change in incoming flow equals zero. That's because we're at -- basically, without any stresses in the system, we're at a steady state of how much sub-flow approaches our area of influence all the time. As long as the river is running, this groundwater system is charged and this is how much flow that transmits.

So all I'm changing in this graph is the pumping rate and thus the outflow rate. So at 10 cfs in the gage in this water balance example, I'm now flowing 5.37 cfs out to the ocean and 5.8 to the pump.

Where does the delta come? The change in river exchange and the change in underflow pumped.

So going further to that, what do we really measure? Where do the particles of water that we're pumping come from?

During 2007, I can't emphasize enough we're testing in 2007 a critically dry year when you would expect everything to be the ultimate worst in this case. At this location up here where we've got P4 in the four, even during the pumping at high rates and both wells, we still remain a positive gradient inflow into the river. The groundwater elevation is still higher than the river elevation.

Where we reverse that grade as the zone of concern that I've discussed about two through three in here where we actually take some of the particles of water out of the river. In P1-L, I just showed you that hydrograph, it remained a steady positive gaining portion of the river. So where does the water on pumping come from? It comes from the 6 1/2 cfs of underflow and partially from within the zone of the surface flow of the river. How many of those particles did I actually take out of the river? I don't want to confuse you more, but you've heard me testify at P2-L we had a 1.2 cfs of loss in flow at that location. Of that loss, really .4 of it was taken out of the river, and .75 was just a reduction of the inflow into the river from the pumping because we reduced this gradient.

So the point, to sum up on this one, because going back to the SDF model application in this case within the zone of influence, I retain a positive gradient around the curve here. The groundwater is higher than the river and the same in the lagoon. What that means essentially is that, aside from being a -- the river is invisible to the pumping wells. More actually seen as a discharge source or another very small pumping well distillate.

Here is where we see the river as a recharge source to the wells within the zone of influence that determines impacts.

So, yes, yes, the water that pumps here comes from the river. It comes from the natural bregator (phonetic) of the river. And the question is what are the impacts to the natural bregator to the river from the pumping within the zone where we can influence it. That is just right here. And that was a ratio of about .3 cfs to every one cfs of pumped water. The rest of the water is made up from this underflow, of which has to get out of the system.

Like to move to the next slide, please.

HEARING OFFICER DODUC: How much longer do you have?

MS. TEETERS: I probably have a quick two or three minutes of some really direct questions.

HEARING OFFICER DODUC: Let's start wrapping up, please.

MR. HORTON: I'm starting to wrap up.

There is questions -- testimony submitted about what flows it takes to open the lagoon once it's been closed. I'm going to relate the actual facts that we observed.

2004, lagoon closed on the morning of August 26th with the gage reading 12 cfs. This is a picture.

Next slide.

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MR. HORTON: It opened on the afternoon of October 17. USGS gage was reading 53. The day before, it was 11. We had a big rainfall event. We pushed open the lagoon. That all makes sense.

Next slide.

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MR. HORTON: 2007, the lagoon closed at noon on September 3rd. USGS gage was reading 6.3 cfs. And we had flow at VT2, the closest gage to the lagoon, of 0.5 cfs.

Next slide.

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MR. HORTON: This is a graph of the water elevations in the lagoon across this period where you can see how we know when exactly the lagoon closed. The lagoon closes. We get a steady rise in the water elevation of up to 2 1/2 feet. And the lagoon is open and it quickly drops back down to the pre-established water elevation.

Next slide.

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MR. HORTON: 2007 then, the lagoon was open at 4:00 a.m. on September 12th. The river flow at VT2 was 3.4 cfs, and the gage flow was 6.3 cfs.

MS. TEETERS: Thank you.

Mr. Lindsay, we have available transcript testimony from the June 17 hearing. And I have it highlighted. If we can go to page 98 of Mr. Custis' testimony.

BY MS. TEETERS:
Q You can see, Mr. Horton, the highlighted text there. Mr. Custis testified that each time you pump and then drop back and then you have to start back up, but you're not starting at the bottom. You're stepping up.
As you read through this testimony and based on slide four of your PowerPoint which we just saw, is what Mr. Custis describing in his testimony actually occurring?
A We do not see that behavior here. And it's because of the unique conditions of the recharge boundaries and the no-flow boundaries which surround the system. So in the normal system or a system isolated far from its boundaries, you would see this kind of behavior. We measured that we don't.
Q And line -- on page 121, lines 18 through page 122, line 2, Mr. Custis states that the water level of Creamery Meadow will continue to drop and drop.
Is this a correct statement based on slide four of your -- today's presentation?
A No.
Q I'd like to talk about max pumping really briefly. It's been a lot of talk about the sustained maximum rate of 5.84. Is it your opinion that max pumping rate cannot be sustained over a long period of time?
A That's correct.

Q And why not?
A The conditions of the old well salinity issues, as I've discussed earlier, as we have the higher than normal spring tides in the summer months and pumping the old well samples, that saline diffusion front that I just referred to on my cross-section, and we have to shut the well down.
Q Now is it your opinion also and based on what you know about the ranch that it would mean pumping lower fields only for a sustained period of time to have the maximum pumping rate?
A That's correct. The maximum rate is based on the lowest amount of -- you would just be pumping the low fields only.
Q And in reviewing the pumping records where you put up on slide three of your presentation for 2004, which was a dry year, was there ever a period when the maximum pumping rate of 5 cfs or higher was sustained for more than four days?
A I think there was.
MS. TEETERS: Can we go back to slide four, please?
--o0o--
BY MS. TEETERS:
Q And do you ever see a period there where it's more than five days at a time?

A   Yeah. So early season here when we're down into the high spring tides, we had extended pumping.
Q   But that's 5 cfs or higher?
A   Okay. Good point. No.
Q   Thank you.
And transcript -- the deposition transcript, page 86, please, lines 22 through 87, line 4. Mr. Custis testified that your impact analysis did not take residual depletion into account. Does your analysis of impact based on your hydrology studies over the three years take residual depletion into account?
A   I believe it does.
Q   How so?
A   Well, we've documented the responsiveness of the aquifer, and we've shown that once pumping stops, this aquifer is recovering in a matter of four days to a week.
Q   So essentially any effects related to pumping decrease after the pump's turned off; correct?
A   They decrease very quickly. And under the river, again, we have very little drawdowns there. And we've shown 90 percent recoveries of those drawdowns in 24 hours.
MS. TEETERS: Thank you very much.
CHAIRPERSON DODUC: That was informative.
CHAIRPERSON HOPPIN: Dr. Horton, I have one

question for you.

MR. HORTON: I appreciate being a doctor, but I'm not.

CHAIRPERSON HOPPIN: I'm not either. Nobody ever accuses me of it, unfortunately.

Mr. Horton, you testified that when the bar closed, there was immediate correlation in groundwater level.

MR. HORTON: Correct.

CHAIRPERSON HOPPIN: Do you notice any changes in the EC when the bar is closed and the groundwater goes up?

MR. HORTON: In the surface water or the -- either surface water nor the groundwater --

CHAIRPERSON HOPPIN: Groundwater.

MR. HORTON: Neither one. Unless you have to be pumping, unless you're testing that water from, say, the Navy well or the old well during the very higher spring tides that we get June, July, and August.

CHAIRPERSON HOPPIN: My other question is you talked about the hydraulic head of the ocean water acting as a retainer essentially of underflow when you look at the map. And I am sorry I don't have the number in front of me. But there is essentially a venturi at the lagoon in your diagram of the aquifer.

Does that have any physical impact as far as the levels of groundwater where it's constrained right before it hits that hydraulic barrier? Or does that make any difference?

MR. HORTON: Well, I'm not -- in terms of the venturi --

CHAIRPERSON HOPPIN: I'm not trying to put words in your mouth. If you don't think it is --

MR. HORTON: I don't think so. We see transmitted through the groundwater system all the way back to our wells the affects of the tide, the hydraulic effect of that.

But again because it transmits directly into the entire lagoon via the surface connection and then the hydraulic response of the pressure on the groundwater system. So we see very quick response in all of our monitoring wells to changes in the tide. That's not a -- that's a hydraulic response and not a movement.

CHAIRPERSON HOPPIN: So would it be fair to say then that the underground geography and soil types of the lagoon create a static situation and the only two real variables would be -- well, would be the tidal effect and groundwater pumping in addition to the natural flow?

MR. HORTON: Pretty much, yeah.

CHAIRPERSON HOPPIN: Thank you.

HEARING OFFICER DODUC: Any other questions?

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: One question. Well, maybe a couple.

I'm looking at a slide in your presentation you just gave, the water balance at 5.8 cfs. It says along the cross hatched area on the Big Sur River 3 cfs to groundwater and I think it had 3 cfs to groundwater also on the example of the lower pumping; right?

MR. HORTON: Correct.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Remind me, how do you know that it's 3 cfs to groundwater along the reach?

MR. HORTON: We had transducers placed in the latest year. We had two here showing losses, and we had our flow gage.

MS. TEETERS: If I can just stop you. Can you explain where "here" is?

MR. HORTON: P5-L and P6-L near the edge of the zone of the influence we measured steady downward gradients there. We also measured flows around the corner at VT3 and then we had the flows up here. So we know the river flow. We know these gradients. We know that we have these losses across this area.

The reason we placed VT3 where we did around this corner is because in the earlier studies we identified that's where the river changed from losing to neutral to gaining stream. We determined that both from all the chemical data in the river and the actual hydraulic data from the peizometers.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Okay. Thank you.

HEARING OFFICER DODUC: Anything else, Mr. Lindsay?

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: No.

HEARING OFFICER DODUC: Ms. Farwell.

STAFF ENVIRONMENTAL SCIENTIST FARWELL: Thank you.

I have a question. Mr. Horton, at any time when the lagoon was closed, did you have or did anyone look at DO in the lagoon?

MR. HORTON: Yes, we did.

STAFF ENVIRONMENTAL SCIENTIST FARWELL: Is that in your testimony somewhere? Exhibits?

MR. HORTON: It's in my reports. I don't talk about it too much, because it's more covered by Dr. Hanson.

But I could say that in our measurements, we found no correlations of any changes in DO or lagoon to pumping or -- I really don't think we saw much of any changes in DO in the lagoon ever.

STAFF ENVIRONMENTAL SCIENTIST FARWELL: Thank you.

HEARING OFFICER DODUC: Mr. Murphey.

STAFF GEOLOGIST MURPHEY: Mr. Horton, I wanted to look at Figure 3-30 that you were testifying about. It showed the 177 days of pumping, except for I think you said two days.

Do you have any corresponding groundwater data that you could relate to that graph that shows the pumping rate? Do you have another figure that would show what the groundwater level looked like?

MR. HORTON: If we could back up one.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Was that in your presentation?

MR. HORTON: It was.

STAFF GEOLOGIST MURPHEY: I think it was Figure 3-30.

MR. HORTON: So this is the actual pumping rate information. And any question about how it's presented?

STAFF GEOLOGIST MURPHEY: Yes. Well, this shows the pumping from both the old well and new well. But do you have corresponding data that shows groundwater level data?

MR. HORTON: So the next slide, this is the same data from the pumping as the red line. And then this is the groundwater elevation at ESR-3, which I've shown as the one to be most representative of all these stresses where it absorbs the maximum sort of impacts from all the stresses in sort of an indicator way.

So this is the groundwater elevation. We do have similar graphs from other wells that were instrumented at this time.

MS. TEETERS: Just to be certain, the blue line is groundwater elevations. The red line is corresponding pumping. And that's at both wells.

MR. HORTON: So for blue, you look on the left for what the groundwater elevation is. And for the red, you look on the right for the cfs of pumping.

STAFF GEOLOGIST MURPHEY: Okay. Now I notice there is a purple dot to the left. And then there is no groundwater data until about June 24th. Why was that?

MR. HORTON: So we were designing a study in early spring of 2004. I went out to take water levels and do reconnaissance on April 15th. And I guess it took that long for everybody to agree what exactly we're going to do out there before we got the instruments out in June.

STAFF GEOLOGIST MURPHEY: So the purple dot, was that an initial water level?

MR. HORTON: That's right. That's one I took myself with a water level meter.

STAFF GEOLOGIST MURPHEY: And the next one was just the 24th?

MR. HORTON: Correct. That's when we installed the pressure transducers that hang in the wells and continuously record the amount of water on top of them, which you then convert to groundwater elevation by knowing the elevation of the well.

BY MS. TEETERS:

Q You said that everyone had to agree. Who are you talking about?

A You know --

Q The team?

A The team.

Q Anyone else? Department of Parks where you put your transducers?

A Yeah. I can't remember if we were throwing work plans back and forth with Department of Parks. I know we did have to put a work plan together in order to get permission to instrument in the river and get access permits and so on, so forth.

Q Thank you.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: One follow-up, please, if I could.

Yep. There we go.

I was asking a few minutes ago about the 3 cfs to the river. Is there a range of river flows where that is valid?

MR. HORTON: Pretty much all of the river flows.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Okay. Thank you.

HEARING OFFICER DODUC: Ms. Mahaney.

SENIOR STAFF COUNSEL MAHANEY: Mr. Horton, you said that the maximum pumping rate could not be sustained over a long period of time due to various issues with the old well. What is a "long period of time" to you when you answered that question?

MR. HORTON: Well, I can just talk about what we've seen in the historical record of pumping.

SENIOR STAFF COUNSEL MAHANEY: The four to five days?

MR. HORTON: It's a handful of days.

SENIOR STAFF COUNSEL MAHANEY: Okay.

MR. HORTON: Thank you.

HEARING OFFICER DODUC: Mr. Hoppin.

CHAIRPERSON HOPPIN: Mr. Horton, in follow-up to Ms. Mahaney's question, if there were ever to be any increased volumes of water delivered to the ranch given the dynamics of the old well, I would assume that it would have to come through an expansion of the new well.

MR. HORTON: Correct.

HEARING OFFICER DODUC: Do you have another rebuttal witness? For the sake of humanity, let's take a short break. How about we'll start five before 10:00?

MS. TEETERS: Would like me to go through the exhibits at this time to number them?

HEARING OFFICER DODUC: Let's do that.

STAFF GEOLOGIST MURPHEY: Ms. Teeters, we did not receive a copy of Mr. Horton's testimony.

MS. TEETERS: It should have been in the packet that was handed out on Friday.

It's my understanding that the transcript is already in the record of the Board. I just merely highlighted it for the convenience --

STAFF GEOLOGIST MURPHEY: We didn't receive any of Mr. Horton's testimony. We received Mr. Philip's and several others that don't appear -- we did not receive Mr. Horton's testimony.

MS. TEETERS: If you did not receive it, it was an inadvertent error and the other interested parties in the case did receive it.

SENIOR STAFF COUNSEL MAHANEY: I think we just asked where is the PowerPoint.

MR. LAZAR: Are we referring to rebuttal testimony?

MS. TEETERS: Yes.

MR. LAZAR: None of the parties received rebuttal testimony.

STAFF GEOLOGIST MURPHEY: For Mr. Horton, did you receive other testimony?

MR. LAZAR: We received exhibits.

MS. TEETERS: It was handed out on Friday.

HEARING OFFICER DODUC: We have Mr. Philip. And then we also have a stack, which I assumed --

MR. LAZAR: We never received any rebuttal testimony.

Would the counsel from Fish and Game confirm this, please?

HEARING OFFICER DODUC: Ms. Ferrari.

MS. FERRARI: We didn't receive any rebuttal testimony. We've only received exhibits for all three of the rebuttal witnesses.

SENIOR STAFF COUNSEL MAHANEY: Did you submit any written testimony for either Mr. Philip or Mr. Horton or was it just --

MS. TEETERS: It was the slide show and then talking points from the slide show.

SENIOR STAFF COUNSEL MAHANEY: It appears that we may only have exhibits for Mr. Philip.

MS. TEETERS: If I could ask, did the other interested parties receive the PowerPoint for Mr. Horton?

Yes. Just got confirmation from Mr. Johnson they did.

I apologize if the Board members did not receive it. It was an inadvertent error. When we put the packets together, you should have received them.

HEARING OFFICER DODUC: Let's be clear. There were no rebuttal testimonies; just exhibits and PowerPoints and the marked up portions of the transcript?

MS. TEETERS: Correct.

HEARING OFFICER DODUC: Okay. So the parties did receive what they were supposed to receive.

MS. TEETERS: Correct. And again, I apologize to the Board.

The exhibits, Mr. Murphey.

STAFF GEOLOGIST MURPHEY: Yes. I've got the packet now.

MS. TEETERS: So Exhibit ESR-55.

STAFF GEOLOGIST MURPHEY: Actually, ESR 55 is Jon Philips's CV?

MS. TEETERS: Yes. And ESR-56 is one of the PowerPoints of photos. And it would be photo locations, July 4, 2011.

STAFF GEOLOGIST MURPHEY: And just to be clear, that starts with photo one?

MS. TEETERS: Photo taken from September 29th, 2009.

STAFF GEOLOGIST MURPHEY: ESR-56 starts with photo one and ends with photo ten; is that correct?

MS. TEETERS: Yes.

STAFF GEOLOGIST MURPHEY: There are several duplicate photos of different packets. We are trying to sort through them.

MS. TEETERS: And ESR-57 is the packet entitled "Photo Location J."

STAFF GEOLOGIST MURPHEY: Okay. Got that. And that consists of three photos.

MS. TEETERS: Correct.

And then were you going to ask --

STAFF GEOLOGIST MURPHEY: No. I got it.

MS. TEETERS: And then ESR-58 is the first planned view is entitled "Passage Transect 4 Photo Location." And that's a hand-drawn sketch of the planned view of PT4. And that is eight slides.

STAFF GEOLOGIST MURPHEY: Okay.

MS. TEETERS: And the first video that was shown, video of PT4 on July 4th, 2011, is ESR-59. And that was about a three-minute video.

And the second video that was shown was a video of PT11 on July 4th, 2011. And that is ESR-60. And that was about a 30-second video.

ESR-61 will be Mr. Horton's PowerPoint presentation.

HEARING OFFICER DODUC: Ms. Teeters, I have other stuff for Mr. Philip. I have the two Google maps. I have the table.

MS. TEETERS: The table is part of his ESR-58. It's already in there. It should not have been given to you. I apologize. I's just a larger version, more readable version of the one in the slide.

HEARING OFFICER DODUC: I see it. Thank you.

And this? It says "new well" on it. It's Figure 31, approximate recent position of the lagoon channel based on --

MS. TEETERS: We didn't enter that into the record.

HEARING OFFICER DODUC: Okay. And then there is this report.

MS. TEETERS: That's part of what we didn't enter into the record also.

HEARING OFFICER DODUC: Did not. And the two Google maps?

MS. TEETERS: Those are part of the first ESR-56.

HEARING OFFICER DODUC: Yes. I see that. Okay.

MS. TEETERS: And Mr. Murphey, ESR-61 is the PowerPoint presentation by Mr. Horton.

STAFF GEOLOGIST MURPHEY: Okay.

MS. TEETERS: I didn't know if you wanted to enter into the record the highlighted portion of the transcript or -- it was just for ease of viewing it on the screen.

SENIOR STAFF COUNSEL MAHANEY: I think you were clear about what page and what lines. So I don't think we need to do that.

MS. TEETERS: Thank you.

HEARING OFFICER DODUC: Thank you, Ms. Teeters.

Well, took up our break time. Let's take a five-minute break and we'll resume at 10:00.

(Whereupon a recess was taken.)

HEARING OFFICER DODUC: You may begin when ready.

MR. BERLINER: Good morning. My name is Tom Berliner. I'm counsel for El Sur Ranch.

Our last rebuttal witness is Dr. Charles Hanson, who has previously been sworn. We have several areas to cover, about ten. We'll try to be crisp moving through this. I suspect it will take longer than minutes. First subject area is application of the North Coast Stream Policy.

EL SUR RANCH REBUTTAL

BY MR. BERLINER:

Q Dr. Hanson, when asked by Mr. Lazar whether El Sur

Ranch consulted with Fish and Game or NMFS regarding its site-specific biological investigations used to determine bypass flow, Dr. Titus indicated that not to his knowledge.

Isn't it correct that El Sur Ranch consulted with Department of Fish and Game, including several meetings at the Yountville Department of Fish and Game office regarding your studies and the SGI studies in 2004, 2006, and 2007?

A Yes.

Q Weren't your investigations modified to address certain concerns raised by Fish and Game?

A Yes, they were.

Q Did NMFS review your studies?

A Yes, they did.

Q In fact, didn't NMFS then comment to the Water Board in 2005?

A They did send a letter, yes.

Q Is that the letter of October 20th, 2005, that's in the Board's files?

A Yes, it is.

MR. BERLINER: I'd like to refer the Board to a letter in the Board's files dated October 20th, addressed to Ms. Victoria Whitney. And it has a document number on it, which I assume is the Board's filing of 8896.2-1. And you should have a copy of that in your package of material.

HEARING OFFICER DODUC: We do. Thank you, Mr. Berliner.

BY MR. BERLINER:

Q Dr. Hanson, this letter, if you recall, concerns a review by NMFS of some of the study work that was being done. Do you recall what NMFS bypass flow recommendation was in that letter?

A My recollection is they said their bypass flow recommendation was 11 cfs as measured by the upstream USGS gaging station.

Q On another subject, water diversions are a common factor affecting steelhead distribution in abundance. Dr. Titus stated that point in his testimony regarding coastal drainages. He also stated that the El Sur Ranch application did divert water as a potential to affect steelhead distribution growth and abundance in the Big Sur River. And he cited Santa Rosa Creek as the example where entire stream segments had been rendered largely unusable as steelhead habitat as a result of long-term diversion effects.

I've put up a slide comparing the Big Sur River and the Santa Rosa Creek. I'm not going to waste too much time on this. The Board has seen these slides repeatedly.

To summarize, isn't it fair to say that the differences that were highlighted by the National Marine Fisheries Service on the Santa Rosa Creek are entirely distinct from the issues that they identified on the Big Sur River?

A They are different.

Q Mr. Dettman also testified in his direct testimony regarding the impacts of water diversions on the Carmel River. And he implied that a similar situation could occur on the Big Sur River, even though his field experience on the Big Sur River was limited to a one-day reconnaissance trip.

Slide two is a comparison of the Big Sur River. And I'll refer to the Carmel River column there.

Is it also fair to say that the vast majority of problems identified on the Carmel River are not found on the Big Sur River?

A Many of the threats and the magnitude of threats on the Carmel are different than those on the Big Sur River.

Q In fact, isn't the only area where there is a common threat between the two is recreational facilities?

A The two that are common, recreational facilities is one, and the other is other passage barriers.

Q Sorry. I missed that one.

And both of those were identified as more

significant on the Carmel than the Big Sur?
A By the color coding in the chart, yes.
Q Thank you.
Regarding juvenile rearing, on redirect by Ms. Ferrari, Dr. Titus testified that in his assessment the issue of juvenile rearing habitat, other than how they say the lagoon was characterized, really wasn't addressed, referring to your studies.
Dr. Hanson, have you assessed the availability of juvenile rearing habitat within your study area?
A Yes.
Q What was your assessment?
A We did a quick assessment based on results from our 11 passage transect measurements in 2007 in addition to data from VT1, VT2 and VT3. What we found was that approximately 92 percent of the area represented by those passage transects had average depths greater than 0.5 feet, which was the criteria identified for juvenile rearing habitat.
Q And what is a significant ratio between riffles, pools, and runs as far as juvenile rearing habitat?
A There is not a strict ratio. But a general rule of thumb that is sometimes applied is a 50/50 ratio between riffles and pools and runs.
Q And here you have riffles at about eight percent and

the remainder at 92 percent; is that correct?
A Roughly so, based on our rough estimates, yes.
Q Regarding Passage Transect 4, both Dr. Titus and Mr. Dettman stated the river is in a different condition today than it was previously. In particular, they identified Passage Transect 4 located just upstream of the lagoon as being a riffle critical for passage.
Have you had a chance to review the data collected on July 4th by Jon Philip of SGI?
A I have had a change to look at the data, the videos, and the photographs.
Q And that was presented earlier today in testimony; correct?
A Yes, it was.
Q Does PT4 look different on July 4th, 2011, from when you collected your data?
A Yes, it does.
Q Is the difference now that PT4 is a braided river rather then a single channel?
A That's the predominant difference, yes.

--o0o--

MR. BERLINER: Can I have the next slide?
BY MR. BERLINER:
Q Is the drawing I've put up as the third slide here representative generally of the braided condition of the

river?
A This is a schematic of the PT4 area as reflected by the July 4th surveys.
Q If you were going to assess availability of habitat for bypass, would you apply the Thompson criteria in the same manner on this configuration as you did historically?
A In general, we would, although there would be modifications to the application.
Q And how would you modify it?
A The first thing we would do is a general site survey to identify those channels and areas where fish passage was most feasible. We would then, from that initial reconnaissance, identify specific locations where the passage transects would be sited.
Q And based on the diagram, where would you put the passage transects?
A Based on the conditions that occurred at the location July 4th of 2011, we would have identified passage transects as shown in this schematic at 2A to 2B and from 6A to 6B representing the two channels that would have provided adult passage.
MR. BERLINER: Can I have the next slide, please?
--o0o--
BY MR. BERLINER:
Q Now on this slide, it's a little subtle, but there is

now a green line that's been added between 2A/B and of 6A/B. Is that what you're referring to?
A Those are the locations where we would have identified pass an transects based on the July 4th surveys.
Q Now, based on your review of Mr. Dettman's testimony, is it your understanding that he applied a transect from approximately point number 2 to 2A?
A That is my understanding.
Q And under current conditions of the river as of July 4th, would that be an appropriate transect?
A The location of the transects varies in response to changes in flows. During the time that Mr. Dettman was on site, the flows were substantially higher than those during the July 4th.
Q So under a lower flow condition, you would have to modify your transects; is that correct?
A Under a lower flow condition, you would modify the location.
Q Have you reviewed the passage transect measurements taken by Mr. Philip regarding passage between 2A/B and 6A/B?
A Yes, I have.
Q Based an your analysis of those passage transects, is there adequate passage for juvenile steelhead?
A Based on the data collected July 4th, there would be.

Q What about for adult steelhead?
A For adult steelhead, I think there are also passage opportunities as reflected in the data from the July 4th survey.
Q So focusing just on adult steelhead, would there be a preferential pathway up the river at PT4 for adults?
A Typically, the adults generally migrate upstream in response to greater flows and greater water depths, a process called attraction flows.
Under the conditions that occurred on July 4th, I would expect that the most likely channel for adult upstream passage would be through transects 2A through 2B.
Q Could you give an example of how an attraction flow typically works.
A Well, for example, hypothetically, let's assume we have a river channel that's a thousand feet across with a damn. There might be a fish ladder located on one embankment that is ten feet across but has approach velocities and attraction flows. The adult steelhead in this case would come up to the dam. They would be attracted to the fish ladder by these attraction flows and they would migrate upstream through the fish ladder, even though it represents a relatively small percentage of the cross-section of the channel.
Q In Table 2 of Mr. Dettman's testimony at CSPA/CDB-103,

page 6, he identified depth greater than 0.7 feet across passage corridors of five and six feet in width. Are those widths sufficient passage corridors for adults to migrate up past PT4?

A I believe that they are. The steelhead would select these deeper portions of the channel, although they may not meet the strict application of the Thompson criteria.

Q And did I understand earlier that you indicated the Thompson criteria might not be applicable in all circumstances?

A You need to apply judgment when evaluating the Thompson criteria for a specific location.

Q Could you explain what you mean by that?

A That you need to consider the channel cross section, the size of the fish, other habitat conditions that would influence whether or not they would likely migrate upstream through a channel.

For example, you might have a channel that is five feet across, but provides sufficient depth through that area. The fish, although there's extensive area adjacent to that, wouldn't necessarily use the shallower areas, but would more likely use the deeper thalwag area to migrate upstream.

Q Change of subject to growth and mortality. Dr. Titus's direct testimony indicated that optimal flows on the river for fish growth are between 20 and 60 cfs. It's been established that based on natural hydrology the river doesn't see 20 cfs in the late summer and early fall until you get to above-normal year types.

Given that we don't have flow of 20 cfs in critically dry, dry/normal, and some above-normal years, Dr. Titus concludes that fish in the Big Sur River are starving during low flow periods, regardless of year time. Do you agree?

A I don't agree. I do agree that the growth rates typically slow and are sometimes arrested in central coast streams during the summer. But the implication of the fish are starving to death I don't think is an accurate portrayal of the conditions during the summer.

Q Dr. Titus apparently bases his conclusion on a length/weight progression analysis and concludes that if the slope of the line falls below 3.0, that indicates the steelhead on the Big Sur River are not maintaining their optimal weight.

Can I have the next slide, please.

--o0o--

BY MR. BERLINER:

Q Showing you a bell curve. Is the use of the slope of 3.0 as a metric for fish conditions specific to salmonids?

A No, it's not specific to salmonids. It's been developed as a general criteria for a wide range of species. This is a distribution of length/weight slopes collected for about 3900 studies, representing almost 1800 different species.

What you can see from this is that the majority of the length/weight slopes fall within the range from 2.9 to 3.1. But you can certainly have slopes that are outside that range as well.

Q Dr. Hanson, I want to refer you to a study by R. Froesa entitled, "Cube Law Condition Factor and Weight/Length Relationships, History Meta-analysis and Recommendations." Is this bell curve taken from that study?

A This is Figure 4 taken from that study.

MR. BERLINER: I'd like to have that study marked for identification, please.

Mr. Murphey, what number would that be?

STAFF GEOLOGIST MURPHEY: That would be ESR-62.

MR. BERLINER: 62. Thank you.

(Whereupon the above-referenced document was marked for identification as ESR-62.)

BY MR. BERLINER:

Q Have you had an opportunity to compare steelhead length/weight relationships on the Big Sur River and other rivers in the western United States?

A Yes, I have.
Q I'd like to refer you to a study prepared by Katherine McLaughlin of Humboldt State University entitled, "Development of a Standard Weight Equation for Juvenile Steelhead Trout and Effects of Temperature, Turbidity, and Steelhead Trout Biomass on Relative Weight."
Are you familiar with this study?
A Yes, I am.
MR. BERLINER: May I have the next slide, please?
--o0o--
BY MR. BERLINER:
Q Based on this study, what comparisons have you made?
A As Appendix A to the thesis by McLaughlin published in 2009, approximately 100 studies were compiled on the length/weight relationship for steelhead. And what I've done is I've simply plotted the results of each of those individual studies as a blue dot on this figure.
And then one of the studies was conducted by the National Marine Fisheries Service in the Big Sur River, and it's shown in red.
The blue dots reflect a population of length/weight relationships for studies conducted up and down the Pacific Northwest as well as California and Oregon.
You can see that the results from the NMFS

surveys for the Big Sur River fall at a slope of 2.99 and are basically in the upper third or upper 80 percent of distribution of these length/weight relationships.

MR. BERLINER: I'd like to have the McLaughlin study identified as ESR-62, please.

HEARING OFFICER DODUC: Mr. Lazar.

MR. LAZAR: Just a point of clarification. Where is this in the exhibits?

HEARING OFFICER DODUC: It's -- oh, the graph itself or the --

MR. LAZAR: Yeah.

HEARING OFFICER DODUC: It should be in here.

MR. BERLINER: Yes.

MR. LAZAR: Okay. Thank you.

(Whereupon the above-referenced document was marked for identification as ESR-63.)

HEARING OFFICER DODUC: Please continue, Mr. Berliner.

MR. BERLINER: Thank you. Can I have the next slide, please?

--o0o--

By MR. BERLINER:

Q Did you make a comparison of length/weight relationships on the Big Sur River to the other rivers that were cited in the study?

A Yes, I did.

Q Could you explain what you found?

A What I did was I took the results of the studies reported by McLaughlin representing about 100 different studies of length/weight for juvenile steelhead and simply ranked them.

Those presented in black on the summary table.

I've ordered them from the greatest slope to the lowest slope. This is about a four-and-a-half page table.

The studies by Dr. Titus on the Big Sur River are shown in red. They were not included in the original McLaughlin study. What you can see from this is that, for example, for Dr. Titus's length/weight relationships based on collections in April 1994, he reported a slope of length/weight relationship of 3.31 which was the highest among all of the slopes included in these hundred studies. The other studies by Dr. Titus fall within various ranges throughout this, but are typically in the upper third of all the length/weight relationships that were reported in these hundred studies.

Q And if I could refer you -- could you highlight the Big Sur where NOAA's data is, which is 2.994 for reference?

A It's shown -- I don't know how to best describe it.

It's reported as Big Sur River in the stream column, California under state, NOAA, N-O-A-A, sample size of 46 and a length/weight relationship slope of 2.994.
Q And is it correct that the rivers that were identified are in Alaska, Washington, Oregon, and California?
A That's correct. That encompasses the basic west coast distribution of steelhead included in the study.
Q There's been a lot of discussion about the availability of food on the Big Sur River and the efficiency of steelhead to consume that food. Do you recall Dr. Titus's testimony in that respect?
A Yes, I do.
Q Isn't it true that the majority of macroinvertebrates drift downstream or move upstream at night?
A That's a typical pattern, yes.
Q Are steelhead efficient feeders at night?
A Steelhead are a sight feeders and more efficient during the daytime, less efficient at night.
Q You said a sight, s-i-g-h-t?
A S-i-g-h-t, sight, as in a visual feeder.
Q Isn't this evolutionary relationship designed to permit the macroinvertebrates to survive in their downstream trips or upstream movement without falling prey to steelhead?
A Drifting at night by a macroinvertebrate would reduce

its vulnerability to predation by steelhead and other fish during the daytime.

MR. BERLINER: Mr. Lindsay, could we please have Department of Fish and Game T-11 put up, please?

--o0o--

BY MR. BERLINER:

Q Dr. Hanson, while Mr. Lindsay is looking for the exhibit, as I listen to the contentions of Fish and Game, it would seem to lead one to believe that the population of macroinvertebrates on the river is entirely dependent on flow?

Now we have T-11 on the screen. If you look at T-11, it doesn't seem to support that contention. Can you explain why the macroinvertebrate population during the summer -- well, maybe I better just back up and ask you to explain this graph and what's on it.

A This graph is DFG-T-11. And on the left vertical axis is flow. Across the horizontal axis are months from January through December. And on the right vertical access are drift densities for macroinvertebrate.

There is a solid line which presents the flow from the USGS gaging station on Soquel Creek as well as drift densities shown in the dotted lines for both Soqeul Creek and also Scott Creek.

What you can see is that during the January, February, March time period, flows go up and the macroinvertebrate drift densities go up. As flows come down during the summer months, there is a general pattern of a reduction in drift macroinvertebrates during the summer period.

But during the fall, the flows remain low and yet the macroinvertebrate densities go back up. And that's a typical pattern. It's based not just on the flow in a river, but the drift macroinvertebrate, which are the food supply for juvenile steelhead, are also a function of the seasonality of when various species of when macroinvertebrates are reproducing and disbursing and therefore available in a stream to provide prey for juvenile steelhead. And you can see out here on the fall that that drift component that would provide enhanced food supplies for juvenile steelhead is basically independent of the flow of the stream.

Q On another topic about density, there was issues raised about population density. Can population density be affected by miles of anadromy?

A Yes, it can, through changes in habitat availability.

Q I take it there are a number of conditions on a river that contribute as far as the availability of habitat?

A Spawning gravels, overhead cover, a variety of factors, yes.

Q On the Big Sur River, there's been testimony there is about eight miles of anadromous stream. How many miles of anadromous stream are available on the Carmel River?
A Based on information presented in the CMAR report, they report 93 miles of anadromy on the Carmel.
Q And what are the relative comparative sizes of the two watersheds?
A Again, the two sizes of the watershed, the CMAR report noted that on the Big Sur River the watershed area is about 60 square miles, when compared to the Carmel at about 255 square miles.
Q Would you expect population densities to vary based upon the amount of watershed available as well as the miles of anadromy?
A Those would be factors that would influence the likely abundance of steelhead within a watershed, yes.
Q Regarding mortality and concerning Dr. Titus's studies, were they adequate to get a representative sample of steelhead mortality for the Big Sur?
A I don't believe they were.
Q Dr. Titus based his studies from the early '90s and observed mortality of 50 to 60 percent in 1994. He implied that mortality was associated with low flow and poor growth. In your opinion, was the study by Dr. Titus sufficient to establish a reliable assessment of

mortality?
A What Dr. Titus's study showed was the change in steelhead abundance within a survey reach between two periods of observation.
So, for example, you go out on one day and you see 100 steelhead. You go out a month later and you see 50. That's the information that the surveys provide. It doesn't provide you information on whether some of those steelhead might have moved downstream, out of your survey reach. It doesn't provide you information on whether some of those steelhead might have been lost as a result of avian predation or other causes. It simply gives you information on change and abundance between two observations.
Q Regarding temperature criteria, when you submitted your testimony, you used an average daily temperature metric of 20 degrees Celsius. Dr. Titus stated a metric of 18 degrees Celsius was more appropriate. Have you had an opportunity to go back and review your actual temperature data that you collected on the Big Sur River?
A Yes, I have.
Q How many temperature measurements did you make?
A The data that I focused on for this analysis was collected in 2007. And during that time, we collected about 23,000 temperature measurements.

Q Are the results of the data included in your report?
A Yes, they are.
Q Do you have a chart with you today that shows the average daily temperature you collected in 2007?
A I do.

MR. BERLINER: Mr. Lindsay, could we have the next slide, please? It will have to go past the rivers.

--o0o--

By MR. BERLINER:
Q Could you please explain this table?
A In response to the question that came up, I went back to our 2007 data. I selected sampling stations representative of basically the areas most closely in proximity to the El Sur Ranch wells, those ranging from PT4 through PT8. And I calculated and have reported here the average daily temperature. As you can see, none of these temperatures exceeded either the 18 degree or the 20 degree guideline criteria or guidelines that we had included in our report.
Q And why did you pick these particular passage transect locations?
A Because these were the locations in closest proximity to the El Sur Ranch wells.
Q Regarding the lagoon, in his direct testimony, Dr. Titus stated that approval of diversions by the El Sur

Ranch at the requested rates could create a situation where during periods of low flow there could be significant impacts to fisheries in the lagoon due to reduction in flow that would increase temperature, reduce dissolved oxygen, or otherwise degrade habitat. Do you recall that?
A Yes, I do.
Q You've previously testified based on your studies of the lagoon and actual data collected that the diversions of the El Sur Ranch pumps have had no detectable impact on the lagoon in as far as temperature, salinity, and dissolved oxygen; is that correct?
A Based open our multiple regression analyses, we did not detect any differences. So yes, that is correct.
Q Are you aware of another recent study of the lagoon that collaborates your findings?
A Yes, I am.
Q And is that the study by Dr. Melissa Foley of Stanford University who conducted a study under the supervision of Dr. Peter Ramondi, who's Chair of the Department of Ecology and Evolutionary biology at U.C. Santa Cruz?
A Yes, it is.
Q And do you have data from Dr. Foley's report?
A Dr. Foley did provide us data, yes.
Q And is that the exhibit that states at the bottom,

"Data of Dr. Melissa Foley, Stanford University"?
A   Yes. There should be two slides. One slide showing -- this is the first slide. This is titled "Big Sur River Lagoon Sampling Site Location." This is the location where Mr. Foley collected her data over a period of years.

--o0o--

DR. HANSON: And the next slide should show an example of the kind of data she collected. This is salinity collected by month in 2005, 2006, and 2007 from that location within the lagoon.

And what these show is that salinities are typically within the range from zero to two parts per thousand, which is consistent with the range of salinity that we observed.

MR. BERLINER: I'd like to have Dr. Foley's data marked as next in order, which I believe would be 64.

HEARING OFFICER DODUC: Is it this one?

MR. BERLINER: Yes. Should say at the bottom data of Dr. Melissa Foley.

(Whereupon the above-referenced exhibit was marked for identification as ESR-64.)

BY MR. BERLINER:
Q   On another subject, Dr. Hanson, Dr. Titus talked about similarities between wetted perimeter studies and PHABSIM

studies. Isn't it standard protocol when conducting an IFIM field survey to establish fixed metrics to go back to the same locations at different flows?
A That is the standard IFIM protocol.
Q Would you expect Fish and Game in their IFIM study on Big Sur River to follow this standard protocol?
A Yes, I would.
Q On our last subject, concerning flow augmentation, do you recall the testimony elicited by Mr. Lazar of Dr. Titus using groundwater for a flow enhancement program would not have the same constituents as river water?
A Yes, I do remember that.
Q If the groundwater were aerated such that the dissolved oxygen was increased to an acceptable level, would this create additional flow in the river that would increase the availability of habitat for macroinvertebrate production?
A Flow augmentation in that reach would likely increase the wetted area available for macroinvertebrate production, yes.

MR. BERLINER: That concludes our presentation. And I'd like to ask to have Dr. Hanson's PowerPoint identified as ESR-65.

HEARING OFFICER DODUC: Thank you Mr. Berliner.

(Whereupon the above-refereced document was marked for identification as ESR-65.)

MR. BERLINER: Thank you.

HEARING OFFICER DODUC: If we could have the other two witnesses up here as well, we'll begin cross with Ms. Ferrari and Mr. Takei.

Ms. Ferrari, we'll start you off with 30 minutes, but I appreciate that you might need a little bit more time.

MS. FERRARI: Thank you. Chandra Ferrari with Fish and Game. I'm going to start with Mr. Philip.

CROSS-EXAMINATION

BY MS. FERRARI:

Q Hi. How are you doing?

A I'm good.

Q Okay. Mr. Philip, did you participate in the 2004, 2006, and 2007 river field studies in the area of the ERS wells?

A I did.

Q And what was the nature of involvement in your studies there?

A I did quite a bit of the field data collection, almost all of the field data collection.

Q So would it be fair to say that you observed the characteristics of the channel during that time, in particular, at the PT4 location?

A Yeah.
Q Are the two channels that were shown in the PT4 video in the same configuration as you observed during your 2004, 2006, or 2007 field studies?
A No.
Q They were not. Okay.
Can you tell me how that channel configuration has changed?
A Well, at least in the summer months of 2004, 2006, and 2007, it was, for the most part, just a single channel following the outside of the corner.
Q So after 2007, the second channel emerged, apparently?
A I don't think I would say that.
Q But it wasn't present during any of your field studies?
A That's correct.
Q The rebuttal figures map location six and map location two show the depth of the river flow at the transects identified PF4-A and PT4-B respectively; correct?
A That's correct.
Q Which in any of these two new channel depth cross section is at the location of PT-4 for the 2006 and 2007 studies?
A The configuration has changed. I don't know if there is a one-to-one comparison.

It would be closest to PT4-A, this one that would be on the right channel as you're looking upstream.
Q PT4-A. What were the flows that were measured at the USGS gages on July 4th, 2011?
A Whether I looked at it, it was 60 cfs.
Q How does that flow compare to the bypass flows that ESR's proposing for the irrigation season?
A I believe it's higher.
Q Would both of these channels be open and flowing when the river flows drop to the 10 cfs level as measured at the upper USGS gage, in your opinion?
MS. TEETERS: Objection. Calls for speculation.
MS. FERRARI: I'm asking for his opinion.
HEARING OFFICER DODUC: I'll allow the question.
MR. PHILIP: I believe there would still be river flow.
BY MS. FERRARI:
Q The report on -- the 2008 report on the post-fire baseline monitoring of the Big Sur River lagoon -- I didn't catch the ESR exhibit number that was.
MS. TEETERS: It was not entered.
MS. FERRARI: Oh, you did not do that exhibit? Okay.
BY MS. FERRARI:
Q Mr. Philip, do you believe that -- hold on one second.

So when flood waters flow down Creamery Meadow area, do they tend to stay within that existing active low-flow channel, or do they expand beyond the active low-flow channel and flood?

MS. TEETERS: I'm going to object as vague as to what you mean by "flood waters".

BY MS. FERRARI:

Q I guess I would ask the hydrologist: What could you constitute as flood waters?

MS. TEETERS: Vague as to location, time. If you could just give us a little more information

HEARING OFFICER DODUC: Clarify, Ms. Ferrari.

BY MS. FERRARI:

Q Mr. Philip, are you aware of the term "bank full"?

A Yeah.

Q What does that mean?

A It's when the low-flow channel is full.

Q Okay. So in a -- if you had the amount of river flow that was above the amount that would constitute bank full, where would you expect that extra water to flow? Would it stay within the active low-flow channel, or would it expand beyond the active low-flow channel and expand onto the banks or flood Creamery Meadow?

A Well, by definition, if it's more than bank flow, it would have to expand to somewhere else.

Q Okay. How often do these bank flow conditions -- or how often have flows that are above the bank flow conditions occurred, to your knowledge?

MS. TEETERS: Can you give us a time frame?

MS. FERRARI: Let's say as long as USGS gage has been monitoring the flows.

MS. TEETERS: Calls for speculation.

BY MS. FERRARI:

Q How about since 1950.

A I would suspect it would probably happen at least once during winter months or more.

MS. FERRARI: Can we please full up -- I believe it's on the DFG rebuttal CD. We have a graph of the peak stream flows for California.

BY MS. FERRARI:

Q We'll just begin for now. So ESR, or El Sur Ranch, showed an exhibit on Friday that was a graph of the flow in 2007 at the upper USGS gage. Do you recall that exhibit?

A No. Can you show it to me again?

Q I'll just tell you. Essentially, that graph showed in March 2011 there was a large flood event.

A Yes.

Q It was close to 5,000 cfs.

A Yes.

MS. FERRARI: It's the peak stream flow PDF.

MS. TEETERS: I want to object to the use of this, as my witness has not had a chance to review it.

MS. FERRARI: We can look at it together right now.

HEARING OFFICER DODUC: Thank you, Ms. Ferrari.

MS. FERRARI: I would recommend we look at it together right now. It's simply the USGS gage data in a graph form that's already been admitted into the record.

BY MS. FERRARI:

Q So as you see, Mr. Philip, this is the USGS gage data showing the peak flows since 1950 to 2010.

A Okay.

Q Looking at that graph, can you count how many times in the last 60 years that the stream flow has been above 5,000 cfs?

A Looks to be about eight times.

Q Okay. I think by my count --

A I'm sure you've already counted.

Q I didn't do it. Okay. So let's say eight times. That's fine for now.

As we talked about before, when the river flows are higher than the bank full, the river flows out into the floodplain and in other words exceeds the channel banks; correct?

A Sure.
Q Do you know what is the typical return period for a bank full flood event?
A I don't.
Q Okay. So the flood event in March 2011 had flows near 5,000 cfs; correct?
A I believe that's the case, yeah.
Q So looking at this chart, would it be fair to say that the March 2011 flood event would rank around ninth as you identified? There were eight other instances that were above 5,000 cfs?
A Can you repeat that again?
Q Would it be fair to say the March 2011 flood event probably ranked around nineth, because there were eight identified events that were above 5,000 cfs?
A Sure.
Q Okay. And there are a total peak flow events in this table of about 61; correct? They show the peak flow events for 61 different years.
A Yeah. Okay.
Q So the March 2011 flood event has occurred at least nine times in the last 61 years; correct?
MS. TEETERS: Objection. Calls for speculation. We don't know that the ninth time is the only time that -- I don't think you've established that.

MS. FERRARI: We said it's at least nine times, and we established there's been that flood event plus eight additional ones that have been above 5,000 cfs by this chart.

HEARING OFFICER DODUC: Ms. Ferrari, let's help me understand. The 2011 event that you're talking about is not on this table.

MS. FERRARI: Correct.

HEARING OFFICER DODUC: So you're looking at stream flows of --

MS. FERRARI: Above 5,000 cfs.

HEARING OFFICER DODUC: Okay.

MS. FERRARI: Which Mr. Philip has identified as occurring eight times on this chart.

By MS. FERRARI:

Q So in addition to the March flood event that a flood event of at least the magnitude of March 2011 has occurred at least nine times in the last 61 years?

A Sure.

Q So what would that say about the probability of this event happening, or as the hydrologist I think would like to say, as the return period of this flood?

A Seems like it happens whatever is nine times in 60 years.

Q 14.5 percent probability?

A Okay.

MR. BERLINER: No. Objection. The math is wrong.

MS. FERRARI: What is the math?

MR. BERLINER: It's like ten percent.

MS. FERRARI: Nine divided by 61? 6.1 would be ten percent.

HEARING OFFICER DODUC: And your point, Ms. Ferrari?

MS. FERRARI: I'm just establishing how often we can see the flood flows. And now I'm starting to move on.

HEARING OFFICER DODUC: We have a rough estimate.

MS. FERRARI: Yes, we have a rough estimate.

MR. BERLINER: There's two different things going on here. There's the number of times it has occurred. And there's the probability of it occurring. Two different things.

MS. FERRARI: Well --

HEARING OFFICER DODUC: Hold on Ms. Ferrari.

Mr. Lazar.

MR. LAZAR: Is Mr. Berliner testifying?

MR. BERLINER: No, I'm objecting.

HEARING OFFICER DODUC: Yes, he is. I will overrule his objection and ask Ms. Ferrari to proceed. But please get to your point.

So are you finished with this line of questioning, Ms. Ferrari?

MS. FERRARI: I'm sorry. I've lost my place.

BY MS. FERRARI:

Q So when you have a flood event as we've defined it and the waters are flowing down the river from Transect 1 through Section AA at the upper end of Creamery Meadow, would those flood waters be more likely to follow the bend in the river within the zone of influence of the ESR wells or take a straighter flow path on its way to the ocean?

A I don't know if I can make that simple an answer. I've seen plenty of flow channels in Creamery Meadow. I don't know if I can answer your question though.

Q So, but it could go straight through, take a straighter path to the ocean? Is that a phenomenon you see with flood waters; they don't always follow the bends in the river?

A That's probably accurate.

MS. FERRARI: Okay. Can we look at Photo J, which is the upstream location of the historic channel cutoff?

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Where is that?

MS. FERRARI: It's ESR rebuttal testimony.

MS. TEETERS: I believe it's 57. Second from this morning. It would be the second PowerPoint.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Is this it?

MS. FERRARI: Yes. Thank you.

BY MS. FERRARI:

Q So looking at this Photo J, is this pile of woody debris something that commonly occurs along the river? So, for instance, did you encounter this type of debris during the 2004, 2006, or 2007 studies?

A Yeah. Not this extensive. But yeah, certainly.

Q So it's not this extensive. Did you see where -- the woody debris, but not this extensive?

A Yeah. That's the biggest pile of branches and trees that I've seen in one spot.

Q So do you think that some, if not a lot, of this woody debris is the result of summer 2008 basin complex fire?

MS. TEETERS: Objection. Calls for speculation.

MS. FERRARI: Again, I'm asking for his opinion.

MR. PHILIP: I don't know. It could.

By MS. FERRARI:

Q Okay. Would it be fair to say that this pile of woody debris is oriented more or less perpendicular to the direction of flood flows that deposited it?

A I wouldn't say perpendicular. I would say 45 degree angle.

MS. TEETERS: Counsel, just to be sure, you're asking in context of 2008; is that what the earlier question referenced?

MS. FERRARI: You mean the basin fire of 2008?

MS. TEETERS: Correct.

MS. FERRARI: Yes.

MS. TEETERS: Thank you.

BY MS. FERRARI:

Q When flood flows are sufficiently large to flow and part relatively straight down Creamery Meadow rather than make the bend at the upper end of the zone of influence and they encounter this pile of woody debris, do they flow around it?

A Probably depends how much water there is. But I would assume that being a barrier, it would take the path of least resistance off to the left.

Q Would they only flow to one side or flow to both sides? Would flood waters flow on both sides?

A I'm sure it depends on how much flood water you've got.

Q So it could -- would more flood water increase the probability that it would go to both sides?

A Yeah. If you have both sides flooding, it could go anywhere.

Q So flow to one side is into the existing low-flow

channel, while the other side is the historic cutoff channel; correct?
A That's correct.
Q So during flood events, it's a probability that you would see -- or it's likely you would see flow on both sides in both channels, both sides of the --
A Did you say there was equal probability?
Q No. I just said there's probability.
A I would say there is a possibility.
Q Possibility. Okay.
So you have a lot of other photos this show these piles of woody debris on the bar of the river. I believe those are photos A, B, F, G, H, and I.
Was all of this woody debris brought in by recent flood waters, or has it been there for a number of years?
A A lot of it's been there for a while.
Q Okay. But some are more recent, some of the debris?
A Some of it, yeah.
Q So as you testified earlier, you could characterize some of these piles of woody debris as rather large compared to debris you see in the river prior to 2008?
A That's correct.
Q Okay. On your September 29th, 2009, Google image, it shows the photo locations; correct?
A That's correct.

Q Can you see the large woody debris that we were just looking at in photos A or G on that image?
A No.
Q Okay. So this suggests that that large woody debris came in after September 2009?
A Yes.
Q Is it true that the majority of large woody debris is deposited on the bar and is somewhat aligned with the historic cutoff channel?
A Define "aligned with the cutoff channel."
Q I guess oriented in the same direction.
A No. It seems more perpendicular to the cutoff channel.
Q But it is deposited on the side closest to the --
A It's deposited on the side closest to the cutoff channel. So blocking the mouth of the cutoff channel.
Q So given that most of the large woody debris has been deposited near to the historic cutoff channel than the sharp bend in the river at the head of the lagoon, could we conclude that during large flood events much of the river flow is oriented with the historic cutoff channel?
A I don't know if I'd say that.
Q So why else would the woody debris be deposited along that orientation?
A Well, that was one of the places where the river kind

of reconfigured itself. I certainly would say one of the possibilities was as the cobbles got re-deposited over towards the side of the historic channel as developing the woody debris, the flood flows went around to the left of it.
Q Okay. Given the recent deposits of large piles of woody debris, would it be fair to say that the lower portion of the Big Sur River near ESR wells have experienced some rather dramatic changes in recent years?
MS. TEETERS: Objection. Can you define "dramatic"?
HEARING OFFICER DODUC: Restate, Ms. Ferrari.
BY MS. FERRARI:
Q How about it's experienced some changes in recent years?
A I'm sorry. Can you just repeat that whole --
Q Given the recent deposits of large piles of woody debris, would it be fair to say the lower portion of the Big Sur River near ESR's well has experienced changes in recent years?
A I guess define your El Sur Ranch wells. Right in the general vicinity, no. But in the lower bend.
Q So in the lower bend?
A Sure.
Q Can you attribute much of this change to the 2008

basin complex fire?
A No. Are we specifically talking about this bend here?
Q Yes.
A No. That bend has been -- the river has been carving out this corner ever since I've been down there in 2004.
Q Sorry. I'm talking about the location of your large woody debris. I think J.
A Right around here?
Q Up around that area.
MR. BERLINER: Your Honor, could I ask both counsel and the witness to specify what they're pointing to on the drawing so we have a record that reflects what they're talking about.
HEARING OFFICER DODUC: Yes, Mr. Berliner.
BY MS. FERRARI:
Q Sorry. I didn't know what ESR exhibit this is.
A I think this is ESR-5- --
MS. TEETERS: It's 56.
MS. FERRARI: ESR 56 at location J.
MS. TEETERS: I apologize. It's 57.
MR. PHILIP: ESR-57 at flow location J.
HEARING OFFICER DODUC: And slide three.
MR. PHILIP: Slide three, yes.
BY MS. FERRARI:
Q In your experience or -- I guess, what were we saying?

What we are saying was do you believe some of the changes experienced in the location of J up there can be attributed to the 2008 basin complex fire?
A I suppose it could.
Q And in your experience, is it normal for the impacts like a large fire, like large amounts of woody debris, to work their way through the watershed within the first three winters that follow a fire?
MS. TEETERS: Objection. May call for speculation beyond his experience.
MR. PHILIP: I was going to say, I don't have a large range of experience dealing with post-fires in rivers.
MS. FERRARI: Okay. I think that is it for Mr. Philip.
BY MS. FERRARI:
Q Mr. Horton, how are you?
A I'm okay.
Q In your exhibit that was showing the aquifer water levels across the irrigation season, is this a conceptual model, or does it depict actual measured water levels?
A The exhibit today?
Q It is your first full aquifer -- aquifer water levels across the seasons.
MS. TEETERS: Second slide from his PowerPoint

today
By MS. FERRARI:
Q Second slide from the PowerPoint.
A That is the measured average water elevations in the wells that are located within the shaded area on that map. That's not conceptual. That's measured.
Q Okay. So you -- so can you identify then which wells you used to determine these -- the no-pumping and the post-pumping groundwater elevations?
A Yes, I can. I believe it's -- as I'm pointing to the blue circle JSA-4, JSA-3, ESR-3, ESR-2, and possibly the old, old well, which is the green one.
Q Okay. If we were to look at the well monitoring hydrographs that you have in your hydrogeology reports, would we see pre-pumping and post-pumping water levels for these wells for 2004, 2006, and 2007?
A I'm not sure the data is displayed specifically that way in those reports. It's included in data tables in 2004 report. We have submitted electronic data along with all of the fully presented process data.
Q So you have the information from 2004 for the pre-pumping measurements and the post-pumping measurements?
A Yeah. That would be included in the 2004 report, included as CD Rom. And that data should be in tables

there.
Q Do you have the same data for 2006 and 2007?
A I believe we do.
Q Can you locate me where you might be able to find those numbers?
A Just a second. So the data is -- in our reports, we presented hydrographs for wells. And in our data submittals that went along with that, we presented electronic files that includes 40 files, which would include miscellaneous, other monitoring data. So it's extracted from those. They haven't been reported summarized in any particular place.
Q So would you say that -- so you would have measurements in 2006 and 2007 for the groundwater elevations before pumping started for those years?
A Oh, I'm sorry. You're saying like in April, way before pumping? No, we did not.
Q You only have the pre-pumping yearly average number for 2004?
A Yeah. 2004 is a year when we have the complete water level monitoring prior to any pumping --
Q Okay.
A -- in the system.
Q Okay. Thank you. So would it be fair to say that you object to use of a model when the boundary conditions are

not met?
A I won't make a general statement like that. But I will -- as you heard me say, the model -- I objected to use of this model in this case as totally inappropriate.
Q So would it be fair to say that you feel it is inappropriate to assume that all the water pumped by a well actually comes from the surface flow of the river adjacent to the wells?
A In this case, that's exactly what I would say, because we're having a question of impact to the water levels of the river in order to relate the pumping impact to fish passage. And although the water in the aquifer is sourced from the river, in the global sense, you would say we're pumping river water. And in the legal sense when you combine underflow and river flow, the question here is about can I impact the surface flow of this river as it goes by the wells.
That way, the model -- the SDF model -- if you ask the question of a model who's only answer it can give is that the water comes directly from the surface flow adjacent to the wells, then no matter how many times you ask it that or move the well location or change the thickness of the colmation bed, it's going to give you the same answer. It's only going to bury it by the amount of time it takes for the percentage of water supplied to the

wells to all come from the river.
Q Mr. Horton, do you believe sometimes models can be useful in highlighting concepts that might have been ignored in an analysis?
A Yeah. In fact, I've been running groundwater flow models for 20 years. I use them for concepts. And I think this model highlights the concepts of how you cannot ignore special boundaries when you know they exist.
Q Okay. You consider the bedrock banks of the Creamery Meadow aquifer to be a no-flow boundary; correct?
A I consider the southern banks and the Franciscan rock to be a very effective no-flow barrier. And in terms of significance of flow, the terrace deposits would also be essentially no-flow boundaries, although they do transmit flow into the system as I've indicated and calculated of about .6 cfs.
Q When a well pumps in an unconfined aquifer where a large portion of the aquifer is a no-flow boundary, would the water that's being diverted come mostly from the side of the well that's towards the no-flow boundary or the side that's opposite the no-flow boundary?
A In this case, we have two no-flow boundaries, and we have effectively three recharge boundaries. We have the groundwater inflow on the upgradient side, the river where we're able to reverse the head such it becomes a recharge

boundary over a small section, and then the ocean side, which serves to prop up things and reflect tidal conditions and also acts as a recharge boundary. In those cases, I expect the cone of depression to expand until it reaches enough water that it fills the pumping demand.
Q Mr. Horton, have you ever used a model when the site conditions don't meet the model's boundary conditions?
A I don't know. We use models all the time to answer simple questions or deeper questions. That's -- the complexity of the question accelerates the amount of modeling and more specificity and assumption that you need to do.
Q So I'm imagining then if you ever used a model where the site conditions did not meet the boundary conditions, you would not have considered it inappropriate in that case?
A Again, it's all relative to the question being asked. The SDF model, if you want to ask a relative how long does it take this cone of depression to intersect the river if the river is supplying all the flow, it's an approximation of that.
Q Have you ever used a model on the ESR project where the site conditions didn't meet the model's boundary conditions?
A I'm not aware that I have.

Q You did though --
A Maybe you are.
Q You did re-analyze the Jones and Strokes pump test data using the Newman 1972 I believe type curves from unconfined aquifer where the well fully penetrates the aquifer; correct?
A Correct.
Q Okay. Would you consider those Newman-type curves a model?
A They are a model.
Q Did you consider the ESR well site conditions to be consistent with the Newman-type curve model boundary conditions?
A In terms of full penetration of the aquifer; is that what you're alluding?
Q I'm talking about the fact they -- for the Newman model, you have to consider an unconfined aquifer of infinite lateral extent?
A Yeah, all of your aquifer analysis equations assume those assumptions, which is why when you analyze the data we look at it from several different methods, and we arrive at hydraulic conductivity value that is in agreement, even though it was simplistic assumption.
MR. FERRARI: Can we put up ESR-4, PDF page 49.
BY MS. FERRARI:

Q I'd just like to highlight the third paragraph. Looks like the third to last sentence that says, "SGI re-evaluated the data for observation well JSA-3 and JSA-4 using the Newman type curves for a fully penetrating unconfined aquifer consistent with our evaluation of site hydrogeologic conditions;" is that correct?
A Yes.
Q Mr. Horton, didn't some of these same assumptions that you needed to use to be able to utilize this Newman model also apply to the SGI model -- sorry -- the SDF model?
A Yes, they do. But we're asking different questions.
Q Okay. Would you agree some of the assumption are the same?
A Yes.
Q Well, I'll just clarify. But you believe in the case of the Newman model that it was okay to use this model in this context?
A It is okay. We're using it to develop measurements of the conductivity of the aquifer materials and the responsiveness of the aquifer to pumping is completely appropriate in that case.
Q Can we look at your water balance model now? It would be your slide water balance for 2.9 cfs of pumping and also your water balance for the 5.8 cfs of pumping.
So when Dr. Harvey testified earlier about his

water balance model, his water balance model without pumping indicates the system is in balance. Do you agree with Dr. Harvey's water balance model in that the system is in balance before pumping begins?
A Yes.
Q Okay. Are the water balances that you are presenting consistent with Dr. Harvey's model?
A I believe so.
Q So these two water balances are for ESR's proposed irrigation season bypass flows when the upper USGS gage has a flow of 10 cfs; correct?
A I'm using the 10 cfs as the example.
Q So these two water balances are done for critically dry water years or are assumingly representing critically dry water years; correct?
A Yeah. I think so.
Q But it's also true that during critically dry water years the USGS gages is more often than not less than 10 cfs; correct?
A Definitely falls below 10 to -- we saw 6.3 I think in 2007.
Q So would that change that input number, that VT1?
A Correct. So at a low point of 6.3, that's seven in the upper right at VT1 would be reduced by 4.7 cfs -- sorry -- 3.7 cfs.

Q   Okay. So you present two scenarios for the water balance during pumping, one at the 2.9 cfs and one at the 5.8 cfs; correct?
A   Yes.
Q   Did you take measurements of the river flows and any of the river flow loses for these water balances at any time outside of the late August to early October 2007 period of testing?
A   Which ones specifically?
Q   Anything below VT1.
A   I believe in 2004 we do have flow measurements in the beginning of the season down near the lagoon mouth, as I've pointed to here.
Q   You don't have any other measurements outside of your August to early 2007 period of the river flows or the river flow losses?
A   I'm sorry. Of the 2006/2007. We focus those in the lowest flow time period so that we would have the best chance of detecting impacts to the river.
Q   Did you happen to calculate a water balance prior to beginning the irrigation season that is a water balance without pumping?
A   Yeah.
Q   Was it presented?
A   Well, you would simply look at this graph and make the

pumping water balance turn to zero and add that amount to the outflow.

Q Okay. So you simply add it to what was characterized as "D" by Dr. --

A Change in discharge or to discharge.

Q Do these water balances constitute -- or essentially are these water balances conceptual in that they constitute averages rather than values that have occurred together on one or more days?

A I think they're beyond conceptual. I remember we're talking about movement of water in the river, which of course happens very fast, and then the underflow. So you have a lag time for affects in the underflow system. When you have really quick responsive acts that occur, the aquifer sees sort of the average of those over time. So that's why we look at these averages.

Q So these numbers, though, they constitute averages?

A Correct. The average losses from the gage, the average losses above the zone of influence, and the average pumping rates. Or in this case, we're showing the maximum instantaneous rate from the proposed permit.

Q So the 8.3 cfs and the 5.3 cfs -- the 8.2 cfs and the 5.3 cfs outflows, they are the combined outflows for surface water and subterranean stream flow to the ocean?

A That's correct.

Q So are you saying in these models that the surface water flow in the zone of influence is always four cfs?
A No. I'm saying in this case 10 cfs at the gage.
Q So at 10 cfs to the gage, you'll always see four cfs in the river?
A That's an average.
MS. TEETERS: I'm going to interject an objection because it mischaracterizes his testimony.
MS. FERRARI: I'll ask him to explain.
DR. HANSON: This is average condition water balance.
BY MS. FERRARI:
Q You would expect to see -- if there is 10 cfs at the gage, you would expect to see an average of four cfs in the river?
A Of around there, yeah.
Q At any given year, it could be more or less than four cfs?
A Given day.
Q Given day. Okay.
Did you -- well, other than this water balance, did you measure or make a calculation of the outflow to the ocean separately for the surface flow and the sub-surface flow?
A No.

Q So essentially did you back calculate the value that was going to be discharging to the ocean in the subsurface? In other words, you knew the other values?
A I don't believe I presented a number for the flow to the ocean of subsurface.
Q Okay. So your water balance appears to have three major sources of inflow to the aquifer zone of influence. You've got the underflow from the upper portion of Creamery Meadow, which is the 3.5 cfs; is that correct?
A Up around VT1, yes.
Q You have the losses from the river between VT1 and Zone 5, which constitutes three cfs?
A Correct.
Q And then you've got the terrace deposits, which constitute .6 cfs?
A Correct.
Q And that totals 7.1 cfs approximately?
A Correct.
Q Of inflow?
A Correct.
Q So would the sum of all of these different inputs essentially be the "I" that you see in Dr. Harvey's model?
A Correct.
Q So both of these water balances show that the reach between VT1 and the Zone 5 lose three cfs as the

underlying water. Is this three cfs loss constant loss or does it vary?
A We've seen it vary a little bit.
Q Okay. So would you say this number constitutes an average too then?
A It definitely is the average from 2007 data --
Q The 2007 data.
A -- when we instrumented the river.
Q So some of the time this loss would be less and some of the time this loss would be more?
A That's safe to say.
Q At the 7.1 cfs of inflow to the zone of influence is a constant inflow though; correct?
A On average.
Q On average. Okay. So do you think this violates Dr. Harvey's model at all that the Data I has to equal zero?
A Delta I means change in the input.
Q I know.
A So the answer is no, it does not violate that.
BY MS. FERRARI: Can we pull up ESR-6, Table 3.3. It's PDF 96.
BY MS. FERRARI:
Q So this table shows you the net loss from VT1 to Zone 5 for 2004, 2006, 2007; correct?
MS. TEETERS: I'm sorry to interrupt. Could we

make an emergency restroom break at this point? I apologize for interrupting your flow but --

HEARING OFFICER DODUC: Let's do that. We'll give five minutes.

(Whereupon a recess was taken.)

HEARING OFFICER DODUC: Ms. Ferrari, do you have questions for Mr. Horton?

MS. FERRARI: Yes.

HEARING OFFICER DODUC: I don't believe Mr. Horton is Mr. Berliner's witness. Maybe we can continue because Ms. Teeters is here. Let's go ahead and continue, Ms. Ferrari.

BY MS. FERRARI:

Q So I believe I just pulled up this River Zone 2 through 4 diagram. And is it true that the values that you have in your water balance come from this 2007 column where you essentially added two-and-a-half cfs to the Big Sur gage and then modified the other numbers along that column?

A Pretty much.

Q So your Footnote 2 in this table says that the VT1 to Zone 5 losses in 2007 were calculated based on the difference from VT1 to VT3; correct?

A Correct.

Q In the years 2004, 2006, the loss listed is 1.3 cfs

and the upper USGS monthly averaged raged from 12.2 to 20.6; correct?
A Yep.
Q Okay. So the losses from the river to the aquifer between VT1 and Zone 5 with the flow in the river; correct?
A They definitely vary a little bit with measurement.
Q So would it be correct to say that this table shows that the rate of river loss from VT1 to Zone 5 goes up as the flow in the river goes down?
A Well, it was higher in 2007. And we measured it the same in '04 and '06 between the dry and the wet years.
When we looked at the losses there between the zones, it's tough to find a very strong correlation with any change.
Q Okay. So losses to the aquifer from VT1 to Zone 5 could increase above 3 cfs when the flow at the upper USGS gage is below 10 cfs; correct?
A I'm not certain about that.
Q Is it possible?
A Hold on a second. I need to look at the data.
So what I did see in 2007 was a range of 1.5 to over 4 cfs during that time period and then average of three.
Q Okay. So it went up as high as a little bit over

four?
A Yes.
Q So you may have to explain something to me, because I'm still a little confused about this concept. But so we know that this 3 cfs is subject to change. It's an average number. It can vary?
A Yes.
Q But the component of Dr. Harvey's water balance, the change in I, says it always equals zero. So if it is changing, if those inputs are changing, how does that relate to --
A His I in his equation is the groundwater underflow. And as we're seeing, it takes variable amounts of recharge up above, depending on the conditions. But what we've seen in the study area is that when it comes around that corner, we have very stable. In other words, our groundwater elevations near the pumping wells and if you come around there are the same, regardless of the year that we've been out there. That means that underflow of that aquifer remains full and becomes fully charged, even though we see daily changes in how those losses that change in R occurs in the reaches above the river. By the time we get down there, again, we're at the very end of the aquifer and we see stability.
Q So are you saying that the amount -- the groundwater

amount in the aquifer always stays constant?
A I'm saying that our groundwater flux as we approach the zone of influence is fairly constant, yeah.
Q So we're talking about this three cfs number then?
A Yeah.
Q I thought we just established that that number is variable though?
A That is an average. I'm talking on average the groundwater flux is constant.
Q So was Mr. Harvey's model anticipating that averages would be used? So essentially his change in I meant that the average input of water wouldn't change?
A Well, I can't say exactly what Dr. Harvey meant to do, but he presented a conceptual water balance diagram. So I think he would assume you're looking at average conditions.
Q But it is true a water balance is a function of specific numbers; right? In has to equal out?
A Correct.
Q So it's based on specific numbers?
A Yes.
Q Okay. Mr. Horton, you consider the ocean to be a recharge boundary; correct?
A It's an effective constant head boundary that.
Q Is that the same as a recharge boundary?

A Looks like a recharge boundary.
Q It looks like a recharge boundary, but it's not actually a recharge boundary?
A Can you refine that question I guess?
Q I guess I'm asking you, as a hydrologist, what you think a recharge boundary is and does the ocean qualify as one?
A Yeah. Well, if I could have my figure from my rebuttal slides with the water balance on there.
So as the zone of influence impacts the area of the lagoon, we have the ability to impact these groundwater levels under the lagoon, as well as we have the ocean that blocks flow and forces the flow up.
Now, as the tide comes up, in and out, it both pushes water back towards the wells and then recedes and these changes in storage, and then the supplemental changes in head condition here.
So what we have seen is those changes effectively make this underflow that would have been lost to the system available for pumping and reverse the gradient in the underflow towards the new wells. So in that regard, it becomes an effective recharge boundary, just like the inflow of groundwater is here.
Q Mr. Horton, maybe let me clarify something real quick before we go on with this line of questioning. You had

calculated, as we said before, the outflow as a combination of the surface flow and the subsurface flow; correct?
A Correct.
Q And then you have this 4 cfs in the river number. So I'm assuming that any -- well, I guess why don't we take a look at the water balance again. We had the 2.9 cfs pumping, and you have the 5.8 cfs water pumping balances. The difference appears to be simply from the outflow. So any addition in pumping above 2.9 cfs comes out of that outflow number; correct? In other words, 8.2 cfs is subtracted by 2.9, the amount of additional pumping?
A Yeah. So both the 2.9 and the 5.8 pumping effectively reduce total outflow by that amount.
Q Okay. So in your opinion, is that amount of pumping completely coming from the subsurface portion of the outflow, or does it also come from the surface flow portion?
A It's my opinion it's coming from both surface flow and underflow.
Q Do you have any idea the percentages attributed to each in your option?
A Yes. So in my report, I stated that across Zones 2 through 4 here we -- in 2007, we got up to 1.2 cfs loss out of surface flow. And that I would correlate to the

pumping.

And then if you look at -- we still have positive gradients of inflow here. And when we do -- I'm talking about the lagoon water area. We remain neutral or positive gradients in here. And the total flux we estimated across this part of the lagoon into the lagoon is on the order of a half a cfs going though the lagoon. So at some point, pumping -- because this is in the area of influence and does gather water from this direction in the underflow, it does reduce some of the inflow into the lagoon. We're talking about percentages of half a cfs or so.

Q So that four cfs in the river number doesn't stay constant?

A No.

Q So part of the pumping comes from that number?

A Correct.

Q So back to the concept of the ocean as a recharge boundary. It is a saline recharge boundary clearly, not a freshwater recharge boundary?

A Well, hydraulically, because it allows the wells and changes the gradients and it allows excess to freshwater in the underflow that would have flown out; therefore, it's effectively a recharge boundary for that water.

But as well as we've documented -- I'm pointing

to the older well. When the spring tide conditions are high enough -- and again, we have spring tide conditions every month. When it's in summertime, we have special alignment of the moon, current, and winds. But the spring tides here are higher than normal. And that's the months of June, July, and August. And that's during those months the old well when it's pumping and as the tide goes up and those conditions, we're able to pull and actually sample and add saline water to the water balance.
Q Mr. Horton, you have on your outflow this 5.3 cfs?
A Yes.
Q And we just talked about some of that comes from the surface portion -- or some that is surface and some is groundwater?
A Correct.
Q But you can't distinguish between which amount goes with which? You can't distinguish that number as to how much of the 5.3 cfs is coming down as outflow and surface flow of the river and outflow is coming through its subsurface?
A Yeah.
MS. TEETERS: I'm going to object. This question has been asked and answered about three times.
MR. HORTON: I can't split those apart. Again, it's a changing ratio based on not only the tide at the

moment but the average daily tide.

MS. FERRARI: Okay.

HEARING OFFICER DODUC: Let's move on, Ms. Ferrari.

BY MS. FERRARI:

Q So what I'm getting at I guess is that it does appear that given the fact that the inputs of water into the system are variable, you've got three cfs in the ground water that we talked about, you've got a four cfs number that apparently changes in some percentage -- that it is possible that not a whole lot of water is going to be exiting this aquifer in the subsurface stream; is that correct?

MS. TEETERS: Objection. Your hypothetical does not provide a complete picture of what this slide and what Mr. Horton's testimony has been.

HEARING OFFICER DODUC: Restate your question, Ms. Ferrari.

BY MS. FERRARI:

Q Is it possible that the outflow in the subsurface is actually quite small?

A Yeah, it's variable.

Q But it can be --

A Can be small.

Q Could it be nothing?

A I don't see it as being nothing, except momentarily possibly at the very peak of the higher spring tides.
Q And you have stated before that you don't believe that the pumping of the wells is the primary driver of moving the saline wedge; correct?
A That's correct.
Q Is that still your opinion?
A Yes.
Q But is it a significant factor in moving the saline wedge?
A Significant in what way?
Q Well, if it's removing all the outflow, essentially acts as the driver to push the saline wedge towards the ocean, if the majority of that outflow is being taken by the pumping, I imagine that that really allows the saline wedge to move inland?
A So we have constraints on how far the saline wedge can move based on the density relationships between saline water and freshwater and the depth to the bottom of this aquifer.
And so what happens as you move inland -- and I'm pointing to the mouth of the river. As we move inland from here, we have depths below ground of 100 feet to the bottom of the aquifer. And that rises quickly over until we get into this area where we're at depths to the bottom

of the aquifer on the order of 25 to 30 feet.

So there is a physical constraint on the bottom the aquifer whereby the saline wedge can move and then there is the ability to pull it up there. We know that we can sample it and partially pull it up to the old well. We have lots of historical data about that. We have a lot of the historical data for the Navy well. And when you do calculations on that slanting interface that you have seen in my cross sections, it would predict that the wedge would naturally extend beneath the lagoon in the groundwater system into this area and kind of rotate back and forth as the tides change the pressure head on it.

And we know that's actually true because of what kinds of salinity data they have historically for the Navy well there, which pump saltwater a lot of the time and always pump a little bit more salty water.

So when we do pump the old well, yes, we are able to move saline water up there and sample it. And as soon as we shut it off, it recedes and moves back to its natural position.

Because of the depth of the bottom and the fact this is all filled with freshwater all the way pushing this way, the physics of the situation say we can't get saline water to the new well location. And in fact, that well has stayed completely unimpacted by any electrical conductivity changes in all the data that we have and historically.

MS. TEETERS: Mr. Horton, could you -- during that recitation you just gave, could you tell me where exactly the natural --

HEARING OFFICER DODUC: Ms. Teeters, I'm sorry --

MS. TEETERS: Just to make a clear record. He was saying where "this" is located. I just want to make a clear record.

MR. HORTON: I'm sorry. I'm pointing to across the mouth sort of at the Navy well and onto this green buttress here, which is very hard Franciscan meta volcanic rocks, which is the reason we have this tight channel across here. It fluctuates right in this line between there based on -- and that's based on the data from this Navy well, the data we have on the depth to the bottom of the aquifer and actual geophysical measurements we did up the lagoon measuring the presence of that interface at depth using electrical conductivity geophysical methods in 2004.

So, but the other question I think it's been opined, the pumping can pull the saline wedge up so that it -- if I could go to my cross section slide. I guess it's up higher -- is that the lagoon is actually present here. And if we could pull this up such that saline water from our saline wedge can make it into the lagoon, and the answer is that does not happen. The saline impacts stay at the base lower parts of our aquifer, well beneath any surface water.

And again, this is because of the physics of the saline flow and the fact that we have continual groundwater in flux, that continual "I." And as long as the river is flowing in its bed, we will continue with this steady inflow of both -- of underflow. Because if the underflow was dry, the river would be drying up well above the locations of these pumping wells. If for some reason we could entirely stop the flow of the river and we kept pumping like crazy and we depleted all this incoming water from the right, we would get a chance where we could actually move the saline wedge up.

Q Thank you. Just one more question -- or maybe two more questions.

We had talked earlier about the concept of residual losses. And as shown in the transcript, you initially said that your studies didn't look at residual losses to the river. And then you subsequently have said that you did. Could you agree that residual losses to the river do occur as a result of pumping?

A For a very short time.

Q For a very short time.

Dr. Harvey testified yesterday that in a situation where pumping by El Sur Ranch occurs during June and July and most of August and there is a five-day break and pumping tests resume, it's very possible the residual losses from the earlier pumping probably hadn't subsided yet. Do you agree with that?

A No.

Q How long or -- I guess do you have any information that indicates that residual losses to the river from all that pumping has subsided?

A Yes. If you could go back up to my slide, Mr. Lindsay, with the drawdown and pumping rates.

MS. TEETERS: I believe it's slide four.

MR. HORTON: So in terms of residual losses from the river, that would require that drawdown underneath the river is sustained for a long period after I stopped pumping.

Now, I presented in my reports and in my testimony a lot of graphs showing both pedometer data under the river and monitoring wells between the pumping wells in the river, showing we get recoveries of the water levels after pumping in three to four days most of the time. And in fact, when you calculate the percentage of recovery we get, we get 90 percent of the water level recovery in the first 24 hours.

Now, what this graph here shows is the extended pumping period of 2004, again averaging 3.3 cfs peaks up to 6, with an average double well pumping rate of 5 cfs.

And we see the same time frame for responsiveness of the aquifer to reduction of pumping. Although, in this case, we see that responsiveness while we're still pumping. At levels of one cfs, we're getting recoveries almost back to original, depending on which wells we're pumping.

All I can say is my data collected are the three years, including this where I have the whole pumping season represented, they all say the same thing, that the responsiveness is on the order of a week, give or take depending on where you're looking and the seasonality.

Q Well, first of all, you don't have all of the groundwater elevation levels for all the years of pumping. I mean, the levels pre-pumping of all those years; is that correct?

A That's correct.

Q Secondly, this is groundwater elevation graph; correct?

A Correct.

Q Does this show the surface level of the river?

A No. But in order for me to have residual losses from the river, I have to have residual drawdowns in the

groundwater system underneath the river.
Q Isn't the concept of residual losses, however, that drawdown of the groundwater levels can stabilize, but losses to the river can still occur after that time?
A So now we're talking about before we turn off pumping?
Q No. We're talking about -- well, yeah, I guess they can occur during that time as well. Because as you said before, it's a function of time.
A Yeah. Thinking about how to answer this.
So the reason that we have losses from the river is because our groundwater drawdown underneath the river becomes such that the elevation -- if you put a well right there in the groundwater, the elevation is less than that of the surface water. So we get the driving head or again just water flowing downhill from top to bottom so it can go out the bed of the river.
So as soon as we stop pumping and we get rebound of the groundwater levels under the river, again they come back up. We remove that driving head just as fast as we recover the groundwater levels.
There are cases in river studies where you have big rivers and big river beds with thick zones of impedance. And within those zones of impedance, they take a long time to recover. So residual losses can be seen in those cases. That is not this case. In any case, when

you do have those residual losses, they can't exceed the losses that you had at the time of the pumping. Again, you have to have the driving force, which is the change in elevation or the change in the head, in hydrogeologist speak, across those two zones.

Q But you haven't demonstrated that on the surface level? You're talking about -- you're extrapolating from your groundwater drawdown data that that must be the case; is that correct?

A I know it must be the case.

MS. FERRARI: Okay. That's it.

HEARING OFFICER DODUC: Thank you, Ms. Ferrari. How much time do you need, Mr. Takei?

MR. TAKEI: About 20 minutes.

HEARING OFFICER DODUC: Okay. We'll do it in 20 minutes and then take a lunch break.

BY MR. TAKEI:

Q Dr. Hanson, I have some questions for you.

Mr. Lindsay if you could pull up the PowerPoint presentation from Dr. Hanson's testimony. I believe it was ESR-65. If you could go to slide seven. It should be the length/weight relationship table. I don't believe it's on the -- I think El Sur Ranch would have provided it to you today.

MR. BERLINER: It would be a PowerPoint.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Okay.

BY MR. TAKEI:

Q While that's Coming up, Dr. Hanson, I'm trying to understand the usefulness of this data that you provided in the chart. And I notice that the data presented for the upper riversheds doesn't state the time period when the data was taken. It doesn't state the flows for those rivers. So can you tell me what the length/weight relationships for the Big Sur has in common or not with any of the length/weight relationships from the other populations on the list?

A Certainly. The data that we used at deriving this particular table taken from McLaughlin, one of the commonalities is that these are all based on juvenile steelhead. So the species are the same for all of the relationships.

The second is that when the data were compiled by McLaughlin, they made a specific effort to try and exclude fish that were of hatchery origin. So we're comparing wild fish to wild fish, is our intent.

My purpose in putting this together was to provide some broader context for evaluating the results of Dr. Titus's length/weight relationships. The data that were reported by McLaughlin did not include specific information for each of these studies on the seasonal timing of when the data were collected, nor did it provide specific information on the instream flows that occurred, the water temperatures, or a number of other environmental variables, nor did it include extensive information on the methods that were used in collecting these fish.

But my purpose was to provide a broader more geographically robust set of information to simply put the information from the Big Sur River into this broader context.

Q I'm sorry. And the broader context is just -- I'm sorry. Could you just restate what you meant by the "broader context"?

A Sure. Let me just give you an example. We have data from Dr. Titus that was collected in June of 1994. It's shown on this table about the fifth line down. And during that survey, Dr. Titus reported that the slope of his length/weight relationship was 3.15. That number in and of itself didn't mean very much to me. What I wanted to do is say, well, how does that slope compare with the slope of juvenile steelhead length/weight relationships from a broader geographic area, as well as how does it compare within Dr. Titus's study from one time period to the next.

Now, in Dr. Titus's testimony, he primarily focused on comparisons within the Big Sur River as a function of the flows and the conditions that occurred during his studies. What I wanted to do is see how those length/weight relationships that he was reporting were reflected in length/weight relationships for juvenile steelhead from other watersheds. Are we in the top part of the range? Are we in the bottom part of the range? Does it show that there is something very abnormal about the length/weight relationships that were reported for the Big Sur River when compared to others.

Q Okay. Thank you.

Now, you mentioned that as a study of the juvenile steelhead -- or a lot of the data is from the juvenile steelhead. And maybe I'm just not understanding the terminology.

It's my understanding that as the relative number of smolts in a population sample increases compared to, say, adult fish, the slope would decrease. But that reference to smolts, does that include all juvenile steelhead or -- I guess I'm trying to understand is smolts the same thing what you mean by juvenile steelhead.

A Okay. I'm confused by your question. But let me as if I can help clarify it.

MR. BERLINER: I'm going to object. If the question is not clear to the witness, I prefer the witness answer questions that he understands.

MR. TAKEI: No. I understand.

BY MR. TAKEI:

Q Let me move on, actually.

If we go to slide number 8 in this PowerPoint, we have some data on temperature. And I notice that it starts in August 31st of '07. Did you have any data for 2007 prior to August?

A We did not.

Q Is it possible that the temperatures in, say, July of '07 would have been higher than what was reported in this chart?

A It's possible. We didn't measure during that time period. So I only restricted my analysis to the period of investigation starting in late August.

Q Would it surprise you that in the 2004 data from the SGI studies indicated that on July 12th, July 23rd, and September 2nd -- this would have been Exhibit 4 of ESR on the PDF page 150 -- indicated there were temperatures in excess of 68 degrees Fahrenheit. Would that surprise you at all?

A No. That could occur.

Q Okay. Thank you.

At the beginning of the testimony, you mentioned there was -- I believe it was a letter from United States

Department of Commerce, National Oceanic and Atmospheric Administration, the NMFS, National Marine Fisheries Service identified from the Board's files as 8896.2-1.

Now, this letter was drafted in 2005, so obviously they didn't have the benefit of all the subsequent studies prepared by the applicant's consultants. And it states in the letter on page 5 that the recommendation was based on maintaining habitat conditions in 2004. And then it goes analyzed page 3 of the letter under its old number four that NMFS characterized the water year as relatively normal.

So based on that, is it reasonable to conclude that their bypass flow that they state at the end doesn't address dry or critically dry years?

A It certainly reasonable based on the letter to assume that NMFS had the benefit of our 2004 studies, but did not have the benefit of the data collected in 2006 or 2007.

Part of the purpose of presenting the letter was to demonstrate that the National Marine Fisheries Service had had an opportunity to review our report from 2004 and had had an opportunity, as did CDF&G, to provide input to the study.

MR. TAKEI: Okay. Thank you. If you could turn to the second slide in the PowerPoint presentation.

BY MR. TAKEI:

Q I just want to clarify the testimony that we heard on this. And I may misstate it, so please correct me if I'm wrong.

I believe you were asked to look at both the Big Sur River and the Carmel River on this chart. And I don't know if it was in the question or the response that you said there was a common threat only to the other passage barriers and there was a common threat to recreational facilities. Was that a fair characterization of the exchange between you and Mr. Berliner?

A Yes. But the cells that are color coded in this table from the National Marine Fisheries Service, a number of the cells are white for the Big Sur River, as well as for the Carmel. But for those cells that were colored, there were two colored cells for the Big Sur that were also colored for the Carmel. And I was simply pointing out those two did occur.

Q So you aren't implying that there is a cell looking at groundwater extraction. So I just want to clarify. Were you implying that because it's red under the Carmel but blank under the Big Sur that there is no threat to the Big Sur or that --

A No, that's not my implication. My implication here is there has been a tendency in some of the dialogue that has occurred to draw inference from other river systems and apply it to the Big Sur. And that inference basically requires that you're comparing apples and apples. And systems are roughly comparable and roughly similar. So I'm not, in this comparison, saying that groundwater extraction on the Big Sur since it's white has absolutely no effect.

What I'm saying is that there are a number of other stressors in the magnitude of other stressors on the Carmel that would undermine drawing conclusions from the Carmel River and applying them directly to the Big Sur.

MR. TAKEI: Okay. Thank you. I don't have any further questions for you, doctor.

HEARING OFFICER DODUC: Thank you. I assume that concludes Fish and Game's cross of these rebuttal witnesses.

We'll take a half an hour lunch break. We'll resume at 12:35. And Mr. Lazar, I assume you will have cross.

MR. LAZAR: Yes.

(Whereupon a recess was taken at 12:05 PM)

AFTERNOON SESSION

12:45 PM

HEARING OFFICER DODUC: We had a luxurious lunch break of 40 minutes. If we can get witnesses up again.

I hope everyone brought your sleeping bags because, if necessary, we will be spending the night. Everyone in position?

Mr. Lazar, you may begin.

CROSS-EXAMINATION

MR. LAZAR: Thank you. Good afternoon.

Adam Lazar, staff attorney, Center for Biological Diversity, here on behalf of California Sportfishing Protection Alliance, Ventana Wilderness Alliance, and the Center for Biological Diversity.

My first question is for Mr. Philip.

Mr. Philip, could we take another look at your slide show presentation passage transect 4. I believe that's slide 4 of your slide show.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Slide four of the transect --

MS. TEETERS: It would be the third PowerPoint.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Okay.

--o0o--

BY MR. LAZAR:

Q Thank you.
And Mr. Philip, were you aware that on -- looks like you identified photo location C as being taken on July 4th, 2011, looking upstream?
A Correct.
Q Were you aware that on June 4th or 5th there was a major storm event in the Big Sur River?
A Yes, I was.
Q Were you aware there was 8.8 inches over 48 hours?
A Not specifically that figure, but it was a big storm event.
Q Were you aware it was enough flow to move the bridge from the parking lot to this point?
A And there it is.
Q And for the record, can you identify what it is you're saying "there it is"?
A I'm pointing to -- there is a couple boards and it looks like a support in the middle of the photograph.
MR. LAZAR: Can we next take a look at CSPA/CBD Exhibit 103, please?
SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Is that in the original exhibits?
MR. LAZAR: It is.
--o0o--
BY MR. LAZAR:

Q Look at Page 4. Now, this is Mr. Dettman's photograph --

Can you scroll down?

-- of the same location. Can you identify differences here between the photo that you just had up and the photo here?

It would be helpful if we could compare the two.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: No.

MS. TEETERS: I have to interpose an objection as to your meaning. It's vague as to your meaning of "difference."

HEARING OFFICER DODUC: Mr. Lazar.

BY MR. LAZAR:

Q Can you describe any differences you might see in the layout of the stream?

A To what --

Q This is rather difficult, because we don't have comparison here.

CHAIRPERSON HOPPIN: This isn't Hollywood.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: That's the best I can do.

MR. PHILIP: Just two basic differences. One, there seems to be a bit more water in the river. And certainly there's no bridge. There are no rock sculptures

in the foreground.
BY MR. LAZAR:
Q So you've identified the level of water there as different?
A A little, yep.
MR. LAZAR: And could we next take a look at CBD 102, please? And I want to look at page 16, please.
BY MR. LAZAR:
Q That there is Mr. Dettman's transect there. And can you see visually there -- can you see the transect there?
A Yeah, I can. There is -- you're referring to the tape that's stretching across the river?
Q That's correct.
A Yeah.
Q Now when you measure critical riffle that's from the shallowest portion of the transect or shallowest portion of the riffle?
A Yeah.
Q At the shallowest point?
A Yes.
Q And can you next look at your slide show presentation?
This would be slide number 3 of Mr. Philip's presentation.
SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: This one?

MR. LAZAR: Yes. Can you blow it up a few times?

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: It's in a PowerPoint. That's the best characterized really do.

BY MR. LAZAR:

Q It's difficult to tell, but can you see the red mark there to the right of the line there?

A Can you point it out?

Q I could, yes. Do you have a pointer?

A I'll take your word for it there's something there.

Q Perhaps if I show you your own exhibit.

MS. TEETERS: I'm going to object. It's not discernable in this photograph and I would --

HEARING OFFICER DODUC: Ms. Teeters, I can actually see it. I know it's hard for the witness to see it.

MR. PHILIP: He pointed it out to me.

HEARING OFFICER DODUC: It's right there.

BY MR. LAZAR:

Q Mr. Philip, were you aware this is where Mr. Dettman measured his critical riffle from?

A I wasn't. When you say that, are you referring to the red --

Q Yes.

A No, I didn't realize that was Mr. Dettman's.

Q Let the record indicate this tape is measured from where Mr. Dettman took his critical riffle measurement.

Is it possible that if one were to take the measure from that tape there as opposed to where you took yours that you would come to a different determination as to the depth there?

A Yeah, I would assume you would.

Q Thank you.

I have some questions for Mr. Hanson.

Mr. Hanson, you were referred to the National Marine Fisheries Service letter dated 2005 during your rebuttal testimony. Do you recall that?

A Yes, I do.

MR. LAZAR: Could we take a look at NMFS policy statement, please?

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Say again what you're looking for.

MR. LAZAR: I'm looking for policy statement of the National Marine Fisheries Service.

HEARING OFFICER DODUC: Mr. Lazar, are you referring to -- what are you referring to?

MR. LAZAR: I'm referring to the policy statement provided by NOAA beginning --

HEARING OFFICER DODUC: I need to remind you the policy statements are not evidence and cannot be considered as evidence.

MR. LAZAR: I see. Can they be used for persuasive affect otherwise?

HEARING OFFICER DODUC: No, Mr. Lazar.

BY MR. LAZAR:

Q Mr. Hanson, are you aware that in the policy statement provided for this hearing, although not submitted as evidence, that National Marine Fisheries Service rejected their conclusions regarding adequate flow in the 2006 letter?

HEARING OFFICER DODUC: I sense an objection coming.

MR. BERLINER: Yes, you do.

HEARING OFFICER DODUC: Sustained.

BY MR. LAZAR:

Q Mr. Hanson, did you place those transects yourself that we just saw in the testimony provided by Mr. Philip?

A I did not.

Q Thank you.

And earlier you testified regarding the relative abundance of steelhead in the Big Sur River versus the Carmel River. Do you recall that testimony on rebuttal just a moment ago?

MR. BERLINER: Objection. That misstates his testimony.

HEARING OFFICER DODUC: Sorry. Could you restate that? I didn't hear your objection, Mr. Berliner.

MR. BERLINER: I objected that misstates his testimony. He did not testify as to the relative abundance.

HEARING OFFICER DODUC: Please restate your question, Mr. Lazar.

BY MR. LAZAR:

Q Do you recall testifying on the comparison in steelhead between the Big Sur River and the Carmel River during your rebuttal testimony?

A No. I talked about the watershed area and the length of stream that was accessible to anadromy.

Q And what were your conclusions based on that?

A That the Carmel River watershed is substantially larger than the Big Sur River watershed and that the stream miles of anadromy are approximately ten to one between the Big Sur River and the Carmel.

Q And did you conclude -- did you make a conclusion regarding the relative abundance of steelhead then?

A No specific conclusion, other than having more stream available, offering more habitat opportunities would very likely result in greater abundance of steelhead within a given watershed.

Q Would that affect density?

A It could.
Q Is it also possible that it would not affect density?
A It would depend on the habitat that was accessible and how the steelhead population responded to that habitat. It could go either way.
Q It could go either way. Thank you.

Could we take another look at DFG Exhibit 11, please?

--o0o--

BY MR. LAZAR:
Q We were just looking at this with Dr. Hanson a minute ago. Do you recall testifying on this slide, Dr. Hanson?
A Yes, I do.
Q And what were your conclusions regarding the flow versus the drift diversity?
A My conclusion was that the drift density is occurring on a seasonal basis in response to factors in addition to flow, such as the life cycle of the macroinvertebrate inhabiting the watershed.
Q Is this solid line here the flow you've identified?
A The solid line that you're pointing out is the flow.
Q Is the flow. And do you see any spikes identified here in this curve in terms of flow? Do you see any spikes in flow identified in that curve?
A I don't, but that curve is based -- as it says in the

title -- on mean monthly flow. I wouldn't necessarily expect to see much in the way of a spike.

Q I see. Could we take a look at the -- which water body is this for?

A This is for Scott and Soquel Creeks.

Q Okay. And then what is the flow here? This is an average flow of the two?

A No. It's the legend that says it's from the USGS gaging station 11160000 on Soquel Creek.

MR. LAZAR: Mr. Lindsay, we take a look at the USGS gage for that period there in the rebuttal slides?

--o0o--

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: This is in your slides?

MR. LAZAR: No. Rebuttal cross.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: The slides you provided me before?

MR. LAZAR: Yeah.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: There they are.

MR. LAZAR: Let's look at --

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Looks like it might be that one. It's August 30th, 2007. No. Let me pull up your disk and make sure they all transferred.

MR. LAZAR: May I have a moment to locate the slide we're trying to find?

HEARING OFFICER DODUC: The clock has been stopped.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: The one?

MR. LAZAR: Yeah.

BY MR. LAZAR:

Q Now, Dr. Hanson, when we're looking at -- can we go back to Exhibit 11, please?

Now let's look for a moment here at the period here with the curve. This being June, July, August, September, October, November, December. And here is the flow. Now let's take a look at the USGS.

Now, Dr. Hanson, can you see these spikes here? I see one, two, three, four, five.

A There are spikes.

Q And can you identify what those spikes are in, based on the legend provided here?

A The blue on this USGS gaging staging record is the daily mean discharge.

Q Let's go back to the graph that you just provided for DFG-11. Are those spikes there reflected in the curve?

A Those are average monthly and the other were average daily.

Q So is it possible that the spikes could have influenced the drift density?
A It's possible.
Q Thank you.
Let's take a look at the table that you've created that shows all of the different length/wave relationships. I believe that's on page -- this is in Dr. Hanson's slide show, page 7.

--o0o--

BY MR. LAZAR:
Q Now, I just want to clarify, Dr. Hanson, I see here that you've put the contributing agency and the month. Can you verify for me -- where it says Big Sur River, does that say June/July and then August/September?
A Are you referring to the two lines that are Titus.
Q I am, yes.
A Yes. Those are two of the data points.
Q Now, from this, is there an indication of what season these other rivers are being surveyed in?
A No.
Q So is it possible that the results of this survey could vary based on what season the other rivers were measured in?
A They could.
Q Thank you.

I'd like to take a look at ESR-34. And actually can we go back to my -- can we go back to my PowerPoint -- excuse me -- my slides. Can we look at the steelhead threat assessment, please? Thank you.

--o0o--

BY MR. LAZAR:

Q This is a color version of what we were just looking at. Does that seem to match up with ESR-34? Can we look at ESR-34 really quickly? Do they seem to match up, Dr. Hanson?

A They do.

MR. LAZAR: Can we go to the color one, please. Can we scroll down, please. Scroll down a few pages. It's going to be page 7. That's good.

--o0o--

BY MR. LAZAR:

Q And can you read what Table 1 says here. Can you read that off to me?

A It says, "Table 1: Assessment of overall habitat conditions for steelhead in component watersheds in the South Central California Coast Steelhead Recovery Planning Area between two CAP workbook analysis."

Q Thank you.

MR. LAZAR: And could we go to page 9 now, two down.

--o0o--

BY MR. LAZAR:

Q Can you read what it says here for the key?

A Says, "key: dark green equal very good condition; light green equal good conditions; yellow equal fair conditions; red equal poor conditions."

MR. LAZAR: Let's go to page 8.

--o0o--

BY MR. LAZAR:

Q And can you identify the colors next to where it says "Big Sur River"?

A The Big Sur River on the left-hand column is green, lighter green. And on the right hand column is yellow.

Q Thank you. Scroll up again, please.

And then read off what those different columns mean there under "habitat steelhead."

A The left-hand column was presumably developed by Hunt and Associates and the right hand column by Kier Associates.

MR. LAZAR: Thank you. I have no further questions for Dr. Hanson.

DR. HANSON: One point of clarification, if I might.

MR. LAZAR: I don't have any more questions, but I think I'm just going to go onto Dr. Horton -- or Mr.

Horton --

MS. TEETERS: I'd like to object. If Dr. Horton has additional testimony in completing his question, he should be allowed to do so.

HEARING OFFICER DODUC: I'll allow it.

MR. HANSON: Just as we were discussing, the flow in Soquel Creek, I just wanted to make a point that in the graph that was presented by Fish and Game on the macroinvertebrates, it included drift macroinvertebrates for both Soquel and Scott Creek. So our discussions was relative to only that one creek, not both.

BY MR. LAZAR:

Q That would be accurate. However, your flow requirements were just from Soquel Creek; correct? The flow on that DFG-supplied graph?

A Correct.

Q Thank you.

BY MR. LAZAR: (Mr. Horton)

Q Mr. Horton, can we take a look at your slide show, please?

Actually, I should ask Mr. Lindsay. Take a look at your slide show. And I'm specifically interested in the graph that shows your water balance at 2.9 CFS pumping.

--o0o--

BY MR. LAZAR:
Q Mr. Horton, can you identify here the outer boundary of your zone of influence?
A Here, upgradient, it extends this direction.
MS. TEETERS: Upgradient of what? Could you --
MR. HORTON: Sorry. Upgradient of the new well, so to the east in the aquifer. Then extends across over towards the mouth of the river.
BY MR. LAZAR:
Q Does it extend into the lagoon?
A Extends underneath the lagoon, yes.
Q So that black line there is the zone of influence as it leaves the -- okay. I understand. Thank you.
And is this 2004 data or 2006 data?
A This is based on 2006 data from a period when we pumped the new well, we were able to pump it at the highest possible rate.
Q This is based on 2006 data. But did you measure the outflow in 2006?
MS. TEETERS: I'm going to object. I'm not sure what you mean by "this" is based. Are you talking about zone of influence or the slide itself?
HEARING OFFICER DODUC: Clarify, Mr. Lazar.
BY MR. LAZAR:
Q I believe I'm asking about the different figures

provided in this chart here. You just said it was based on 2006 data.

A Yeah. So the properties of the aquifer don't change from the study years in relationship to how it responds to pumping.

Q So the measurements up here, the 2.9 cfs, the .6 cfs, the 4.0 cfs, the 6.5 cfs, these are all based on 2006 measurements?

A No.

Q No?

A No. This is a water balance example that represents sort of summation of a lot of different data. The 2.9 cfs in the pumping rate represents the average pumping rate that El Sur Ranch has been conducting over its history as defined by Dr. Neal Allen in his testimony to represent the average condition we've seen there.

The flows in the river we're looking at the ten cfs at USGS gage. And then with these transfers -- I'm pointing to the transfers of surface water groundwater here and losses from the gage. We're looking at the average condition we measured in 2007, sort of the worst-case year.

Q This is a mishmash then?

MS. TEETERS: Could you repeat your question?

MR. LAZAR: This is a mishmash of different years.

MS. TEETERS: Objection, argumentative and misstates what the slide represents.

BY MR. LAZAR:

Q Is a mixture of data from different years?

A It's a complex of data.

Q Thank you.

And how did you set the boundary in Creamery Meadow?

A So you're referring to zone of influence in this part that I've drawn across the Creamery Meadow --

Q Yes.

A -- is based on the projection of draw downs seen in monitoring wells that surround the pumping wells.

Q The radius drawn appears to be a perfect circle; is that accurate?

A It's a radius off the new well.

Q How did you determine that the zone boundary would be a perfect circle?

A Well, as it responds to pumping, our cone of depression moves out radially from the pumping well. As it encounters boundaries, it moves on up.

Q So are you saying that actual zone of influence will always be a perfect circle?

A No. Clearly, it can't in this case, because we have

boundaries that cut off the circle on this side of the well and over here. So technically, if we had an infinite aquifer, they would be within our zone of influence but they're not.
Q I see. But the portion in Creamery Meadow you have drawn as a portion as part of a perfect circle?
A Yes. This is the idealized theoretical zone of influence. And it's based on data primarily that comes from monitoring wells in this area. And I consider it to be a conservative or sort of a larger-than-expected zone of influence, because we do have the river condition in between us and the well.
Q Now, did you take groundwater measurements in Creamery Meadow?
A No, I did not.
Q So how can you be assured without taking groundwater measurements in Creamery Meadow what the zone of influence is?
A Well, because I have enough measurements of the shape of the drawdown cone in this section of the aquifer.
Q But you don't --
MS. TEETERS: By "this section of the aquifer," can you explain what you're talking about, Mr. Horton?
MR. HORTON: I'm talking about the area that's surrounds the new and old well where we have eleven or so

monitoring wells.
BY MR. LAZAR:
Q   But again you did not take groundwater measurements in this zone of influence?
A   I took a lot of measurements in the zone of influence --
Q   Excuse me. In the Creamery Meadow.
A   Specifically within Creamery Meadow, but on the right side of the bank of the river and Peizometers underneath the river on the Creamery Meadow side as well.
Q   Thank you.
Can we take a look at ESR-2, please?
--o0o--
MR. LAZAR: And I'd like to look at page 60.
--o0o--
BY MR. LAZAR:
Q   Now, Mr. Horton, do you see this deepened trough in the bedrock here parallel to the river?
A   That is not the trough. This is the trough right here. This contour represents the trough. This is simply a slope leading down to the tough.
Q   Can you point out for me the tough?
A   I'm pointing to the -30 contour line which moves up the valley and swings back around and comes out. This represents the deepest port of the subsurface channel that

existed in ancient time when the river was carving the bedrock as opposed to filling it up.
Q Now, the trough you've identified flows through Creamery Meadow?
A That's correct.
Q And then where does it intersect the river?
A It intersects the river in about the Zone 4. What I would call Zone 4 here.
Q Given the underlying topography of bedrock here, is it reasonable to use or assume theoretical circle of zone of influence?
A Yeah. Yes.
Q I thought you just pointed out that there is an underground trough here that appears to flow in a particular direction?
A Yeah, but in an unconfined aquifer system, groundwater is induced to flow due to the change in head conditions, which occur at the top of the aquifer. We actually have free flow on that groundwater surface. Until our drawdown got down to a level where we start to change the thickness of this wetted aquifer, the wells don't really care.
Q Okay. And then I'd like to affirm -- let's go back to the water balance 2.9 cfs pumping slide, please.
Now, I'd just like to affirm that in the losing reach here, the infiltration below VT1 and upstream of the

zone of influence as you've drawn it is 3 cfs?
A   Correct. I've got 3 cfs based on our 2007 data.
Q   And this infiltrating water mixes with the 3.5 cfs groundwater component?
A   Correct. It's added to that.
Q   At the head of the Creamery Meadow?
A   Throughout this area.
Q   Now I'm curious about the infiltrating water in the losing reach. Does it flow into the zone of influence?
A   Certainly does.
Q   So this means it becomes a portion of the pump water?
A   Yes, it does.
Q   How are you sure if it does, considering we don't have measurements in Creamery Meadow?
A   There is nowhere else for it to go.
Q   Now referring to the schematic that you -- this is two slides later. Is it your contention that pumping from the old well makes up for all of the difference in production from 2.9 cfs?
A   I'm not sure I understand the question.
Q   Referring to this schematic here, is the difference between this schematic and the previous one that this one contains pumping from the old well?
A   Primarily, yeah.
Q   According to the schematics, at Delta R below VT1 and

groundwater flow remain the same with increased pumping; correct?
A Ask me that again.
Q According to the schematics, Delta R below VT1 and the groundwater flow remain the same even with increased pumping?
A So you're referring to the changes in exchange with the river and the groundwater system?
Q Correct.
A Are they the same as with and without pumping?
Q With increased pumping is what I asked.
A The answer is no.
Q They do not remain the same with increased pumping?
A Correct.
Q What happens with the increased pumping?
A Well, based on our measurements in Zone 2 through 4, we start to supply more and more water on a ratio of .3 cfs per cfs pumped. As you increase your total pumping rate, those losses would go up.
Q But if no measurements were made around Creamery Meadow, how can you be sure that groundwater elevations in the area around the zone of influence at 2.9 cfs remain unchanged when total pumping was increased to 5.8 cfs?
A Well, in comparison between pumping 2.9 cfs and 5.8 cfs, our groundwater drawdowns do not remain unchanged.

We do get more drawdown where the cones of influence or zone -- cones of depression in these wells overlap.
Q Isn't that evidence that groundwater is declining throughout the pump test period?
A You just reach a new steady state of drawdown in response to the increased pumping.
Q I see.
Let's take a look at ESR-6, please. And I'd like to look at page 59.

--o0o--

BY MR. LAZAR:
Q Did you see where -- can you scroll down just a little bit? One click maybe?
Do you see approximately September 23rd to October 5th the change in groundwater elevation there?
A Are you talking about the both well pumping period?
Q That's correct.
A Yeah.
Q And can you see approximately what the change in ground elevation is there?
A Well, what I see is a trend in groundwater elevation that was falling in response to rainfall events in the system before we started pumping.
Q Doesn't say any particular measurements there, or does it?

A In terms of the elevation? So we see a steady trend from almost the week before pumping of 10.6 elevation falling down to 10.3 by the end of the pumping period.
Q And once again, since you did not measure groundwater in Creamery Meadow, isn't it possible that the reduction in groundwater elevation here and the infiltration from the river is indicative that water upstream of the zone of influence is making its way into the zone of influence?
A Yes, it is. Totally agree that the water is discharging from the stream above the zone of influence is entering the flow and eventually pumped by the wells.
Q Thank you.
I'd like to ask a few questions about the lagoon closure figures.
In your 2007 figures, are you aware that the lagoon closed and opened when the flow at USGS gage was 6.3?
A I believe that's what I showed.
Q So the flow at the USGS gage remained the same -- so the flow at the USGS gage remained the same, but increased from .5 cfs to 3.4 cfs at the lowest El Sur Ranch monitoring station; is that correct?
A Can you slow that down and try again?
Q Sure. We were discussing earlier the opening and closing of the lagoon and --

A Just the numbers and where they go to.
Q Sure. The lagoon closed and opened when flow at USGS gage was 6.3. The flow at the USGS gage remained the same, but increased at the lowest El Sur Ranch monitoring station from .5 cfs to 3.4 cfs.
A Over that time period.
Q Correct. And when the lagoon opened again on September 12th, were both pumps off?
A Let me check.

HEARING OFFICER DODUC: While he's checking, Mr. Lazar, how much additional time do you expect to need?

MR. LAZAR: I probably need at five minutes.

HEARING OFFICER DODUC: Okay. Thank you.

MR. HORTON: What I'm showing is, in 2007, the sand bar closed at around noon on September 3rd. The gage was flowing at about 6.3 cfs. It reopened at 7 cfs at the gage. During that time, the pumps were pumping approximately 3 cfs when it opened.

BY MR. LAZAR:
Q And when the lagoon opened on September 12th, one of the pumps was actually on?
A It was on both when it closed and when it opened. So looks like we were pumping just less than one cfs when the lagoon closed and about 3 cfs when it opened.
Q What other factors can be involved in the closing?

A What factors occur in the closing?
Q Uh-huh.
A Well, I'm aware the factors are, of course, the tidal condition of the moment.
Q I'm sorry. Let me just clarify. When you say "tidal conditions," you mean the wave height?
A Well, wave height and average daily tide, combined with weather conditions, the amount wind across the Pacific as it blows up on here and has a very, very long fetch, as well as the season. And then, of course, usually the onset of a storm and the low pressure system coming over.
Q So could the closure be associated with high waves?
A Definitely.
Q And what about high tide cycle?
A Combination.
Q And what factors do you see involved in the opening?
A Variable. Clearly, what we saw was it opened in response to a high flow event, a spike in surface flow caused by a rainfall event. And then secondarily we saw it open just as the lagoon outflow ate its way through the closure.
Q So the period of wave activity?
A I haven't looked at it. I'd have to refresh my memory on the tidal condition when it opened specifically. It

was 4:00 a.m. in the morning, I believe, based on our transducers.
Q What about tidal exchange would that impact the opening?
A Tidal exchange.
Q What about a narrow tidal exchange?
A I'm not sure what you mean by that.
Q The hourly -- the difference in the hourly wave height.
A Yeah. I mean, I think we do get conditions of wave over watch which occur even when the lagoon is incorporated closed or closed and I think that could occur and also it will precipitate opening of the lagoon.
Q Thank you.
Now, we've heard Dr. Dettman -- excuse me -- Mr. Dettman and Dr. Titus testify on the importance of maintaining a hydraulic surface connection or a channel between the lagoon and the ocean. Are you familiar with that testimony?
A I heard them testify, and I heard them testify that most of the river naturally get closed in the summertime.
Q Now, referring your to figure water balance 2.9 pumping slide, in your slide show schematic, you've outlined here how pumping of 2.9 cfs reduces outflow to 8.2 cfs at the mouth.

A Correct. That's mass balance in average case.
Q I notice several small arrows along the west side edge of the lagoon. Does this signify surface outflow?
A I'm pointing to the western edge. Exactly.
Q And the arrows to the right, are they the surface flow or subsurface flow?
A Those represent subsurface flow to the right.
Q These arrows to the right appear to be much larger than the arrows for the surface flow. Are you testifying the subsurface flow is greater than surface flow?
A I'm not. That's an unintended artifact there.
Q In other words, the size of the arrows is not actually a measure?
A No. I didn't intend that.
Q Can you roughly estimate the relative side of subsurface and surface flows?

MS. TEETERS: I'm going to object. This question has been asked and answered four times.

HEARING OFFICER DODUC: Let's make this the final time.

MR. HORTON: You said a word there right before, "brashley" estimate? What did you say?

BY MR. LAZAR:
Q I said roughly.
A Can I roughly estimate? Well, we know it's on the

order of a couple cfs differentials, at least.
Q So your conclusion is that surface flow is a large fraction of the total?
MS. TEETERS: Objection. Mischaracterizes the evidence or the testimony.
HEARING OFFICER DODUC: Rephrase your question, Mr. Lazar.
BY MR. LAZAR:
Q Did you just characterize surface flow as being a large fraction of the total?
A The reason is it's very difficult to separate them out because they do change with respect to each other quite a bit. And as well as pumping, because as I said, the pumping makes use of that outflow. So you've got overlapping conditions of both pumping tides up and down. And that does change the exchange of underflow into the lagoon, out of the lagoon, and out of the mouth, combined with the dimension of the mouth and the river flow. So we combine them there because they're fluid and sort of changing.
Q Now, in 2004, how many measurements of lagoon outflow did you make to justify this conclusion?
A Which part of the conclusion that --
Q Your measurements of lagoon outflow. How many times did you measure that in 2004?

A I think around six times. Five or six.
Q Were these the only times you measured surface outflow in 2004?
A Correct. For the lagoon or the lagoon mouth, yes.
Q Now let's take a look at ESR-22, please.
HEARING OFFICER DODUC: How much additional time do you need?
MR. LAZAR: Probably three minutes.
--o0o--
MR. LAZAR: Can we look at page 52, please?
--o0o--
BY MR. LAZAR:
Q Now, what was the outflow on July 1st-- July 3rd, the first dot there?
MS. TEETERS: Objection. I'm not sure what the question is according to this slide. According to --
MR. LAZAR: My question here is, what is the stream flow on July 3rd according to this slide.
HEARING OFFICER DODUC: July 3rd is not shown on this slide.
MR. LAZAR: Excuse me.
BY MR. LAZAR:
Q What is the measurement shown where it says July '04.
A So I'm looking at a graph by Hanson Environmental with stream flow on the left and time on the bottom axis. It

appears to be around 10 cfs in early July '04.
Q And then the next two dots?
A Coming down around seven-and-a-half, seven.
Q And the lagoon outflow ranged from 8 to 10 cfs during July when you measured it?
A Are you telling me or asking me?
Q I'm asking.
A Of 2004?
Q Yes.
A I'm going to have to look that up. I can remember a lot, but not everything.
Okay. July 2004, your question is, again?
Q When you measured the lagoon outflow in July 2004, what was the cfs range?
A So on the 23rd of July, flowing out about 8 cfs.
Q Thank you.
Now if we go to the PDF we were just looking at, page 51, previous page, can you scroll down? Thank you. This is estimated -- I'm going to read you what the figure says. "Estimated stream flow at transect VT1 upstream reference location." What was the VT1 flow here for July, the first dot in July?
A Just above ten.
Q And the next one?
A About nine, eight-and-a-half.

Q And then towards the end of July?
A Seven-and-a-half.
Q So on the days when you measured the surface outflow, it was eight to ten cfs or around eight you said, which is within plus or minus two cfs of the surface flow? Question.
A I'm not sure -- are we relating back to the average water balance?
Q So when you just told me the lagoon outflow in July of 2004, you said it was at eight cfs.
A Correct.
Q And now we've just looked at two different flow measurements, which appear to range between 7.5 and 10 cfs.
A Up at VT1, yeah.
Q So on the days when you measured surface outflow, it was around eight cfs and within plus or minus two cfs of the surface flow?
A Yep. Yeah. Right about -- actually, on the 23rd, 10.3 cfs at VT1 and eight cfs at the mouth of the river.
Q So your six measurements of surface outflow in July 2004 were around eight cfs, which is very close to your balanced estimate on your schematic here of 8.2 cfs total outflow. So that matches up.
But I thought you testified the subsurface

outflow was higher than the surface or at least a large fraction of the total. From the data, it appears that the reverse is true. Which is it?

MS. TEETERS: I'm going to object. It mischaracterizes Mr. Horton's testimony.

HEARING OFFICER DODUC: Mr. Lazar, would you like to restate the question without characterizing previous testimony?

BY MR. LAZAR:

Q From the schematic you provided, you list the outflow at 8.2 cfs. Now, in the graphs we just looked at here, you reported to us that the readings are between 7.5 and 10 cfs.

A Well, I can answer your question.

Q Let me try to rephrase my question.

So the outflow appears to match up with the measurements you took or that were taken by Hanson in July of 2004; is that accurate?

A Well, the Hanson measurements are based on the same measurements I have. And you're looking at one data point in a data set.

And if I could have my Exhibit ESR-4, Table 3-1 one put, Mr. Lindsay, I could answer this question more fully.

--o0o--

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: What page is it on?

MR. HORTON: In the table section, which would be near the back of the report. You're too far back. That was showing the State Park's opening river and digging trench. It would be just following the figures.

MR. TAKEI: Try 120.

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Thank you.

MR. HORTON: So if you try 170 or something. Keep going. 180. There it is.

Okay. So this is a summary of the 2004 river flow data we collected. And this was spot data. We did not have constant reading river flow gages transducers set during that study, as compared to 2006 and 2007 when we measured continuously.

Show on the table, the USGS gage flow and calculated river flow at Velocity Transect 1, 2, and 3; 3 being, in this study -- just to confuse you guys -- the gage that was at the mouth of the river literally right across the channel before it meets the ocean.

Velocity Transect 2 was up around the P4-U location. And Velocity Transect 1 is also in the same general area.

We only have these six measurements at Velocity

Transect 3 at the mouth of the ocean. And this was because of the lagoon closure during that period of time. So there was no surface outflow.

In July, Mr. Lazar has picked out the one anomalous data point in this data set where we have 10.2 cfs flowing at VT1 and 8 cfs going out Transect 3.

In the subsequent four measurements here, we show an increase in flow compared to VT1 to VT3 in every case. In the very next case, from 8.87 to 10.10 -- actual, 8.7 to 9.1. We see these increases.

And this just highlights the fact that degree of exchange of how much goes out of subflow and how much goes out as river flow as the aquifer approaches the mouth is depending on these conditions, one of them being the aggregate average daily tide and what's happening with storm condition. And, clearly, we had a storm coming in that closed the lagoon at that time.

BY MR. LAZAR:

Q Mr. Horton, if I understand you correctly, you're saying that there is no rule of thumb in terms of if more is going out surface or subsurface?

A I'm not saying that exactly. I'm saying that changes depending on when you exactly look. On an average basis, I'm sure there is a good ratio there.

Q What is that ratio?

A I don't know.
Q You don't know the ratio?
MS. TEETERS: That is now the sixth time that that question has been asked and answered.
HEARING OFFICER DODUC: I'm sure it's been more than six.
MS. TEETERS: I'm sure.
--o0o--
BY MR. LAZAR:
Q Now referring to your figure for the 5.8 cfs water balance, if increased pumping reduces outflow by 2.9 cfs, wouldn't this reduce the surface flow first, considering that your measurements in 2004 show that the surface flow account for the outflow?
A Are we going to pull up those slides? I can refer to one of my rebuttal slides here.
HEARING OFFICER DODUC: You're getting close to an hour on your cross, Mr. Lazar.
MR. HORTON: If I could go to the hydrograph of P1-1S. There, we have number 13. So does the pumping that's capturing this underflow reduce some of the surface flow outflow through the mouth of the lagoon. Is that the correct question we're talking about?
--o0o--
BY MR. LAZAR:

Q If increased pumping reduces outflow, wouldn't this reduce the surface flow first, considering your measurements in 2004 show that the surface flow accounts for the outflow?

A So what we're looking at here is the vertical gradient between the underflow and the surface water in the lagoon through the pumping season in 2007.

And I'm showing across we have a neutral gradient that makes exchange in the river and the underflow is equal, and then a positive gradient for most of the period. So -- and we don't have a big correlation of pumping with a change in this gradient with any kind of significance.

So, at the most, what it's doing here is partially reducing the amount of groundwater inflow during this time period that goes into the lagoon and then would subsequently leave as surface flow. But it's suggesting that most of the water being made up in the pumping wells is capturing that underflow that would otherwise be traveling out some flow never seen by us in the river.

Q Now let's consider the closure of the lagoon in 2004. As I look at your figure in 2004, lagoon closure, it's the next slide actually in Mr. Horton's preparation.

It closed the morning of August 26th with the USGS gage rating of 12 cfs. This is within the flow range

that Mr. Dettman identified as normally associated with maintaining open condition, but less than the bypass flows he recommended for keeping the lagoon open. Is that your understanding of his testimony and recommendations?
A I really did not memorize his testimony. So if you say so.
Q So if the lagoon closed, as happened in 2004, wouldn't a reduction of pumping here increase it in surface inflow?
A Increase in surface inflow?
Q Increase the filling of the lagoon. Let's rephrase that.
A Well, in order to do that, we would need to be substantially impact the hydraulic head condition that exists in the lagoon area itself that I'm pointing to here. And through our transducer monitoring data, as I reported, we're not able to draw down or substantially impact the surface water elevation of the lagoon. In fact, it's controlled by the average daily tide and when the lagoon is well connected by the tide at the moment.

So in order to actually impact the amount of surface flow such that it creates a difference here at the mouth, we have to remove enough such that this elevation is changed. Otherwise, there's no change in dynamic with the interface of the ocean.
Q I understand. Thank you.

No further questions.

HEARING OFFICER DODUC: Thank you, Mr. Lazar.

Mr. Johnson, do you have cross?

MR. JOHNSON: I didn't bring a sleeping bag, so I'm going to decline.

HEARING OFFICER DODUC: Thank you, Mr. Johnson.

And Mr. LeNeve is not here today. So I believe that concludes the rebuttal from El Sur Ranch.

Sorry. Exhibits before you all leave. Would you like to move your exhibits into evidence?

MS. TEETERS: Yes, we would like to move Exhibits ESR-55 through ESR-65 into evidence.

HEARING OFFICER DODUC: Any objections?

Not hearing any, the exhibits have been moved.

(Whereupon the above-referenced exhibits were received into evidence.)

HEARING OFFICER DODUC: Mr. Lazar, in your cross, you also had some documents. Were those already part of the record?

MR. LAZAR: The USGS study for Soquel Creek was not part of the record previously. We're pleased to introduce it as an exhibit now or at the time of your convenience.

HEARING OFFICER DODUC: Let's go ahead and do it now. Give it a number, Mr. Murphey.

STAFF GEOLOGIST MURPHEY: Next one would be CSPA/CBD-106.

MR. LAZAR: We already have exhibits submitted with those numbers corresponding to them. Could we make it 112, please? I believe

HEARING OFFICER DODUC: Any other exhibits, Mr. Lazar as part of your cross?

MR. LAZAR: No, Madam Chairperson.

HEARING OFFICER DODUC: Any objection to moving that exhibit?

Hearing none, that exhibit has been moved into evidence.

(Whereupon the above-referenced document was marked for identification and received into evidence.)

HEARING OFFICER DODUC: Let us take a break and resume at 2:00. And we'll begin with the Department of Fish and Game rebuttal.

(Whereupon a recess was taken.)

HEARING OFFICER DODUC: Ms. Ferrari, your rebuttal witnesses. And just one, Ms. Ferrari?

MS. FERRARI: Yes.

HEARING OFFICER DODUC: Thank you. We'll start you off at ten and see how it goes.

MS. FERRARI: We will actually make it in ten, I believe.

HEARING OFFICER DODUC: Excellent. That sleeping bag threat always works.

DIRECT EXAMINATION

BY MS. FERRARI:

Q Dr. Titus, you previously took the oath in this proceeding, I believe, on June 16th, the first day of the hearing?

A Yes.

Q Dr. Titus, did you review the stream transect data produced by El Sur Ranch?

A Yes, I did.

Q Did you determine that any of the data sets had the potential for use in a wetted perimeter analysis?

A Initially, I didn't. But with further review, I discovered that some of the data were -- may work for a wetted perimeter analysis.

Q Okay. What specifically changed your opinion that led you to conclude that now El Sur's data was sufficient for a wetted perimeter analysis?

A Well, initially, I looked at the individual year reports. And typically the data for any given year were collected within such a narrow range of flows that they wouldn't really bring out the wetted perimeter discharge relationship. But after the proceedings of the first two days of hearing, I thought maybe I should go back and look and see whether or not I could put together a data set from my combining data across years. And from that, I was able to find one data set that appeared to work.

Q Okay. Thank you.

Dr. Titus, the data that you used, to your knowledge, it wasn't collected for the purpose of conducting a wetted perimeter analysis, was it?

A Initially, no.

Q Do you think that affects the reliability of the data in any way or affects your conclusions?

A No. Not at all. I mean, we collected those data for the original purpose with the same degree of accuracy and same level of precision that we would have for a wetted perimeter analysis.

Q And so you believe that the data collected by El Sur Ranch was likely as reliable as well?

A Yes, I think so.

Q Can you explain why the data for the years 2004 and 2006 for VT1 were sufficient to approximate a wetted perimeter?

A Well, again, they were sufficient because -- primarily because they spanned a broad enough range of flows that they could bring out the wetted perimeter discharge relationship, whereas -- and all of the data that I would need for that were reported in the reports. There may be some other data with El Sur Ranch that weren't in the reports that might also be useful for a wetted perimeter analysis if they were available.

Q Dr. Titus, if it's okay with you going forward, we'll refer to this new -- or the wetted perimeter analysis that uses El Sur Ranch's data as the new wetted perimeter analysis. And the previous wetted perimeter analysis that uses your data will be referred to as the original wetted perimeter analysis.

A Okay.

Q Can you please tell me about any similarities or differences between the new wetted perimeter analysis and the original wetted perimeter analysis?

A The new and the old wetted perimeter analysis are similar in that I used the same basic procedure to develop the wetted parameter discharge relationships in both analysis and use wetted width and the mean depth data, along the same -- along with the same basic equation in both cases to calculate a wetted perimeter measurement at various flow levels.

I then plotted the resulted wetted perimeter measurements against the corresponding flows to geographically depict the relationship between the two parameters.

The one primary difference between the new and the original wetted perimeter analysis is that the new analysis uses data from a single fixed transect location, while the original analysis used data from ten fixed habitat units, but utilizing width and depth measurements from five transects within each habitat unit.

And while the latter represents an adaptation of the basic method to available data, the primary difference really is the spatial scale for which the wetted perimeter discharge relationship is being developed, in the new analysis, it describes the relationship for a single fixed transect location, while the original analysis describes the relationship for several habitat units in the stream for eventual application on a river reach scale.

Beyond that, identification and interpretation of break point and incipient isotopic flows or second break point flows from the wetted perimeter curves was identical in both analyses.

And while it may be argued that the original analysis may have been improved by using fixed transect locations within each habitat unit, a sound sampling design of systematically selecting transects during each measurement occasion should yield a statistically very similar result as would be produced by using fixed transects.

Another difference between the two analyses is that the flow measurements were made on site at VT1 that go along with each wetted perimeter measurement. So while the original analysis relied entirely on stream flow data from the USGA gage, the new analysis had both flows measured on site at VT1 in addition to the USGS gage flows. I guess those measurements could be compared.

Q Thank you.

Dr. Titus, is the general morphology at VT1 similar to the morphology in the habitat units analyzed in the original wetted perimeter?

A Yes. In fact, they look very similar. It appears that they could have come from the same analysis.

In both case, the relationship shows steep increase in wetted perimeter at flows less than 10 cfs, followed by a well-defined initial break point and then another more gradual increase in wetted perimeter leading up to asymptote. This pattern reflected the highly rectangular channel morphology in both cases in both analyses. This result suggests that basic channel morphology of the river through the Andrew Molera State Park reach has not changed significantly over the last 20 years. Thus, speaking to the continued relevance of the original wetted perimeter analysis.

Q Dr. Titus, is the incipient asymptotic flow identified

in the new analysis similar to that identified in the original analysis?
A Yeah. It's also very similar. The incipient asymptotic or second break point flow was reached at 18 cfs based on flow measured at VT1 and at 20 cfs based on flow at the USGS gage. The mean incipient asymptotic flow identified in the original wetted perimeter analysis was 17 cfs. So they were in the same ballpark.
Q So is the new wetted perimeter analysis a more valid and reliable assessment than the original wetted perimeter preliminary analysis to inform development of a minimum bypass flow?
A No. In my opinion, they're both valid and reliable for the questions that address. The one aspect of both analysis that bolsters my confidence and results that they produce is the repeatability of wetted perimeter measurements at very similar flows at both VT1 and at the habitat units in the original analysis.
While it's perhaps intuitive that wetted perimeter measurements made at a single fixed transect location should be very similar at very similar flows, the fact that there were two in the original analysis as they average of five transect measurements in a given habitat unit also speaks to the reliability of those measurements.
Q Using the results from the new wetted perimeter

analysis, can you conclude that a 10 cfs bypass flow is sufficient to ensure adequate rearing habitat conditions for juvenile steelhead during low flow conditions?

A No. Not per the criteria that that department stated in the original wetted perimeter analysis, that is of maintaining the fully wetted channel to provide or maintain food production and juvenile steelhead rearing habitat at minimum level.

Q Based on the results of the new wetted perimeter analysis, what minimum bypass flow for juvenile steelhead rearing would be recommended?

A I would recommend a realized flow following diversions of between 18 to 20 cfs. And that result is then consistent with the 17 cfs that came out of the original wetted perimeter analysis and the 15 to 20 cfs recommendation by Mr. Dettman.

MS. FERRERI: Okay. Thank you.

HEARING OFFICER DODUC: Thank you, Ms. Ferrari.

Any questions?

Who will be doing cross for El Sur Ranch? Mr. Berliner. I'll warn you ahead of time, since we're talking about only one witness, I'm going to be quite firm about the 30 minutes for cross.

CROSS-EXAMINATION

BY MR. BERLINER:

Q Good afternoon, Dr. Titus.
A Good afternoon.
Q I want to make sure I understood you correctly. And if I don't get this right, please correct me.
A Okay.
Q Did you say that the data collected for VT1 was as reliable as the data that you collected for your analysis?
A I think they're comparable. Beyond knowing more detail about exactly how transect tapes were laid out across the stream and measurements or readings were made off of them, I would say they are likely comparable.
Q So the critique of your analysis by Dr. Riser might apply equally to the critique of the transect that was taken by Mr. Philip?
A In what respect?
Q Well, as to whether it was done from the same spot each time and the reliability of data collection.
A I think the main point is is that Dr. Riser was focusing on what's the use of single fixed transect locations. And in that respect, the data at VT1 are more like what he was describing.
Q Were you here earlier when Mr. Philip testified?
A Yes, I was.
Q Did you hear him testify that he did not take them from the same transect location?

A Yes.
Q So since they're not taken from the same transect location, don't they have the same problem?
A What's the problem?
Q They weren't taken from the same spot?
A I'm not convinced that's a problem.
Q Okay. If that's not a problem, then we agree he didn't take his, we'll just have to deal with that I guess another way.
A Well, I'm not answering the question relative to Mr. Philip's testimony. But with respect to VT1 versus the measurements we made in our original wetted perimeter analysis, after a thorough analysis of the data, I'm not convinced there is a problem that way. In fact, to the contrary.
Q In the wetted perimeter analysis as you characterize it -- I loathly characterize it for that, because that was not a purpose of Mr. Philip taking those measurements, which apparently you agree with; right? He did not take it for purposes of doing the wetted perimeter analysis?
A The measurements that he made at the critical riffle or the --
Q The VT1.
A Oh, VT1. Yes. I assume that's the case.
Q You provided us with some information last Friday that

compared your wetted perimeter calculations for using measurements that Mr. Philip took. And on October 14th of '04 at a -- are you familiar with that information that you provided last Friday?

A No.

Q It's a Table 1 titled "Wetted Perimeter Data Collected on the Big Sur River during 2004 and a 2007 and Associated Flow Measured on Site at VT1 and at USGS Gage 11143000"?

MS. FERRARI: Can you please clarify that you're talking about our rebuttal testimony exhibit.

MR. BERLINER: Yes, I am.

DR. TITUS: Okay. That looks familiar.

HEARING OFFICER DODUC: You're asking about the rebuttal, not the direct testimony?

MR. BERLINER: The rebuttal.

BY MR. BERLINER:

Q If I can direct you to the October 14th, '04, date. On October 14th, there was a flow of 9.8 cfs. Do you see that?

A Yes.

Q And that's the measured flow at VT1; right?

A Okay.

Q And the measured flow at USGS gage was 10.0?

A Right.

Q And that yielded a wetted perimeter by your

calculations of 36.2 feet; correct?
A Right.
Q And then if you go a year later to October 12th of '06, you have to double the flow to 18.38. Do you see that?
A Yes, I do.
Q And you get a wetted perimeter of 42 feet. Do you see that?
A Okay.
Q So that's a difference of six feet; correct?
A It is.
Q And do you recall Dr. Riser's testimony last week where he indicated that a "step" of this amount he would not consider sufficient to be a break point?
A I don't recall that specifically.
Q Okay. If I were to -- you don't recall his testimony at all on that point?
A No. I remember several parts of it.
Q No. I mean on that specific point.
A No, I don't.
Q Do you consider a difference of the six feet to be significant enough to justify a second break point?
A In terms of what it does on the overall shape of the curve, certainly.
Q You do. I have no other questions.

A Okay. Thank you.

HEARING OFFICER DODUC: Thank you, Mr. Berliner.

Mr. Lazar, do you wish to cross-examine? No.

Mr. Johnson?

MR. JOHNSON: No.

HEARING OFFICER DODUC: Thank you very much.

Mr. Lazar, please bring your rebuttal witnesses up?

I'm sorry. Was there something else? Oh, exhibits.

MS. FERRARI: Yes, sorry. We'd like to mark Dr. Titus's rebuttal testimony DFG-T-25. And we request that be accepted into the record.

HEARING OFFICER DODUC: Any objections?

Not seeing any, those are accepted.

(Whereupon the above-referenced document was marked for identification and admitted into evidence.)

MR. LAZAR: Mr. Lindsay, one minor point of clarification. I misidentified the numbering of the exhibit that I submitted on rebuttal -- excuse me -- cross on rebuttal. It should be CSPD-CBD-113.

HEARING OFFICER DODUC: Okay. You may begin, Mr. Lazar.

DIRECT EXAMINATION

BY MR. LAZAR:
Q   Good afternoon. Adam Lazar, staff attorney, Center for Biological Diversity here on behalf of Ventana Wilderness Alliance, Center for Biological Diversity, and California Sportfishing Protection Alliance.
I have with me today Mr. Chris Shutes and Mr. Dave Dettman.
Mr. Shutes, I'd like to ask you some questions first.
A   Very well.
Q   Mr. Shutes, in your direct testimony, you highlighted uncertainty in the setting of protected bypass flows. What are some of the uncertainties that you identified?
A   These include the size of upstream diversions, protection of riffles based on minimum bypass flows, protection of the lagoon, and some others.
Q   And do you consider these to remain factual disputes?
A   I think that there has been contested discussions of the latter two. And certainly the size of upstream diversion is factually disputable.
Q   How do the different parties in the proceeding address uncertainty in their scientific approaches to minimum bypass flows?
A   Underlying the differences between the experts for the applicant on the one hand and the experts for DFG and the

experts for CBD on the other hand and CSPA is a fundamental disagreement about how the science should be used in setting stream flow requirements of the Big Sur River. The applicant scientists and attorneys would like the State Board to set flows that are based on proven direct causation of adverse impacts to biota and their habitat, require minimum bypass flows would allow diversion in flows greater than flows to show a direct proven impact.

The DFG and CSPA-CDB scientists and attorneys maintain the public trust responsibility responsibilities of the State Board who require a minimum flows that allow no diversions where it is reasonably likely that the flows have fallen below a level that are protective of the overall aquatic ecosystem and its key biota.

Q Mr. Shutes, allow me to read you the following section from Dr. Hanson's testimony.

"Taking into account the natural variation in flows within the river, the effect of well operations on river flows could not be detected statistically during the critically low flows in 2007. Based on the small change in water surface elevation estimated by SGI in 2008, it was concluded that a change of this magnitude would not result in a detectable adverse impact on the quality or availability of habitat for juvenile steelhead within the lower river and the lagoon."

That's from section six. Did you identify any inconsistencies in Dr. Hanson's conclusion?

A Yes. There was several. Dr. Hanson takes the findings of a hydrogeologist and offers an expert opinion as a biologist based on the findings of a hydrogeologist.

On the other hand, it's worth noting in cross-examination Mr. Custis was asked whether he was a fisheries biologist, and when he said no, the flow of testimony was not allowed.

Mr. Hanson's testimony incorporates hydrogeology conclusions, but his testimony was not disallowed because of this. Therefore, there appears to be a double standard between accepting conclusions by the applicant's experts and those of the CDFG's.

In my opinion, the problem with Dr. Hanson's testimony above is not that he's not a hydrogeologist. Biologists are often comfortable in analyzing data outside of related to their particular specialties.

The first problem with this particular testimony or a first problem is that the assumed small change in surface flows may not be accurate. And the second problem is that Dr. Hanson uses so many qualifiers and other confusing uses of language and his testimony doesn't provide confidence in the conclusions.

For example, in several places, Dr. Hanson uses the passive voice. And this linguistic construction avoids stating who detected or didn't detect what. And because the passive voice is used it is also not clear who performed statistical analysis or what that analysis was.

Dr. Hanson does not establish that well operations do not have affects on surface flows. Dr. Hanson does not say that there was no change in surface flows from well operations during critically low flows in 2007. He says, "The effect of well operations on river flows could not be statistically detected."

There are several problems, including a number of unspoken assumptions in these conclusions. First, the small change in water surface elevation found by another consultant may not accurately represent the effects of the applicant's diversions. He says that any change caused by diversions would not be detectable, but we don't know how that determination would be made or by whom.

We agree that -- we don't necessarily agree on what an adverse impact to steelhead habitat is. And the lack of a detectable adverse impact on the quality of available habitat -- or availability of habitat means that conditions for fish in the Big Sur River -- there is an assumption that that means that they will not be made worse -- those conditions will not be made worse by the applicant's diversions.

In other words, Dr. Hanson, by using the passive voice and by running together a number of different concepts, is very hard to understand what exactly he's saying or whether if one of the conditional statements in his testimony were changed whether that would make an effect on the overall consequences of what he's saying.

HEARING OFFICER DODUC: Before you continue, Mr. Lazar, Mr. Berliner, did you --

MR. BERLINER: No.

HEARING OFFICER DODUC: Okay.

BY MR. LAZAR:

Q Mr. Shutes, the applicant appears to suggest that as proposed bypass flows are supported by the EIR. Did you find any language regarding bypass flows in the EIR?

A I did. First, one of the State Board's oral witnesses said that the purview of the EIR -- it was beyond the purview of the EIR to set minimum bypass flows. And this opinion is consistent with the response to comments of the final EIR, which states on page 3-29, "little is known about the relationship between the flow of the USGS gage and flow entering through the ZOI during high flow events, flows greater than the top 20 cfs. However, the relationship for dry season flows is not linear. The DIR does not set a bypass flow requirement, and it is not

within the scope of the EIR to set pass flow requirement.
Q Thank you, Mr. Shutes.
Now finally, you observed the applicant as provided for a 1.8 cfs buffer between the gage and the point of division and its recommended bypass flows. Have you observed any potential complicating factors in establishing this 1.8 cfs as a protective buffer?
A This was the buffer that I understood Dr. Hanson to refer to on cross-examination. However, there have been demonstrated dry season losses to surface flow between the Big Sur River and the lower river that are greater than 1.8 cfs, and it is not known whether those are attributable to natural losses, diversions, or other factors.
Therefore, even if one were to accept the 8.2 cfs figure as sufficient to protect steelhead in the Big Sur River, that would not always be sufficient to have a protective bypass flow if the bypass flow were established at 10 cfs at the upper Big Sur gage.
Q Thank you, Mr. Shutes.
MR. LAZAR: I have some questions for Mr. Dettman now.
BY MR. LAZAR:
Q Mr. Dettman, Dr. Hanson testified regarding the suitability of habitat in the Big Sur River for steelhead

and to the health of the river's steelhead population. Did you have a chance to review Dr. Hanson's conclusions?

A Yes, I did. Dr. Hanson concluded that the lagoon and the reach they studied provides suitable rearing habitat for juvenile steelhead over the late spring, summer, and fall periods. And this is outlined in his ESR-21, paragraph six.

Q Mr. Dettman, did Dr. Hanson base this conclusion on his 2004 and 2007 studies?

A Yes, in part. Dr. Hanson based this conclusion on the studies they did in 2004 and 2007 to document the abundance of steelhead in the study area and provide a population abundance data based on those observations and counts of steelhead in the lower one mile of stream.

Q Do you have any problems or concerns with Dr. Hanson's conclusion that the Big Sur River steelhead population was healthy, robust, and successful?

A Yes. While it may be true that some individual fish reared in this reach successfully and also within the zone of influence, a conclusion about the whether the population is healthy, robust, or successful really should consider whether the population density is high enough to support a returning population of adult fish. And by what we mean here is sufficient production has to be large enough to have large numbers of juvenile fish and those

juvenile fish need to be large in size.
Q Did you find any data used in Dr. Hanson's study that suggests lower numbers in density?
A Yes. If you could put up the Exhibits CSPA-106.
Q This is part of our rebuttal exhibits, Mr. Lindsay. I believe it's under CBD rebuttal testimony.
A It would be the first slide that's not the introduction.

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MR. DETTMAN: This lists -- the table lists the summary of the abundance data collected by Hanson in 2004 and 07 organized for the purpose of addressing population density and abundance. Hanson's data for 2004 and '07 shows a low density of steelhead in the lagoon averaging .5 fish per linear food of stream channel and a total of 280 fish.
Q 280 fish. Is that a lower or high number?
A A total of 280 fish may seem impressive, but lagoons and other portions of this part of California produce significantly more steelhead than this. A nearby example would be from the Carmel River lagoon, which there's several measurements. I can only find one here of a population estimate done in 1996, which was 3500 fish in October.
Q We just heard a moment ago that the Carmel River is a

lot bigger. Are these differences explained by just the mere size of the river?

A In part, yes. Yes, they are. How I think the densities in abundance in the Carmel River in 1996 were probably lower than they could be. But I also think that the density and abundance in the Big Sur River could be much larger than that was measured by Dr. Hanson.

In the lower river, Dr. Hanson found juvenile steelhead in most reaches with an average abundance of two to 37 fish per fish reach. When expressed in the population density fashion, this works out to an average of .02 fish per linear foot in 2007 and .026 in October of 2004, indicating there was little difference between the years. Most important here is the general scarcity of fish in the years.

Q Scarcity of fish. Did you compare Big Sur's juvenile steelhead population density with other streams in the area?

A Yes. For comparative purposes, could you put up the following slide?

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MR. DETTMAN: This illustrates the juvenile population density in the lower Big Sur River and nearby Carmel River where population surveys have been conducted systematically at reference stations since 1990.

In general, the population density in the lower Carmel River average .7 fish per linear foot and range from .31 to 1.76 during the '93 to 2010 period.

By comparison in specific years, the 1994 population in the lower Big Sur River averaged .12. This was data from Dr. Titus, compared to .33 in the Carmel River. And in 2004, the comparison was .023 to .5 in the Carmel and 2007 is .026 compared to .33 in the Carmel River.

Q And what conclusions regarding the size of the population can be drawn from this comparison?

A Well, all of the data is limited. This comparison indicates that the juvenile populations in the Big Sur are about an order of magnitude lower than they are in the Carmel River. Juvenile population densities in this range should be characterized as critically low and more indicative of an endangered population rather than a threatened one.

In summary, the critical low numbers of juvenile fish observed by Hanson in 2004 and '07 call into question the suitability of rearing habitats in the lower Big Sur River and highlight the need really to fully evaluate the effect of flow on habitat quantity and quality before adopting a final set of bypass requirements.

Q Now, just to clarify, you said that the comparison

indicates the juvenile population levels in the Big Sur River were an order of magnitude lower than the Big Sur River. Were you referring to population densities?
A Population density. That's correct.
Q Thank you. Let's talk about stream flow. Is stream flow an important measure of steelhead habitat?
A Yes. Stream flow is an important controlling factor in the maintenance of steelhead habitats. It sets the boundaries on depths, stream widths, how fast the water moves, and influences other important factors, such as dissolved oxygen, water temperature, streambed composition through flood events, and sediment transport, and the macrobenthic invertebrates.
Q What is the relationship between stage and stream flow?
A Stage and stream flow is a curved linear line. Usually, it's a power function.
Q What do you mean curved linear line?
A It's not a straight line. It describes how stream flow changes in relation to the vertical distance or depth of reference, so to speak. And usually is measured from a non-reference location, but sometimes from an arbitrary benchmark.
Typically, the relationship is plotted on the log paper where its becomes a straight line. And this rating

is usually developed after several measurements of discharge in stage at a range of flows so that other discharges can be estimated by interpolation between the stage measurements.

Q So as an aquatic biologist, if you're trying to judge the effects of the diversion on steelhead, then determining the relationship between stage and stream flow is important?

A Yes, because it allows you to estimate discharge at a point in time other than when the measurements were taken. And this is very important in understanding the relationships.

It also can be used to estimate stage changes in the water surface elevation and discharge over time if a permanent record is kept of the stage. This is a major function of the US geological survey, and they maintain over 9,000 realtime gages and over 25,000 sites nationwide. Two of those realtime gages are on the Big Sur River.

Q So do you have professional experience to determine relationship between stage and stream flow?

A Yes. I've measured stage and discharge on many occasion and developed relationships for the data that I've collected as well as the data from other folks.

Q And did Dr. Hanson use the measurements of stage from

Dr. Horton's reports to determine stream flow?
A I'm not sure. But I believe Dr. Hanson uses stream flow estimates and stage measurements to evaluate passage flows and the habitat conditions for steelhead based on Mr. Horton's data.
Q How did Dr. Hanson use the hydrogeologist's measures of changes in elevation to determine the impact of steelhead habitat?
A Hanson has asserted that the operation of the wells do not significantly affected the water surface elevations in the Big Sur River during pumping and use these measurements of stage changes to estimate the effect of the pumping on stream flow.
On the basis of the constrained pumping scenarios that were evident in 2007, Mr. Horton estimated that the pumping of El Sur's wells reduce the river flow at VT3 by .4 cfs. And we heard this is equivalent to A theoretical reduction of .04 feet in the stage height of the river.
In contrast, Dr. Hanson indirectly estimated river stage changes up to .09 feet by measuring the depths and then calculating depth changes during pump tests.
Q What do you mean by "indirectly estimated"?
A I mean he determined the difference between mean depths across the channel from the transect data and then used these calculation as an indirect estimate of the

stage change at a specific location.
Q That was a calculation made by Dr. Hanson?
A I believe it was.
Q What did you conclude based on his calculations?
A Based on this information, it's reasonable to assume the actual stage changes in the river would range from .04 to .09 feet under similar test conditions as were carried out during 2007. And the changes were vary from one location to another depending upon flow, depth, water velocity, and the channel shape, gradient and streambed curve.
Q And did you try to find other data to corroborate your assessment?
A Yes. To develop a better understanding of how stage and discharge were related, I contacted the USGS office in Marina, California and asked them about the rating curve for the lower gage that was just being developed. In a phone conversation on June 8th --

MS. TEETERS: Objection.

HEARING OFFICER DODUC: Ms. Teeters.

MS. TEETERS: We're going to object to the use of this data or material that Mr. Dettman learned from the his phone conversation with Mr. West from the USGS as hearsay.

HEARING OFFICER DODUC: Mr. Lazar, the

significance of this?

MR. LAZAR: I think that under the rules of the Water Board that the hearsay evidence may be admitted subject to the condition of probity.

HEARING OFFICER DODUC: I asked -- yes, thank you. I'm aware of that.

What I asked you for is the linkage, the relevance of this information. Make the linkage of this. Why the show of proof of the relevancy of the data?

MR. LAZAR: I thought it was a hearsay objection.

MS. TEETERS: And actually, we're also objecting on the basis that Mr. Dettman is not a hydrogeologist or a hydrologist.

HEARING OFFICER DODUC: Thank you, Ms. Teeters.

Yes, the objection is a hearsay objection. And I would allow it if I find relevancy in its merit. So --

MR. LAZAR: Okay. Mr. Dettman is attempting to demonstrate the contrast using the USGS gaging of the difference in stage and stream flow.

HEARING OFFICER DODUC: I'll allow it.

MR. LAZAR: Thank you.

Could we see the next slide, please?

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BY MR. LAZAR:

Q Mr. Dettman, can you explain what this is?

A   Can I finish basically what I started?
Q   I apologize. Please do.
A   In a phone conversation on June 8th, they provided me with the break points for the first rating curve. And this is provisional data.
     I don't consider it hearsay necessarily. It's data that was transmitted to me over the phone. Not much different than the internet.
     And I used this data to provide a plot, which is the plot that's on the screen now. I then constructed a log-log function for the lower portion of the stage discharge relationship as shown here by the -- what appears to be green, although it might be blue on some folks' eyes. Basically, the lower portion or leg of the graph.
     I then used this information to estimate the effect of incrementally changing the stage by .04 feet, what affect that would have on stream flows below 20 cubic feet per second.
Q   And so you charted the effects here?
A   Yes. The simulation -- and this is a relatively simple one -- is listed in the following table, CBD 109, the next chart. This shows this incremental changes of .04 feet at the gauging station and the flow reductions that occur based upon the rating curve provided by the

USGS.

And basically with every .04 feet of stage change at that location, the stream flow changes by about 45 percent. While this simulation is an approximation, it serves to illustrate that even small changes in stream elevation can have substantial reductions in stream flow, depending upon the location and habitat. And this is particularly important at the lower flows where this effect is magnified because of the shape of the curve.

This finding highlights the need to fully evaluate the affects of flow on habitat prior to setting any final bypass requirements.

Q Thank you, Mr. Dettman.

Now, El Sur appears to base these bypass flows on juvenile steelhead passage. Is that your understanding?

A El Sur appears to have based the bypass flows on juvenile steelhead passage.

Q Are these -- is juvenile steelhead passage the only criteria to evaluate the quality of habitat for steelhead?

A No. Juvenile passage is not a sufficient criteria really to judge the overall quality of rearing habitat for young steelhead.

Q Why would Dr. Hanson use fish passage as a criteria or even a proxy? Earlier today, we heard something about a one-to-one relationship between riffles and pools, for example. Why would that fail to provide a good measure to quality of the overall habitat?

A Hanson used the depth criterion of .3 feet over 25 percent of the cross channel or the stream channel as a basis for recommending flows to maintain juvenile rearing habitat in the lower Big Sur River. This is pointed out in paragraph 24 of Exhibit ESR-21. And that's on page 15.

While this step criteria may be appropriate for recommending minimum flows for the physical passage of fish between habitat units, it's not appropriate for developing or recommending minimum flows to maintain the suitable conditions in the entire stream.

Q Why is that?

A This is because the quality of rearing habitat is a complex function of several other flow-related variables, including water velocity, sand, and silk concentrations on the streambed, the size of the substrate on the bottom of the stream typically bolder and habitat produces a lot more fish in the sand habitat. The stream's width, the degree of shading over the stream, the amount of overhead cover, the overhanging vegetation, and in-stream cover which includes small and large woody debris.

Recommendation for all of the rearing habitat in the river should be based not simply on the question of what the depth across a very narrow portion of the riffle might be, but a more thorough evaluation of all these important factors. And this will result in recommendations that will be sufficient for maintaining habitat in the riffles as well as the other portions of the stream.

Q Thank you.

Now Dr. Hanson also testified on the adult steelhead run in the Big Sur River?

A I believe that Dr. Hanson testified on the timing of the adult run early on in his testimony and characterized the movement of kelts as occurring immediately after spawning, with the completion of downstream migration by April or May.

Q Did Dr. Hanson's testimony suggest that flow for adult migration is not needed in summer months?

A Yes. I think based on his testimony I believe there may be an impression that flow for adult migration downstream is not needed later than May. While no real systematic data has been collected on the Big Sur River, we do have anecdotal information that there's been no systematic study of this. There is historical data from Waddell Creek that indicates that flows may be needed much later than May.

If we could have the following figure.

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MR. DETTMAN: This is the data collected by Shapovala and Taft in 1933 to '42. And what it really shows is basically histogram by periods of the numbers of adults that they counted moving downstream.

And although most adults had completed their downstream migration by late May, approximately 25 percent of the total numbers that they sample and found moving downstream moved downstream later in the year and through the end of the year.

So based on the previous testimony of Dr. Titus and Dr. Hanson's, small numbers of steelhead have been observed in the Big Sur River during the late spring through fall months. This leads me to form an opinion that maintaining habitats for adult steelhead in the Big Sur River during the late spring, summer, and fall months is important, and that State Board should consider flow and habitat needs for adult kelts when setting bypass flow requirements.

BY MR. LAZAR:

Q Thank you Mr. Dettman.

Now Mr. Dettman, Dr. Hanson testified extensively about dissolved oxygen levels in the Big Sur River. Why is dissolved oxygen level an important indicator of the suitability of steelhead habitat?

A Steelhead are relatively active fish with high metabolic rates. And they need high concentrations of oxygen basically to swim, feed, and grow to a large size. This is especially true in streams along this part of the coast, and the Big Sur River is no exception where water temperatures tend to be on the warm or relatively high side, as compared to British Columbia, for example.

Q And do you have experience in analyzing DO levels in rivers for habitat suitability?

A Yes, I've analyzed DO in most streams I've worked on, especially where those water temperatures may be high during the summertime or where there is a risk of having dissolved oxygen levels that are too low for various reasons, either below damns, in stranded habitats, in fish raring facilities, or polluted waters.

Q And did Dr. Hanson characterize dissolved oxygen as suitable for steelhead?

A Dr. Hanson characterized dissolved oxygen levels within the study reach as suitable for juveniles in instances where the DO exceeded six milligrams per liter.

Q And did Dr. Hanson base these conclusions on Mr. Horton's calculations?

A I'm not sure. I note that Horton noted that levels were naturally depressed in the losing reach, that is immediately below VT1, and were only affected by pumping operations within the zone of influence for a short period

of 2007.
Q And you said a minute ago or a moment that go that Dr. Hanson characterized DO levels within the study reach as suitable for steelhead juveniles in instances where DO exceeds six milligrams a liter. What is the standard acceptable level for DO for juvenile steelhead on a river such as the Big Sur River?
A Well, this is certainly a topic of professional disagreement. I will say that. However, the Central California Regional Water Quality Control Board has adopted water quality objectives for the Big Sur River that include maintaining minimum DOs of seven milligrams per liter at all times and 85 percent median saturation levels. These were adopted specifically to protect fish in the Big Sur River and other coastal streams in central California and have been adopted for -- in really the region as a whole and, therefore, are in this sense standardized.
Q And were DO levels what you would characterize as low dissolved oxygen levels discovered on the Big Sur River?
A Yes. I will describe those further on in my testimony.
Q What did Dr. Hanson and Mr. Horton attribute the low DO to?
A They associated the low DOs to a natural decline

within the upper portion of the study reach with normal summer conditions whereby stream flow percolates into the river bed and with unusual conditions whereby the pumping were drawing cool oxygen-depleted water into the stream for a brief period in an isolated location.
Q   Do you recall agree with their assessment of DO and their basic conclusion that DO was suitable in the study area?
A   No. My opinion is that they mischaracterize the levels of DO as suitable and used an incorrect standard for measuring potential impacts to steelhead and the stream ecosystem within the study reach as a whole.
The basis for their conclusions and characterizations can be investigated by examining other streams within the region and addressing the following questions:
Are the levels in the study reach similar to other streams?
Are levels natural and could differences be explained by diversion of surface flow either from the zone of influence or indirectly via the zone upstream of the zone of influence?
Q   So questions are: Are levels measured in the study area similar? Are levels natural? And could differences be explained by diversion of surface flow from the zone of

influence or areas upstream of the zone of influence? Is that what you said?
A That's correct.
Q Okay. Thank you.
And what are typical natural levels of DO in the south central California coastal streams?
A The following figure -- if we could put that up.

--o0o--

MR. DETTMAN: This illustrates a comparative level of DO at nine streams within San Lucia region, including the Big Sur River. The Central Regional Board collects this data as part of their central coast ambient monitoring program, or CCAM.

During the years 2001 to 2009, the DO in the Big Sur River at the Andrew Molera State Park -- that's the station --

BY MR. LAZAR:
Q I believe you have it listed as site 308.
A 308. My eyes aren't what they used to be.
Q It's the forth one to the right. Starting on your left.
A This one?
Q Yeah.

MS. TEETERS: Objection.

HEARING OFFICER DODUC: Hold on.

Ms. Teeters.

MS. TEETERS: We have never seen this figure before. We do not have it in their packet of rebuttal testimony.

HEARING OFFICER DODUC: Mr. Lazar?

MR. LAZAR: This is --

HEARING OFFICER DODUC: What page?

MR. LAZAR: Page 17 of the rebuttal testimony.

HEARING OFFICER DODUC: I see it.

MS. TEETERS: Thank you for the clarification.

HEARING OFFICER DODUC: Please continue.

MR. DETTMAN: As I was saying, the DO at the location adjacent to the State Park picnic parking lot here is shown in the fourth box diagram, and the averages there are 9.5 milligrams per liter and range from 7.4 to 13.4. Levels at the upstream site located in Pfeiffer Big Sur State Park --

BY MR. LAZAR:

Q 308 BSU. I'm sorry. BSU is that one there. Yeah. And then BSR is the one to the right.

A Okay. Well, anyway, these two are the Big Sur River.

Levels at the upper State Park monitoring station average 9.0 and range from 8.2 to 12.6. These levels are similar to other streams in the San Lucia region except for the locations in steep reaches or steep streams where oxygenation is even greater.

This comparative data shows that the level in the Big Sur River upstream of the study area were similar to other streams and within levels typically you can describe as well oxygenated streams.

Q Are these measurements available to the Big Sur River during 2004, 2006, 2007 when the El Sur Ranch studies occurred?

A Yes. If we could have the following chart.

This shows the measurements on a site basis for the Big Sur River at the Andrew Molera State Park parking lot during the same years, except for one measurement in June of 2008 year, one outliar.

All the DO levels at this site were above seven milligrams per liter and 80 percent saturation. The vast majority of measurements were above eight milligrams per liter and all but three were above 90 percent saturation.

If we could look at the next graph --

--o0o--

MR. DETTMAN: -- which shows the same data expressed as degree of saturation rather than absolute number.

Based on this oxygenated surface flow, the habitats immediately upstream of the study area are highly suitable for steelhead and other biota that are normally associated with rearing young juvenile steelhead in these coastal streams and would be qualified as likely very productive.

BY MR. LAZAR:

Q Mr. Dettman, were any measurements taken within the study area and nearby the station monitor at the Andrew Molera State Park parking lot?

A Yes. If I could have the next chart.

--o0o--

MR. DETTMAN: This data shows the instantaneous measurements that were taken at VT1 versus the daily values that were measured -- these are all instantaneous basically -- at the State Park foot bridge.

Basically, the values at VT1 are higher than they were at the State Park measuring point and typically range from 111 to 116 percent saturation during the period of the pump tests in 2007.

These levels are all above -- well, they're not all. There's one here at probably 95, maybe 99 typically -- and a couple on this end. Typically, the numbers are high because in the -- they're taken during the middle of day when the algae is photosynthesized and this puts a lot more oxygen in the water and actually super-saturates it.

Q In summary, would you characterize the DO levels in

the Big Sur River upstream of the study area as suitable?
A Yes. Highly suitable and within the range of expected healthy well oxygenated streams along the coast here.
Q Mr. Dettman, would you characterize the DO levels within the study area in the same way?
A No. In contrast to the upstream reach, the DO levels within the study area downstream of VT1 exhibited several aberrant daily DO patterns during the pump test in 2007. And these are detailed in my written rebuttal testimony and illustrated in the following two figures.

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MR. DETTMAN: These look very complicated. There is a lot of data on here, but they're not really that complicated.

At the top here, we have the data that I just showed at the upper State Park parking lot. And you can see those are all 100 percent saturation.

Plotted on here are the data from basically the midpoint at each of the -- for three days -- I'm sorry. For the entire period for the pump test periods. And these are expressed on a daily basis for this period of time.

And the important point to take away here is that -- and there is a lot of details about how these change. But the important thing is that in almost all cases, even downstream of VT1, the dissolved oxygen is almost always below 100 percent saturation. And in many cases probably drops down to levels that could be described as highly stressful and in some cases perhaps lethal in some of the locations.

If I could have the next graph.

BY MR. LAZAR:

Q For the record, Mr. Dettman, could you point out in your written rebuttal testimony what page you identified those patterns at so the Board can refer to those later.

A I could if I had those here.

Q Sorry. We had the figures attached to his actual testimony.

For the record, those points that he's identified begins on page five of the written rebuttal testimony.

Thank you, Mr. Dettman.

And to what do you attribute the difference in conditions between the area above the study area and the study area itself?

A The daily DO patterns that I identified in the written testimony and in these figures really are likely the combined result of the intermittent pumping that was done on the wells during this period and the critically low flow conditions that occurred during the pump tests.

The signing or separating cause and effect specifically to the flow conditions or to the pumping is difficult really due to the variable nature of the stream flow during the pump test period and the limited operation of the ESR wells during this period.

Q In other words, the study was designed so that the results were not reflective of the actual permit conditions?

A I can't really attribute that there was a purpose to that. But in effect, really had the ESR wells been pumped at normal rates and duration, the results would have probably been more conclusive and shown a clear linkage and impact of the well operations.

Regardless of this limitation to the design of the experiment, the DO levels in the reach below VT1 did not consistently meet the water quality objectives that have been outlined for the Big Sur River, which include DO of 7.0 and median saturation levels of 85 percent.

So considering these requirements or standards and the likely linkage between pumping and DO, the operation of the wells should be conditioned so that water production ceases or other actions are taken whenever DO within the zone of influence declines below the saturation levels in the upstream reference areas.

Q Is that part of your recommended permit conditions?

A Yes, it is.

Q Thank you.
Mr. Dettman, do DO levels, dissolved oxygen levels, vary within a 24-hour cycle or diurnally?
A In well oxygenated streams, the level of DO fluctuates diurnally, or however you want to describe that, in response to plant photosynthesis and animal and plant respiration.
Figure 7 -- if we could have the next slide --
--o0o--
MR. DETTMAN: -- shows the typical range within the Big Sur River at the upstream site there at the State Park. The State Park has done a number of 24-hour tests of dissolved oxygen where they monitor and record the levels on 30 minute or one-hour intervals. And that's what this data shows.
Typically, the DO ranges from about 77 here as a low to about 92 during the daytime, and then upwards of 110 to -- about 110 during the -- maximum during the day. This pattern is similar to other locations in coastal streams that are well oxygenated and ones I've worked with.
Q Thank you, Mr. Dettman.
And did the DO levels in the study area vary in a similar fashion as the upstream monitoring sites?
A No. In contrast to the natural patterns in Figure 7

here, if we could have figure -- the next following figure, Figure 8.

--o0o--

MR. DETTMAN: This is the pattern that is evident during snippets of the -- each of the pump tests during 2007. I didn't want to pull all this data, because it gets so crowded you can't really pick it apart.

But this is basically a three-day sequence for each of the pump tests. And I tried to pick out the mid-portion of the pump test for the plot.

The patterns that we see here are completely outside the natural regime of the healthy stream in this part of the coast. They generally -- the saturation doesn't recover during the daytime. Or if it does, it doesn't recover to full saturation and often remains low and low enough to cause either stress or death if there was fish in here for a period of three days. And 20 percent saturation at the typical levels of -- that we see in terms of temperatures these fish would probably not survive. This may be one of the reasons why we see so few fish in some of the selected locations that were monitored with population estimates in October in the same year.

BY MR. LAZAR:

Q Really quickly, can you narrate the activity you were just providing there with your pointer?

A I thought I did. Right here.
Q Okay.
A These levels at 20 percent.
Q You're pointing to --
A Or even down here, we had levels of almost zero percent saturation, in some cases. These are levels that are just not suitable whatsoever.
Q Would they even be harmful?
A Yes. Harmful. That's correct.
Q And your written testimony contains more detailed information?
A Yes. There are four highlighted bullets there that go into a little more detail.
Basically, overall, the DO levels within the zone of influence during the pump tests were often below the water quality standards of highly stressful for fish and within the ranges that could cause displacement of -- behavioral displacement, abnormal behaviors, perhaps mortality in some cases.
Q Thank you, Mr. Dettman.
Now Mr. Dettman, earlier we heard testimony regarding the presence of different levels of dissolved oxygen, or DO, in groundwater and surface water. Do you recall that discussion?
A Yes, I do.

Q So are there different levels of DO present in groundwater and surface water?
A Yes. In general, the dissolved oxygen in surface water streams is usually saturated or near so most often ranging above 90 percent and often exceeds saturation in the middle of the day.

In contrast, the dissolved oxygen in groundwater is typically much lower due to chemical and biotic processes that basically use up the oxygen at a higher rate. And since there is no algae living below the stream, basically you don't get any re-generation of oxygen. And that results in extremely low levels in groundwater. And this has been well documented throughout most of the United States, I believe.
Q Now, part of your experience has been managing or evaluating flows in order to maintain fish populations in rivers; is that correct?
A That's correct.
Q And for what rivers do you do that for?
A Most of the work I've done in relation to this has been on the Carmel River and (inaudible) Creek below Kent Reservoir on the American River below Folsom and the lower Sacramento, and in Soquel Creek in Santa Cruz County.
Q You worked on maintaining sufficient flows, that is, quantity of water in order to protect the fish and also

manage the DO levels in these rivers?
A Yes. Managing the DO has been an integral part of my work activities, especially on the Carmel River where we tried to maximize summer flow releases without depleting oxygen in the small storage reservoir, Los Padres there. Basically, Los Padres serves as really the only surface supply in storage for making releases into the Carmel River below San Clemente Dam.

I also set up a system to monitor and manage dissolved oxygen in the Sleepy Hollow Steelhead marine facility where waters diverted from the Carmel River is used to raise fish and then is discharged back into the river.

I also various sources of supply for the rearing facility, including groundwater wells and existing wells owned by Cal American Water Company.
Q So in managing flows and dissolved oxygen, if water comes into a stream from another source, let's say from groundwater, that has a lower DO, this is important to know because it could impact the steelhead habitat?
A Yes, especially if the groundwater is contemplated for use in raising fish or for release into a river. Sometimes the DO and groundwater is too low and it also has not been measured in the study. Oftentimes, dissolved CO2 is too high for releasing directly into the rearing

facilities of rivers.

There is a number of places in California that have oxygenaturing devices of some kind below dams. So on the Carmel, we have a cooling tower that operates there continuously during the summertime. And it really has two purposes: Initially, it was to cool the water off. Kind of a long story, but basically when San Clemente could no longer be used as a surface supply, it had to be drawn down in the summertime. And that resulted in heating until riparian vegetation got established.

HEARING OFFICER DODUC: Mr. -- sorry. I thought you were finished. Go ahead.

MR. DETTMAN: And that resulted in high water temperature. So we put a cooling tower in the facility.

We also found that the cooling tower got rid of CO2 and helped to aerate the water for release into the facility and made it easier to manage dissolved organics and waste products into the facility before it was re-released out into the river.

Q Thank you.

HEARING OFFICER DODUC: You're about 45 minutes into your rebuttal. How much additional time do you need?

MR. LAZAR: Probably ten minutes.

HEARING OFFICER DODUC: Ten minutes.

BY MR. LAZAR:

Q So determining the source and amount of inflow or outflow in DO in these various sources is important then for managing the suitability of habitat?
A Yes. One needs to know how much inflow is available from different sources and how much outflow is needed or permitted for release and/or for discharge.
Q And have you used DO levels in the past to evaluate sources of supply of pumping rates in river flows?
A Not specifically as in the case of the ESR wells in the Big Sur River. But I've used techniques generally knows as the dynamics of conservative solutes or mass balance equations too evaluate the discharge rates of pollutants and effluents from fish facility and the mixing of releases from different levels of a reservoir and determining whether 02 and C02 and well water would be suitable for transporting and rearing fish.
Q And did El Sur Ranch provide data on DO content to pump water?
A Yes. As part of their monitoring effort during pump tests, ESR measured dissolved oxygen content in the pump water. That is the water that they remove from the ground. This information can be used to assess assertions about what fraction of water might be diverted.
Q Did you conduct such an analysis based on these measurements?

A Yes. If I could have Figure 9 and also 10, but not right at the moment.

--o0o--

MR. DETTMAN: Figures 9 and 10 show dissolved oxygen in well water produced from El Sur's Ranch during the old and new well test during 2006 and 2007 operations.

Notably, the dissolved oxygen levels early in the summer are similar to levels measured in the ambient water quality. You see over here where the dissolved oxygen is at 80 percent, ranges from 60 to 80, and then actually gets up to almost 100 percent saturation in a few days during this pump test.

Further, the DO pumped is dissimilar to DO levels typically measured in groundwater. And here plotted are the numbers that were available to me from the 2004 pre-pump tests where they determined the dissolved oxygen content prior to any pumping in the groundwater at monitoring wells.

The close correspondence with the river water DO and the dissimilarity to the groundwater are strong indicators that El Sur is diverting a high proportion of oxygenated surface water from the Big Sur River and really in some ways contradicts the assertion that the relative contribution of surface and ground water sources is as portrayed.

Q Did you make an independent estimate of the fraction of surface water diverted based on DO levels?

A Yes. If DO and the produced water matches or is similar to the DO levels in the river, then the fraction of the surface flow is much higher than portrayed by Horton. This fraction can be assessed and tested with an empirical -- simple empirical model by reviewing the DO pumping rates and estimated surface flow losses in September 2007.

And for this analysis, I used a mass balance equation developed by the Department of Ecology in Washington State. There is a footnote that highlights that.

At the maximum pumping rate of 5.02, Horton estimated that the diversion of surface water within the zone of influence was one to 1.2 cfs. And this, as you recall, represents about 24 percent of the total pumped. This is outlined in Exhibit ESR-6, Table 31, one PDF 34.

If this percentage is accurate, then the DO in the pumped water should be approximately 1.74 as determined by this mass balance equation.

However, the dissolved oxygen levels in the pumped water actually average 6.0 during September, thereby indicating a greater fraction of surface water was diverted.

So considering that the surface water increased downstream of VT3, the only other real source of surface water is from the stream or from the area around the lagoon.

Horton estimated that the average loss in the reach from VT1 to VT3 was three cfs during September. And that's outlined in this ESR 6, Table 3-3, PDF page 96.

So based on this estimate of the mass balanced equation, the expected DO concentration would be 6.26 if three cfs of surface water was supplied to the pumps.

This expected value is very similar to the average actually measured in the pump water during this time period in September 2007. So this agreement between the measured and calculated DO levels leads me to believe that the fraction of surface water diverted was approximately 4.2, not 1.2. And it was basically comprised about 4.2 over 5, or about 84 percent of the pumped water was actually estimated to be surface supplied.

Another indicator of the close linkage between surface water and the El Sur Ranch water, as you'll notice in this graph that once the pumping starts, the levels of DO generally increase throughout the time period of pumping, indicating that there is a greater fraction of surface water being brought into the pumping as the pumping continues.

This actually illustrates -- I think both 9 and 10 can be used. I'll use 9 here.

The other thing that we notice is that during this period following -- I think it was basically the 1st of September -- the levels in the pumped water actually dropped down significantly. And I think this is due to the fact that water -- DO levels in the actual river water were so low that even when it was brought in, it was, of course, not oxygenated and reflected the level in the river. These patterns are consistent with the DO concentrations measured by Horton and noted by Hanson during late August, June, and September during 2007.

Q Mr. Dettman, please summarize the levels in the Big Sur River during 2007 and how these levels likely affect steelhead and other aquatic resources in the area in the river.

A The DO levels in the upper end of the ESR study area, VT1 and upstream of the study area, are within normal levels of highly oxygenated streams in this part of California. Downstream of VT1, however, DO is frequently lower than the objectives laid out by the Regional Water Quality Control Board. And in some locations, daily DO was low enough to cause high levels of stress and possibly mortality and other areas would simply interfere with growth or cause aberrant behaviors.

The diurnal fluctuation in DO indicates that the natural processes of ecosystem restoration and photosynthesis are disrupted by the diversions and low flow stream flow conditions. These combine to reduce the levels to those that are not sufficient for healthy steelhead populations.

The differences in DO amongst the sites within the study area and the pumped oxygenated water that matches DO in the stream is consistent with the diversion of a high proportion of surface stream flow. Based on the DO and the pumped water and the groundwater and the surface flow, the location of ESR's diversion is partially outside the described zone of influence and really extends upstream of that area basically by drawing in some of the water that's "lost" in the losing reach. That water is brought into the area that pumps can actually divert. And we've heard testimony to that today from Mr. Horton.

This expansion of the zone of influence, as I will call it, is supported by the observed DO levels in this reach, which are lower than the natural levels at VT1 but generally meet the objectives of the basin plan.

I believe that's all I have. Thank you.

HEARING OFFICER DODUC: Thank you, Mr. Lazar.

MR. LAZAR: I apologize. I have a few more minutes of questions.

HEARING OFFICER DODUC: If you'll wrap up your rebuttal.

BY MR. LAZAR:

Q Just a few more questions, Mr. Dettman.

Dr. Titus was asked if he was aware of any other case where minimum instream flow had been set based on requirements for juvenile steelhead passage. Dr. Titus answered he was not aware of such a case. Are you aware of such a case?

A Yes. It's not common anymore. Most of the stream flow recommendations that are made now are set on the basis of looking at several portions of the life cycle. So there aren't really any recent cases. But during the 1960s, I'm aware of that on the San Lorenzo River, such a technique was used to set stream flows for adult steelhead and salmon passage. However, to my knowledge, none of the recent cases are limited only to one single life stage.

Q And if the .3 foot criteria for juvenile fish passage has been met at a critical riffle, does this mean that there is adequate passage for the entire width of the stream?

A No. No. Outside the .3, of course, the sides of the stream are quite shallow and actually not only would not be suitable for passage of fish, but would not be suitable

for actually rearing steelhead in terms of physical space.
Q Does the .3 depth criteria create a presumption of sufficient DO?
A No. I wouldn't assume there would be sufficient DO or assume there would or would not, really. It's really a separate analysis.
Q And finally, supplementing oxygenated groundwater is proposed as an alternative to be used in the applicant's discretion as an alternative minimum bypass flows. What are the problems with this method?
A There are a number of technical problems including, but not limited to, the physical and biological feasibility, cost, maintenance and operations, the susceptibility to flood damage. We've seen just a relatively minor storm wash out a bridge put in by the State Parks. And you know, there is likely to be channel changes in this reach. So any such project, so to speak, would be difficult to put forward and actually make work.
I think there is also a -- certainly is a hesitancy from my perspective that I face this with on the Carmel River. The fisheries' agencies really do not like to use technical fixes to solve the problem that they consider to be unnatural and can be solved by providing flow.
Q And is it an easy task to create an oxygenated stream

like what is being proposed?
A I'm not aware of any systems that have attempted to oxygenate an entire stream with the injection of groundwater. There may be some, but I'm not aware of them.
There are additional concerns related to DO reductions that may not easily be remedied as streams that are low in DO. And I've mentioned this as usually have excess C02. It's a lot more difficult to get rid of CO2 than it is to add oxygen. The production of excessive CO2 by de-watering would be compounded by using groundwater, which is often high in CO2.
Q C02 has a negative impact on --
A Yes. Basically, it counteracts the affects of oxygen of CO2. You can't breathe it very long. And fish are the same way. It's a complicated metric. But basically at high levels of CO2, the fish cannot, even if they want to, exchange as much oxygen as they need. And that's the simplest way I can think of putting it.
Q I just have a couple more questions on your flow requirements. Your summer flow requirements appear to be only slightly higher than those recommended by the applicant. Are they really so similar?
A No. The differences are greater than the simple arithmetic difference. Basically, because number one, I'm

recommending flow be maintained at all times. And they have some outs for that.

The other is that the bypass flow location I proposed is at the -- basically at the new USGS gage or somewhere in that reach.

Q Depends on the time of the year?

A Depends on the time of year, yes, for the summertime.

Q And is the applicant's proposed exception to bypass flows acceptable if the ranch can demonstrate adequate fish passage at lower flows?

A No. This Exception should not be allowed, because it does not address the potential loss of actual habitat quality and quality in the other part of the stream that the fish would otherwise use.

Q Now, our winter flow requirements, CSPA and DFG's, appear to be much, much higher than those proposed by the applicant. Why such a contrast?

A CSPA and the CDF&G's winter flow requirements are based on a review of medium flows and the assumption the of absence of PHABSIM report that median flows will be protected.

The applicant's proposal is based on a milligram passage condition as single riffle or two and do not consider other flow requirements for spawning, egg incubation, smolt production, and downstream immigration of other rearing of other fish.

MR. LAZAR: No further questions. Thank you very much.

HEARING OFFICER DODUC: Thank you. Let's take a short break. And for those of you who need refreshments, the cafe downstairs closes in five minutes. So we'll re-group at 3:35.

(Whereupon a recess was taken.)

HEARING OFFICER DODUC: Let's try to get through this home stretch.

Mr. Berliner, Ms. Teeters, which one of you will do cross?

MS. TEETERS: As with the cross on Friday, Madam Hearing Officer, we would like to be last, as the parties are aligned. Ms. Goldsmith made the argument. You granted that request. And we would make the same request today.

HEARING OFFICER DODUC: That means, Mr. Johnson who's not in the room. I'm sorry. Ms. Ferrari, who is in the room. Why don't we start with you on cross.

MR. LAZAR: I believe Mr. Dettman is still using the rest room.

HEARING OFFICER DODUC: Okay. Ms. Ferrari can start making her way up. I know she has questions for Mr. Shutes. He's here.

MS. FERRARI: I don't.
HEARING OFFICER DODUC: Of course not. Any questions for Ms. Shutes from staff?
I tried, Chris. Sorry.
Ms. Ferrari.

REBUTTAL CROSS-EXAMINATION

BY MS. FERRARI:
Q Thank you.
Mr. Dettman, I have a couple questions for you.
I will start -- if you can please put up CSPA/CBD Exhibit Number 107.

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BY MS. FERRARI:
Q Thank you.
Mr. Dettman, your CSPA/CDB-107 exhibit shows that juvenile steelhead population density is significantly higher in the Carmel River than the Big Sur River. Does the higher population density generally indicate better rearing habitat for steelhead?
A Before I answer that question, I just want to clarify, these are locations in the Big Sur River compared to similar-looking locations in the Carmel River.
Q Okay.
A Versus the remainder of the Carmel River.
Q Thank you.

A But given that qualification, what was your question?
Q Does higher population density generally indicate better rearing habitat for steelhead?
A Generally, yes.
Q Based on this information at those particular locations, could you reasonably conclude that the Carmel River has better rearing habitat for steelhead than as compared to the Big Sur River?
A It may have better rearing habitat. It may also be that the seeding, so to speak -- in other words, the reproduction is better in the Carmel at those locations.

MS. FERRARI: Okay. Can we please pull up ESR-65, slide 2?

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: That's in the original?

MS. FERRARI: I think that's their rebuttal slides. Is it Hanson? It's the Hanson PowerPoint. Slide two.

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BY MS. FERRARI:
Q Mr. Dettman, do you recognize this graph? You may have seen this earlier in Dr. Hanson's testimony.
A Yes.
Q Referring to the slide, it shows that there are more threats on the Carmel River as compared to the Big Sur

River and that the threats on the Carmel River are more significant or apparently more significant given the color of the cell.

So in your opinion, why would the Carmel River have a higher juvenile population density than the Big Sur River if it is subject to more threats and presumably more significant threats given the color coding?

A Well, I think in the specific locations of the study area, there is a problem that really overrides the factors that are considered here. And that is that for some reason the dissolved oxygen in the lower one mile of the Big Sur River is not high enough to support a healthy ecosystem. And that probably overrides any other benefits that might appear to them.

The Carmel River, although it definitely is threatened by surface water diversions, I think I testified that I do not believe it's threatened by dams. I took exception to that.

In the lower part of the Carmel River, that is, in the area where the water basically seeps in ground and where there is only a half a cubic foot per second of flow, I think if we measured the populations in those locations and compared them, I think we might find they're very similar. Keep in mind that the stations that are put up on the Carmel River, although they're in the lower

river, they are in sections that are watered all the time.
Q Is it -- well, can we take a look at ESR-34? This would be the same NMFS cap workbook on PDF page 6.

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BY MS. FERRARI:
Q Mr. Dettman, there is a section there labeled -- if you would scroll down a little bit -- that says "data gaps." Essentially, it says that blank cells indicate a lack of available information. So we're calling the slide that we just saw with the different threat codes -- is it also possible that the NMFS workbook could be unreporting the threats to steelhead on the Big Sur River because they don't have enough information about the threats?
A I think it could be because they don't have enough information or they just didn't have time to actually investigation it.
Q Thank you.
Mr. Dettman, in your life of work as a fishery biologist, do you often have to deal with hydrological questions in your line of work?
A Frequently. On the Carmel River, I would say that a quarter to a third of my work involved actual hydrology. I was the one who was responsible for projecting at the beginning of every dry season how much inflow occurred naturally in the system. And to do that, I had to

analyze -- we used an unimpaired record of flow. And we also used historical flow to make projections of surface flow five to six months ahead of time so we'd have an idea how much total water we would have in addition to storage in those pockets. And I was involved in the day-to-day operations of setting the flow requirements, monitoring the requirements that CAL AM had. And so, yes, much of my work involves hydrology.

Q I imagine that you are often concerned about the source of the dissolved oxygen as part of your overall effort to manage the suitability of habitat in the stream?

A That's correct. I think I testified to that earlier.

Q So does that mean that you would have experience measuring the contributions of effluents to their sources or sources to the effluents?

A Yes. This is a common thing in a fish facility both from the standpoint of dissolved oxygen and other solutes. We actually used -- probably won't be able to do this anymore. We actually used formaldehyde to treat fish in the facility. And I designed the system to basically rid the water of the formaldehyde before it could be discharged. Very strict limits on the quantities that could be in the discharge. Thirty parts per billion I think at that time, and we've met that consistently.

It was a very difficult thing to put that together, because even the people who -- I did a lot of work on the phone talking to actual chemists who work with formaldehyde, talking to manufacturers. They all gave us various ways to reduce it, but actually none of them had a way to actually get rid of it.

We designed the system to do that basically by bubbling the ozone into the treated water for a period of two to three days. Because of the heightened activity oxygen potential of ozone, it was able to rid or convert all of the formaldehyde into basically harmless acid.

Q So it would be fair to say that the type of analysis that you did in your rebuttal testimony to try to ascertain the sources of dissolved oxygen quantities is a familiar thing that you have done before?

A Yes. It is familiar to me. I will qualify though what I did because it is a relatively simple technique. There are very complicated techniques used for tracing pollutants in plumes. And I didn't think that -- number one, I didn't have time to do that. And I don't have the training to do that. It involves isotopes and, you know, wasn't really -- I don't think it was really necessary, given the high levels of dissolved oxygen that appear to be in the pumped water.

Q Okay. Thank you. I just have one more question.

You had provided some testimony on your concerns with the applicant suggestion to supplement oxygenated groundwater as an alternative. I believe they were proposing to inject this oxygenated groundwater somewhere further upstream. Is that a correct characterization?

A That's my understanding, yes.

Q You said that there would be a number of technical problems. Would it be true that there would have to be some infrastructure put in place to transport water from a pump to a location upstream?

A I would think so, if the purpose was to supplement the surface flow at the same time as the water was oxygenated. Of course, I haven't done even the feasibility study of this. But it might be possible to use other means to simply oxygenate the water in the hyporheic zone or in the surface supply.

Q So if it were seeping to inject water into the surface flow and there was some additional infrastructure that had to be placed, to your knowledge -- I mean, would that infrastructure have to be placed on land that is owned by the Department of Parks and Recreation?

A I don't know the answer to that.

MS. FERRARI: Okay. Thank you.

HEARING OFFICER DODUC: Does that complete your cross?

Thank you, Ms. Ferrari.

Mr. Johnson.
MR. JOHNSON: No, thank you.
HEARING OFFICER DODUC: So that leaves you, Ms. Teeters. Or Mr. Berliner.
MR. BERLINER: Both.
HEARING OFFICER DODUC: You may begin when ready.
MS. TEETERS: Thank you.

REBUTTAL CROSS-EXAMINATION

BY MS. TEETERS:
Q Good afternoon, Mr. Dettman. I'm Danielle Teeters. I don't believe we've met. I represent Mr. Hill in the water rights application.
You submitted a CV with your testimony; is that correct?
A I did, yes.
Q And your CV is a summary of your education and experience important to your analysis in this matter?
A I think probably more of my experience, yes.
Q Thank you.
And to be sure, your CV lists experience that qualifies you to render an expert opinion on those matters for which you testified; is that correct?
A I think my experience will allows me to do that, yes.
Q Now you rendered some opinions and analyses in this matter on the hydrogeology on the Big Sur River in

rebuttal testimony; is that correct?
A That's correct.
Q Yet, your CV lists no specific academic training in hydrogeology or hydrology; is that correct?
MR. LAZAR: That's vague. Define "academic" and "experience."
HEARING OFFICER DODUC: Restate.
MS. TEETERS: I just said academic training and I would refer to that as anything beyond high school. College level. Graduate work.
MR. DETTMAN: Yes. I was a student at the University of Cal at Davis. And during that time, I took, as I recall, two or three hydrology courses as part of the requirements to be a fishery.
BY MS. TEETERS:
Q So your academic training and hydrology or hydrogeology is limited to two or three classes; is that corrects?
A It is. Qualify that though, because I did take courses in limnology and aquatic ecology. And I have a list here. That it was a long time ago -- and statistics. And in those courses, we'd often cover the question of dissolved oxygen as part of the curriculum.
Q Thank you.
Your CV lists no specific projects in which you

conducted hydrogeologic studies; is that correct? And by studies I mean --
A That's correct.
Q Okay. Or hydraulic studies?
A Could you qualify what you mean by hydraulic studies.
Q Studies wherein you are conducting tests of groundwater?
A I'm thinking about the list. And I think that there aren't any specific studies there, but certainly hydrology in groundwater was important in many of the reports that I wrote.
Q Are you a registered hydrologist?
A No.
Q Are you a registered or professional hydrogeologist?
A No.
Q Your CV lists no case or matter before this Board or a court of law wherein you testified as an expert in hydrology or hydrogeology; is that correct?
A I think if it wasn't on there it should have been. I testified for the county of Sacramento on the impacts of releases of chlorine I believe at the Freeport Treatment Plant, the diversion discharge point there. And that was primarily geared towards determining what the affects of the chemical was or could be on fish. But in doing so, I had to review a lot of the hydrology that was done for

that.

Q And were you qualified as an expert in hydrology or hydrogeology in that matter?

A No.

Q Did you personally visit the Big Sur River in regard to this matter, other than in April this year?

A No.

Q Other than in April where you took some transect measurements, did you conduct or receive any conduct of hydrogeologic or hydrologic studies on the Big Sur River in relation to this matter?

A No. That wasn't what I was hired to do.

Q Thank you.

MS. TEETERS: Madam Hearing Officer, at this time, I would like to make an objection regarding the submittal of Mr. Dettman's opinions and analysis regarding hydrology and hydrogeology as he's clearly not an expert in these matters based on his CV and the response to these preceding questions.

HEARING OFFICER DODUC: Mr. Lazar.

MR. LAZAR: I'd like to note that academic experience and his just one aspect of expertise, Mr. Dettman has provided testimony both on rebuttal and cross on rebuttal pertaining to his experience -- wealth of experience in using hydrologic calculations to determine impacts on stream flow, as well as determining fractions of stream flow that may contribute dissolved oxygen and contributions from different sources based on those calculations of dissolved oxygen.

MS. TEETERS: Madam Hearing Officer.

HEARING OFFICER DODUC: Yes, Ms. Teeters.

MS. TEETERS: Mr. Dettman's experience does not include conducting hydrogeologic studies and collecting data as a result of the studies. And that's a big part, I believe, of being a hydrologist or hydrogeologist. He can read all the reports he wants, and I can appreciate his knowledge of doing so. But that does not make him a hydrogeologist.

HEARING OFFICER DODUC: Final words, Mr. Lazar.

MR. LAZAR: Mr. Dettman has decades of experience managing streams using this hydrogeological data.

I appreciate Ms. Teeters' remarks. However, his experience clearly demonstrates understanding graphs and use of hydrogeologic concepts, including diversions, dissolved oxygen, and measurements of stream flow.

HEARING OFFICER DODUC: Thank you. I will allow the testimony. But we will consider Ms. Teeters' objection in weighing the evidence.

MS. TEETERS: Thank you.

BY MS. TEETERS:

Q Do you know the proper way to take a DO measurement of groundwater?
A Well, when I've done that, it's been primarily with hyporheic waters in the streams. I would think it's very similar. Typically, you use a tube and you have to make sure that the water is brought -- in the old days, we used hydration methods. You had to make sure you brought the water to the surface without aerating it, which is part and parcel of the primary requirements of any methods to do that.
My understanding is that now we have reused a few of these on the marine facility at Sleepy Hollow where you have meters that are essentially in the substrate and you can do that.
Q Thank you. So preventing aeration is critical?
A Is key, yes.
Q Thank you.
Now, in measuring DO in groundwater, if you release water from a spigot and aerated it, that would not give you a good reading on DO as to the groundwater before it came out of the spigot; is that correct?
A I think that would depend upon who's doing the work and how they do it. You could take water out of a spigot if you run it into the bottom of a container and let the container overflow for a period of time. But if you're

just dropping the water into a bucket, you're certainly correct.
Q That might increase the DO?
A Yes. It could tend to do that.
Q Okay. If you -- for your example, if the water was in a bucket and then you stirred the water vigorously, would that provide more aeration to the water and might increase the DO levels?
A If the DO was well below saturation, it might. At some point, you reach close to an equilibrium where you're not going to go -- with that method, you're not going to go above saturation.
Q In your rebuttal testimony, you make an analysis of the DO and pump water at the El Sur Ranch; is that correct?
A That's correct.
Q In Figures 9 and 10 of the rebuttal testimony, you graph the DO in the ESR well water in 2006 and 2007; correct?
A That's correct. I obtained those values from -- I believe it was ESR-17.
Q Thank you. That's my next question. And you used that data in both Figures 9 and 10?
A I did, yes. As well as the temperature data.
Q As to the DO data listed in ESR-17, do you know how

that data was collected?
A I assumed it was taken from the discharge point of the well head or the source nearby it.
Q Did you see any explanation in ESR-17 as to how that data was collected?
A No.
Q Did you see any annotation of who gathered the ratings?
A No. I assumed it was the consultants for the ranch.
Q Did you see any indication on how those readings were gathered within ESR-17 exhibits?
A No, I don't recall that.
Q Now, in the SGI reports, did you review those for all years?
A I reviewed most of them.
Q Okay?
A Some of the detailed addendums and such I did not.
Q Did you happen to note if there was an explanation that -- of how the SGI team conducted the tests that they did in their studies?
A No.
Q That was actually contained in your exhibits, but we'll move on.
Did you review Dr. Hanson's reports?
A I did.

Q And was there an explanation in his studies as to how the tests were conducted?
A I believe there was. There was a methods section at the beginning of each year where they describe methods that year as well as I think reviewed the methods from the previous years.
Q And did it also describe the equipment that he used -- his team used for those studies?
A I think it did, yes.
Q Did you notice that Dr. Hanson did not use the DO data from ESR-17?
A No.
Q And did you notice that SGI did not use the DO data from ESR-17?
A No.
Q Did you find it odd that the data contained in ESR-17 was accompanied by the same level of collection information as what Dr. Hanson had in his reports?
A You mean within the exhibit itself?
Q Yes.
A It was a listing of information -- well head information. As I recall, it included the number of kilowatt hours on the electrical meter, temperature of the water, and electrical conductivity, the dissolved oxygen, time, and date, and then a note as to whether or not the

pump was on or off.

Q Thank you.

Now if the samples measured in ESR-17 were collected in a manner as a previously described to you --

A I'm sorry. Which manner was that?

Q As I described -- recap it for you really quickly. Out of the spigot, into a bucket, and agitate it, increasing the aeration, would the resulting DO measurements might overstate the amount of DO in the well water?

A If that's how they were collected, I would think they would, yes.

Q Thank you.

Now, in your testimony on page 8 --

A But I would note that wouldn't -- sorry.

HEARING OFFICER DODUC: Did you want to add something?

MR. DETTMAN: I did.

HEARING OFFICER DODUC: Please.

MR. DETTMAN: I would note that that wouldn't explain the patterns that resulted from that information. It would affect perhaps the absolute quantities but not the patterns.

So if at the beginning of the test, assuming that someone measured in the same way each time, you would get an index of the groundwater's content of the DO. But it would be -- and there would be errors associated with it.

MS. TEETERS: Thank you.

BY MS. TEETERS:

Q Now on page 8 of your testimony, your rebuttal testimony, you state that there is a close correspondence with river water in the dissimilarity to groundwater. These are strong indicators that El Sur's diverting a higher portion of oxygenated surface flow from the Big Sur River and that it contradicts Mr. Horton's assertion about the relative contribution of surface and groundwater sources.

A That is correct, yes.

Q Now, if the measurements from the wells were higher in DO due to the method by which they were taken, higher than the DO in the groundwater, then the correspondence with DO in the river may not be very close; is that correct?

A It's possible. And it would also overestimate the fraction of water that would be diverted from the surface.

Q And also the dissimilarity to groundwater DO might be smaller; is that correct?

A That's correct.

Q So the actual DO in the groundwater might not contradict Mr. Horton's assertion about the relative contribution to surface and groundwater sources; is that

correct?
A It's possible, given the fact that as you've told me that water was sampled in the bucket and from a flowing spigot; that's true.
Q Thank you.

Madam Hearing Officer --

HEARING OFFICER DODUC: Yes, Ms. Teeters.

MS. TEETERS: At this time, in the audience today is El Sur Ranch Manager Mr. Jim Gray. He's responsible for taking the DO measurements set forth in El Sur Ranch Exhibit 17, which consists of sheets of paper logs, handwritten papers of how these measurements were taken on the basis that they were taken. He can testify as to the method he personally uses to take these measurements.

His testimony is very important as to Mr. Dettman's DO analysis contained in his rebuttal testimony. We believe that analysis is fatally flawed because it relies on DO data that was not collected appropriately. His testimony would be very quick and to the point and only involve his collection methods.

Would you like to hear from Mr. Gray regarding this?

HEARING OFFICER DODUC: Mr. Lazar.

MR. LAZAR: We would object, of course. But it's possible that if we had the opportunity for everybody to cross-examine this witness, then we might allow his testimony.

HEARING OFFICER DODUC: Ms. Ferrari.

MS. FERRARI: I'm sorry. I would just like to register an objection to this as well, because I believe it is essentially is a rebuttal of a rebuttal, which we have been instructed before is not allowed.

Thank you.

HEARING OFFICER DODUC: Mr. Johnson, would you like to weigh in? You've been very quiet today.

MR. JOHNSON: I agree with her.

HEARING OFFICER DODUC: Thank you, Mr. Johnson.

I'm going to disallow the testimony.

MS. TEETERS: Just for the record, Madam Hearing Officer, this DO number was never questioned before because neither SGI nor Hanson relied on it. They didn't use the well --

MR. LAZAR: Who is providing testimony here?

MS. TEETERS: I'm just further arguing for offer of proof for Mr. Gray's testimony.

MR. LAZAR: Objection. I don't understand this testimony.

HEARING OFFICER DODUC: Let's move on with the cross-examination, Ms. Teeters.

MS. TEETERS: Thank you.

BY MS. TEETERS:
Q Mr. Dettman, in your testimony, you report that El Sur Ranch pumping drew water with depressed dissolved oxygen into the river; is that correct?
A I'm sorry. Would you repeat that?
Q Yes.
You report that El Sur Ranch pumping drew depressed dissolved oxygen water into the river?
A I think that was my testimony based on the evidence that was in the ESR reports.
Q And can you point me to the testimony?
MR. LAZAR: You're mischaracterizing his testimony.
HEARING OFFICER DODUC: Is that an objection, Mr. Lazar?
MR. LAZAR: Objection. Mischaracterization of testimony.
HEARING OFFICER DODUC: Restate, Ms. Teeters.
MS. TEETERS: Let me actually read it into the record.
BY MS. TEETERS:
Q Perhaps you could. It's on page 4, and it begins -- the sentence begins on line 20 and ends on line 23.
MR. LAZAR: Ms. Teeters, is this rebuttal testimony?

MS. TEETERS: Yes, it is.
MR. DETTMAN: Begins at paragraph eight?
BY MS. TEETERS:
Q Yes. And begins on line 20 with the word "they."
A "They associated with natural decline within the upper portion of the study reach with normal summer conditions whereby stream flow percolates into the riverbed with the unusual conditions whereby El Sur's pumping through depleted DO water into the stream for a brief period with isolated location."
I believe that was at the peizometer location three or four described in Hanson's report.
Q That was not what the testimony said.
But my question to you would be: Did you perform any independent measurement or analysis to determine if well operations actually drew low DO water into the river?
A No. I relied on the testimony of El Sur's experts.
Q Now, are you suggesting then taking this testimony, even though it's not what SGR reports say -- are you suggesting that the pumps are going to preferentially take water from the river reaches farther from the pumps, including areas that Mr. Custis and Mr. Horton and Dr. Harvey have all testified as being outside the pumping zone of influence over water adjacent to the pumps themselves?

A No. I'm not suggesting that. Not -- it's not preferential. I think that was the word you used. It's more of a mixture. There's some subterranean water, and there's some river water that originally came from the losing reach.
Q If the operation of El Sur Ranch wells was causing the reduction in dissolved oxygen within the river channel, would you expect that dissolved oxygen levels would be reduced significantly each time both wells were operating when compared to periods where no wells were operating?
A Well, that's a very complex process and situation. I think it could go either way. And I saw it when I looked at the graphs. Saw the cases where it increased and cases where it declined.

The point is that during that operational period, the dissolved oxygen concentrations in the river were below those that were suitable for fish.

The day-to-day short-term changes are probably influenced by what levels were preceded so that some of the algae that would otherwise produce oxygen now may not be able to. Probably draws in organic materials into the streambed that's either rapidly or slowly decays with the temperature and a whole host of other factors we're not measuring.

I think it's -- based on the data that I saw, there is a great deal of fluctuation in all of the data during the pump tests and when the pumps are running and when they're running.

What wasn't measured was the DO in these levels during the period when there was no pumping for an extended period of time.

MS. TEETERS: Mr. Lindsay, could we put up ESR-24? PDF page 81.

Thank you.

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BY MS. TEETERS:

Q Now looking at the results of dissolved oxygen monitoring in the river during 2007, a critically dry year, were dissolved oxygen concentrations reduced when both wells were on in late September, compared to the period immediately preceding this test when those wells were off?

A No. They slightly increased.

Q Yeah. I think you're confused. Looking at --

A Both the wells are off from approximately September 6th through September 13th. Then the old well is turned on. And then both wells are off for another week. And it's a weekly change when both -- this was all preceded by when the new well was turned on during the exceptionally low flow period that in my view completely changed the oxygen dynamics in the entire stream. And that may have lasted a month or two.

So the manipulation that was done as a part of these tests was a confounding factor perhaps to patterns that were there during this period. I mean, I don't -- I'm not saying that they're either greater or lesser. What I'm saying is they're generally below the levels that are suitable for fish.

I might add that the graph, the Y axis is expressed in milligrams per liter, which is one way to measure dissolved oxygen. But for fish, it's not the best way. These should have been expressed as percentage saturation. In order to do that, you basically correct each one of the data points for temperature to provide percent saturation at these various locations and times.

Q Now looking at the data when the new well is on on September 6th, do you see that? Do you see where it starts about August 31st and it's starting to move down? On a downward trend.

A I don't know when it actually started to move down. These are instantaneous measurements taken at weekly intervals. It may have gone up or down during that period. It may have gone down to two milligrams per liter during -- on September 1st when no measurements were taken. I can't tell from this graph.

This point should not have been connected together with a line. They should have been expressed as a single point with perhaps a range if there was replicates at each location and time.

So no. I don't agree that you can say anything about the trends with this data.

Q Do you see the data that's charted on this graph starting around August 31st and then moving down around -- moving from that point from about 6.5 down to about 5.75 on or about September 6th? Do you see that downward trend there that's charted on this graph?

MR. LAZAR: Objection. Mr. Dettman just clarifies his interpretation of this graph.

MR. DETTMAN: I see a difference between the two dates. I see that. I wouldn't --

HEARING OFFICER DODUC: Thank you for the answer.

BY MS. TEETERS:

Q Would it surprise you that that's around the time of the Labor Day Weekend when there is a lot of use in the Andrew Molera State Park that might cause DO levels to drop?

MR. LAZAR: Objection. She's stating a conclusion.

MS. TEETERS: I asked if it would surprise him. It wasn't a conclusion. It was a question.

HEARING OFFICER DODUC: Restate your question.

BY MS. TEETERS

Q Mr. Dettman, would it surprise you if DO levels dropped around this time due to high use at the Andrew Molera State Park?

A Yes.

Q It would surprise you?

A Sure.

Q So you would not think that DO levels would drop based on use at the Andrew Molera State Park and their leaching fields leaching into the river. You don't believe that kind of condition would drop DO levels; is that correct? Is that your testimony?

A You asked me if I would be surprised. I would say yes. If you asked me it's known they're dropping effluent into the river that could have caused this change noted from the 1st to the 6th, I would say perhaps.

Q Thank you. Thanks for clarifying that.

A I would note that the measurements that were taken during the same period at the Andrew Molera State Park parking lot did not show such declines.

MS. TEETERS: Let's also take a look at ESR-24, PDF 102.

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BY MS. TEETERS:

Q Now, this table reflects data on the river flows at VT3 during a 2007 test period. Can you tell me from this table what river flow was on September 5 when the dissolved oxygen concentrations were depressed in the river?
A The river flow at which location?
Q At VT3.
A At VT3, it appears that the flow was down to -- was probably a record low for this period of .35.
Q Now focusing your attention on the results of the monitoring on September 20, it appears that dissolved oxygen levels in the river were typically near or above seven milligrams per liter?
A That's on this chart here?
Q Yeah.
A The oxygen -- I don't see it.
Perhaps you mean on the previous figure?
Q Yes. I'm sorry.
A Can we go back to that one?
SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Do you want me in the original exhibits or in the --
MS. TEETERS: The last graphic we had, ESR -- okay. Thank you.
BY MS. TEETERS:
Q So looking at September 20th, it looks like the

dissolved oxygen levels in the river were typically near or above the seven milligrams per liter?
A I'd like to make a request since this is rebuttal testimony that you use my figures.
Q I don't have to. I'm not limited to that.
A I'm sorry?
Q I'm not limited to that.
A I know. It's just a request.
Q Request denied.
A Okay.
Q Looking at this graph, does it appear that around September 20th it appears that the dissolved oxygen levels in the river were typically above or near seven milligrams per liter?
A On which date?
Q Around September 20. Per the graph.
A Well, I'm looking at your graph and mine, because there's better data to make these determinations that was prepared by your consultants.
Q I'm asking you as to what this graph states.
A Okay. I'll look at just that graph. I can do that.
MR. LAZAR: Mr. Dettman is attempting to respond to her question using his own information. I object that he's being restricted right now.
HEARING OFFICER DODUC: Please answer based on

her graph for now and then we might explore your graph later.

MR. LAZAR: Thank you.

MS. TEETERS: And going back to the other graphic, Mr. Lindsay.

HEARING OFFICER DODUC: Did he answer your question?

MR. DETTMAN: I don't think I answered the question.

BY MS. TEETERS:

Q Did you provide an answer?

A You asked me was the dissolved oxygen above seven on the 20th?

Q Yes.

A It appears that it is above seven. That's only one measurement point and one point in time.

Q And then going forward from there, September 27, is it at or above seven milligrams per liter?

A Being restricted to looking at only one data or two data points out of the thousands that you took during this period, it appears that the DO is at eight milligrams per liter approximately on that date.

Q Thank you. And then going back to the other graphic table.

--o0o--

BY MS. TEETERS:
Q On September 20, flows in the river had increased at VT1 to 5.09 cfs and flows at the UUSGS gage were above seven; is that correct?
A I don't see the USGS gage in here, but that makes sense based on what I know.
Q Thank you.
Now, wouldn't this seem to indicate that a bypass flow at the USGS gage of 10 cfs or more would provide adequate conditions to maintain dissolved oxygen?
Let's just take it at 10 cfs. Wouldn't that provide adequate conditions to maintain dissolved oxygen in the lower river at a level of seven milligrams a liter or above?
A Not necessarily. We're only looking at three data points during a three-week period, and there are thousands of data points.
Q Does your graph provide additional information on this aspect?
A Yes. If I can refer you and have you put up -- I've got a non-color version. If you could put up page 21 of my rebuttal testimony.
--o0o--
MR. DETTMAN: And so this is the information that I put together based on the hourly data that was collected

I believe of dissolved oxygen at the various locations. And while it's true that at VT1 up here on the 20th of September, thereabouts, the oxygen concentrations is 90. It fluxes from 80 to just below 100 percent. But in these other locations, it's well below the 85 percent recommended basin objective.

If we had milligrams per liter here, I would have to have a conversion chart with me. But these are well below the seven milligrams per liter.

When you asked me later on when the flows increase, I still see deleterious levels of DO when the stream flow is increased during this period. So I would not recommend that the flows be set based upon these being adequate for steelhead or other biota that are in the stream. There's a -- I only analyzed the one years' worth of data. If we went to 2006, I think there may be some data there when the flows were higher that would help show perhaps what level to set the bypass based on dissolved oxygen.

Q Now, does groundwater have a lower DO than surface water?

A Yes, generally it does.

Q So if, as here, there is a natural groundwater inflow within the study area, would that lower the DO in surface flow?

A   Well, certainly, if the water -- groundwater is drawn into the stream somehow and it's lower in DO, that would tend to lower the dissolved oxygen mixture, so to speak, in the river, calling that natural -- I don't think there has been any testimony that documents that it's completely natural. There were no tests done of dissolved oxygen in the manner that they're measured here during the extended periods when there was no pumping prior to the summer season.
Q   So the groundwater accretes to the stream?
A   Sorry?
Q   So the groundwater accretes to the stream?
A   Not necessarily. It could go either way, whether the stream is losing or gaining.
Q   Are you familiar with SGI's reports in -- well, all of their years where they studied hydrologically the connection between the groundwater and the surface flow?
A   Yes.
Q   And were you aware of the areas within the zone of influence, Zones 4, 3, 2, 1 where there were localized areas where the hydrogeologic studies and tests that SGI did showed that there was groundwater upwelling in localized spots?
A   Yeah. Yes, I'm aware of that.
Q   Thank you.

So if pumping prevented some of the groundwater that's lower in DO from surfacing into the river, wouldn't that prevent the lower DO from daylighting?

A Not necessarily. I think that it's possible in this case that -- and we heard testimony from Dr. Horton -- or Mr. Horton today that a portion of the flow from the losing reach, that is, below VT1 and above P5, is entering that so-called trough and then goes into the zone of influence. So, in effect, the zone of influence, as I understand it, is more than just a measurement of the depth to groundwater. It's the process by which water enters that zone of influence.

And I think there was testimony that the water from the losing reach actually enters the zone of influence from upstream.

Now, you can say the zone of influence increases into that area or it can just recognize that the water from the losing reach is in part entering the pumped well field through the zone of influence by flowing into it a portion of it may come back into the stream.

In any case, reducing flow in that reach below VT1 and that water being pulled down through and percolated into the ground results in lower DOs in general in the stream. I think that's shown here. That's the reason that, for example, VT1 the reason it has 80 percent saturation.

MR. LAZAR: You're referring to figure five again of your --

MR. DETTMAN: I'm sorry yes. Figure five.

We see VT1, which is the so-called reference point, has significantly lower DOs than the measurement points just upstream at the State Park. And so the reason this declines sharply here is because --

MR. LAZAR: Where's "here"?

MR. DETTMAN: The reason this declines on the 5th of September is because it's associated with pumping that's occurring during that period of time.

BY MS. TEETERS:

Q Mr. Dettman, do you understand that VT1 is outside of the zone of influence?

A I certainly do.

Q Do you understand that P5-L is outside of the zone of influence?

A I do.

Q And do you understand that ESR wells cannot induce the loss between VT1 and P5-L. It's an actual --

A Induce the loss or intercept some of the water that's lost.

Q A natural condition. A loss is a natural condition.

A I don't know whether it's a natural condition or not.

None of the data that's been developed document that has occurred during the period -- extended period when there is no pumping.

Q And did you conduct any hydrogeologic or hydrologic studies that indicate that it is not a natural loss?

A No.

Q Thank you.

I'd like to talk with you about stage discharge relationship.

A Okay.

Q Can a stage discharge relationship rate curve as established at one specific point on a river be applied to other points on the same river?

A Generally not, no.

Q Thank you.

You state in your rebuttal testimony that SGI estimated that pumping the El Sur wells reduce the river flow at VT3 by .4 cfs; is that correct?

A I believe that's what was measured.

Q Actually, it was measured at VT2.

A Well, I've got VT2 and 3 confused sometimes because the locations were signified as the same place when they were different places in different years.

Q Thank you. Okay.

Now, also in your rebuttal testimony on page 3,

you state that "incremental stage changes of .04 feet at the USGS gage yields flow reductions on the order of 45 percent within the flow range"; correct?
A Based on the stage discharge relationship and if the stage changed by that level at that location, yes.
Q Isn't it just another way of restating what Mr. Horton found, which is that large changes in flow yield relatively small changes in river stage?
A In what?
Q River stage.
MR. LAZAR: Can you repeat the question?
MS. TEETERS: Yes, I can.
BY MS. TEETERS:
Q Isn't that just another way of restating what Mr. Horton found, which is that large changes in flow yield relatively small changes in river stage?
A That assumes that the Y value that you're interested in, that predictive value, is the stage change. I'm interested in the flow change, myself. They would not be strictly interchangeable. The one function would be slightly different than the other because the techniques for progression demand that.
But to make a short answer, it would be very similar, yeah.
Q Thank you.

Mr. Berliner.

BY MR. BERLINER:

Q Afternoon, Mr. Dettman.

A Afternoon.

Q My name is Tom Berliner. I am an attorney for El Sur Ranch.

Do you agree that the population of steelhead on the Big Sur River is self-sustaining?

A Well, there is no active program to supplement it. So whatever level that it is existing right now -- and it may not be self-sustaining. I don't think there is enough data to make that conclusion. And the data that I looked at indicates that at least in that reach the population of young fish, juvenile fish, is extremely low.

Q Do you agree or disagree with this statement: The Big Sur River population is not dependent upon intervention from hatchery production or rearing facilities for maintenance of its steelhead population?

A In general, I think the statement is correct, yeah.

Q Good. It's from Dr. Titus.

In considering whether the size of the stock on the Big Sur River could be increased, wouldn't it be appropriate to consider other potentially limiting factors in addition to flows such as barriers upstream, spawning, and rearing habitat in determining the overall condition

of the stock?
A Yes, I think it generally is a valuable analysis to do because -- especially in this case, because we know that upstream of that gorge area there is a tremendous potential for rearing juvenile steelhead. It may not now be realized.

I haven't seen any real reports that have documented whether or not fish in fact can or cannot move past that "barrier." I think it's possible on some extremely high flow years that some fish may be above that point.

So having said that, but recognizing that it would be a good idea to have more fish in the Big Sur River, if that's the goal, then perhaps modifying that location could be some part of a special enhancement program, we'll call it.
Q Are you aware that Department of Fish and Game has testified that if access to the upper river were provided, it could increase steelhead population by a thousand percent?
A I wouldn't doubt that figure at all.
Q Just to let you know, it's in Fish and Game's T-23, which is the Big Sur River Protected Waterway Management Plan.

In addition, if you wanted to increase steelhead

population on the river, wouldn't it also help to improve spawning gravels and address fine sediment issues?
A I'm not sure I can -- I've read what's been written so that's how I'm speaking. I haven't done a complete analysis of the spawning gravels in the stream.

Because of the recent fire, I would expect we'll see large fluxes of fine grain sediment for a large period of ten years or so which will influence suitability of that habitat.

But aside from the effects of the fire, what I've seen in the upper reaches of the Carmel basin, for example, in the Arroyo Seco, which are immediately adjacent to the Big Sur watershed, there doesn't seem to be a problem with spawning gravels in those streams, per say, except below any dams that might be in place.

So I would say it would be one of the factors that one would want to look at to see if there were problems somewhere that could be remedied.
Q Are you familiar with the Duffy report?
A Yes.
Q Do you recall that the Duffy report sited spawning gravel problems on the river?
A Yes. I believe that the problems that she described were two-fold. One is there were some fine grain sediment that looked like it could influence the survival of eggs

in the reds. Those are the nests -- steelhead nests.

The other was that it appears that recreation itself is perhaps a major factor in the survival of eggs and elvins and fry because people essentially walk on top of the nets and they don'ts really know they're doing that. It's a common problem in some urban streams and also interestingly enough was originally described, as I recall, in Wyoming and Montana as part of a study to determine what the affects of fishing on spawning was. And it was found that people -- some people were fishing right on top of the glides. So any way --

Q Kind of self-defeating; right?

A Yeah.

Q Since you're familiar with the Duffy report, do you know that you're sited in there?

A I do know that. And I think that's a mistake.

Q I was wondering about that.

A I can never remember estimating -- I think it was a thousand fish.

Q Five hundred to a thousand fish.

A Yeah, I don't know what the source of that is. I've looked at all my files, Dettman 2003, and I can't find it. So I don't know how that got in there. Unfortunately, there is no reference list attached to that report that I have.

Q Do you disagree with that number or do you just not have enough information?
A Well, I think I would disagree with that number certainly now. If the population levels of young fish in the lower mile are equivalent to the population levels in the upper seven miles -- we'll call it above the study area but below the gorge, I can't see any way how there could be 500 running adults to the river under the current population levels of juveniles.

And I think there's also information in the Duffy report related to fishing and catch. And I think that shows -- although it's not a long-term report, but there is some information there to show that the catch of steelhead has declined. I think a thousand is certainly not in the realm of possibility right now. Maybe 500 in a really good year.

HEARING OFFICER DODUC: Ms. Ferrari.

MS. FERRARI: I'm sorry. I'm just going to ask if Mr. Berliner can clarify what part of Mr. Dettman's rebuttal testimony you're asking questions about? We're having a hard time of finding what sections you're asking him cross questions about.

HEARING OFFICER DODUC: Mr. Berliner.

MR. BERLINER: I was referring to Mr. Dettman's conclusions about whether the Big Sur River steelhead population is healthy, robust, and successful. He made those statements. It would be page one of his testimony, paragraph two.

MS. FERRARI: Okay. Thanks.

HEARING OFFICER DODUC: Thank you, Mr. Berliner.

BY MR. BERLINER:

Q Mr. Dettman, I have to confess. I didn't quite follow when you were testifying about where you collected your fish data on the Carmel River that you were talking about earlier today. Can you explain that? Because I don't want to start asking you questions and get confused.

MR. LAZAR: Objection. Vague. Can you be more specific?

MR. BERLINER: I'll try.

BY MR. BERLINER:

Q Did you testify -- maybe I can get it through questions.

Did you testify that you collected your population data from the lower mile of the Carmel River?

A Not the lower mile. The lower ten miles. Most years, the lower mile of the Carmel River is not even flowing, or it wasn't during the period that the data was collected.

Depending upon the water year strength -- we'll call it, the front of the river. That's the last location where the river still flows the entire season -- is located anywhere from four miles up to eight miles depending upon the water demand, the strength of the water year, and how much water is in storage and how much can be released.

So the numbers that I used in the comparison were from that lower stations where the stream is still viable. And typically, they were all below -- we'll call it river mile ten.

Q And is that stretch of the river supported by releases from the dam?

A Most definitely.

Q And are there river rehabilitation programs in there such as improving spawning gravel, woody debris, et cetera? I don't know the extent of the programs.

A There are no spawning gravel programs in that reach. There are some upstream both immediately and below the dams.

But in that reach, there have been a number of riparian remediation projects that have been done and carried out. They have been very successful with the return of water to that reach. As you may or may not know in 1977, '76 and through the 1981 period, the entire reach of the river below what's called the Rosie's Bridge which is in mile 14 1/2, that reach dried up every year all the way to the ocean. So all that habitat was lost to the population.

And now about half of that has been returned to good production in almost all the years through management of flows and dissolved oxygen and temperature and these restoration projects.

Q And aside from the flow related management activities, could restoration projects on the Big Sur River provide additional benefit to the fishery on that river?

A I think they would. I think Denise Duffy located a number of stream crossings where there was some damage done by large numbers of people traipsing across the river. And so those types of small projects to restore habitat in those locations would probably beneficial.

Q How would you characterize the habitat in that stretch of the Carmel that referred to for mile 10 on down in terms of available habitat for steelhead?

A In that reach of the river, the available habitat is flow driven and dependent. I jotted down the flows in that reach a little while ago in the years where we measured the fish populations.

And in 1994, the flows ranged from -- and these are for the months of August through October. The flows ranged -- daily flows ranged from 1.5 to 3.5 relative.

Q Cfs?

A Cfs -- relatively low.

2004, they ranged from 3.7 to 17.

2006, they ranged from about 7 to 13.

And 2007, they ranged from 1.4 to 1.6.

Q So would you attribute the good population numbers -- relatively good population numbers on the Carmel to the habitat above that stretch of the river?

A No. Not necessarily. The fish spawn as far downstream as about river mile four. There is production early in the season from the upstream areas of excess surplus fry that move their way downstream and occupy these locations.

So the production of young in that reach is a function really of providing flow, providing good dissolved oxygen. Temperatures, interestingly enough, are higher than they are on the Big Sur. But there's also very good cover in terms of riparian vegetation and debris in the stream and in most years.

Q You testified that based on comparing the steelhead densities in the Big Sur and the Carmel that the critically low numbers of juvenile fish observed in '04 and '07 call into question the suitability of rearing habitat in the lower Big Sur. What are you referring to by the lower Big Sur River?

A I'm referring to the reach where it was called the study reach, essentially below VT1. The big bend in the

river I think is what's been described.
Q So you're not including the area between the study reach and the gorge; correct?
A Correct.
Q So isn't it a fact that the density of the steelhead -- juvenile steelhead could be low and yet the habitat quality for rearing could be good?
A That's a distinct possibility, especially in streams that are classified as threatened or endangered. Because typically the returns of adults are not high enough to saturate the stream with enough eggs that then produce fry that then fully seed the stream with young fish.
Q Is it right then that constraints on spawning habitat access could result in lower production of juvenile steelhead? It's independent of rearing habitat?
A It could.
Q And isn't it true the lower densities of juvenile steelhead could have been the result of a number of factors that are completely independent of the El Sur Ranch operations?
A That's possible. But in order to really evaluate that, you have to have synoptic measurements of the density of fish upstream of the so-called pumping.
Q Well, if you had habitat constraints within what we're calling the lower reach, wouldn't you have problems

independent of the El Sur Ranch operations if the ranch operations had nothing to do with that habitat and those habitat issues?

MR. LAZAR: Objection. Vague. I'm not sure what he means by "problems."

HEARING OFFICER DODUC: Clarify, Mr. Berliner.

MR. BERLINER: Sure.

BY MR. BERLINER:

Q Could there be constraints on juvenile steelhead production in the lower river if habitat conditions independent of ranch operations were in effect?

MR. LAZAR: Objection. Vague. Doesn't define "habitat conditions."

BY MR. BERLINER:

Q Mr. Dettman, as a biologist, are you familiar with habitat conditions for juvenile steelhead?

A Am I, yes.

Q Okay. Then my question is directed to your understanding of habitat conditions.

HEARING OFFICER DODUC: I agree. Please answer the question.

MR. DETTMAN: Could you repeat the question

MR. BERLINER: Could you read back the question, please?

(Whereupon the question was read back.)

MR. DETTMAN: It's possible that there are factors that are independent from the ranch operations that affect the overall population.

MR. LAZAR: Objection. You asked him to speculate. There's nothing to describe what these other conditions here are.

HEARING OFFICER DODUC: Mr. Berliner, where are you going with this?

MR. BERLINER: There are any number of factors that could affect juvenile fish, juvenile fish densities, juvenile fish production.

HEARING OFFICER DODUC: Could you phrase your question in terms of whether some of those factors specifically identifying them could impact habitat conditions?

MR. BERLINER: Sure.

BY MR. BERLINER:

Q Mr. Dettman could there be constraints independent of ranch operations that constrain juvenile steelhead production or density?

MR. LAZAR: Objection. Vague. It calls for him to speculate what these hypothetical conditions are. Please be more specific.

HEARING OFFICER DODUC: Mr. Berliner, try one more time.

BY MR. BERLINER:
Q Sure.
Habitat conditions might consist of the riparian cover, the riparian vegetation, temperature, flow, substrate, woody debris, the typical things that we see in a river that might affect habitat for salmonids. You're familiar with all of those; correct?
A Yes, I am.
Q And those are some of the kinds of things that you worked on on the Carmel River; right?
A And other rivers, yes.
Q When you assess habitat conditions on the Carmel and other rivers you worked on, those are amongst the kinds of things you look for; right?
A That's correct.
Q Do we have a common understanding then of habitat conditions for juvenile steelhead?
A I think so.
MR. LAZAR: The objection was to asking what other habitat conditions.
HEARING OFFICER DODUC: All right. Let me try, Mr. Berliner, because I actually want to know the answer to your question.
Aside from El Sur Ranch operations, what other factors would you apply may influence habitat condition?

MR. DETTMAN: In that reach of the river or upstream?

HEARING OFFICER DODUC: In that reach of the river.

MR. DETTMAN: Certainly, the flow level itself could be independent of the operations. I mean, there are years where the flows are naturally extremely low. In 1997, for example, the low flow of the -- on record that year, which is an extreme draught, was only two cfs at the USGS gage upstream. So I would expect in a year like that that with or without the operations of the ranch the stream actually might dry up in that reach.

HEARING OFFICER DODUC: Are there any --

MR. DETTMAN: For example, and then substrate conditions could be different. That would be the one factor I think that now might be actually operating on the whole system because of the effects of the fire.

I don't believe that vegetation in that reach specifically would be a problem. The entire canopy that I saw appeared to be well vegetated. There is a lot of wood debris. We saw some of that this morning. There's plenty of cobbles and rough stream bottom.

So I think the levels of dissolved oxygen, to the extent those may or may not be part of the ranch's operation, could be a causative factor in the low numbers.

And there may be interaction there with the State Park itself.

But hear again, I didn't see any evidence of that at the monitoring station -- long-term monitoring station that is run by the Regional Board there. I would think that based on what I know so far is the sediment -- fine grain sediment would be about the only other factor that we can identify from upstream.

HEARING OFFICER DODUC: Thank you.

You're getting close to about an hour on El Sur Ranch's cross. How much additional time do you think you need?

MR. BERLINER: Is "not too much" a reasonable response? I think in ten minutes, maybe.

HEARING OFFICER DODUC: Okay.

BY MR. BERLINER:

Q In your testimony you discuss the estimated change in river stage --

A Yes.

Q -- of 0.4 feet. And you intended that Dr. Hanson incorrectly estimated river stage changes 0.9 feet; correct?

A I think that's correct, yes.

Q And you indicated you've made a number of passage transect measurements, correct, in your career?

A Oh, yeah. Many.
Q And isn't it true that flow and water surface elevations within a stream can vary within a day based on a number of factors such as changes in evapotranspiration, tidal conditions, wind, waves, riffle turbulence, and other factors?
A Can you specify which location we're talking about? I'm not --
Q Just in general.
A In general. In this reach, one or all of those factors could affect a specific location.
Q Based on your experience in making field measurements, are you testifying that you could conduct a field measurement of a difference of 0.4 feet in stream elevation?
A Could you explain "conduct"? I'm not certain what that means.
Q Could you conduct a field test and determine that there was a change in the stream elevation of 0.4 feet?
A Depending upon the type of habitat, yes. At the USGS gage, because it's a gauging station, it's sort of ideally set up for that because it's typically in a reach that doesn't have a lot of surface turbulence.
Q And what about in the El Sur reach of the river?
A By "El Sur reach," you mean the study reach?

Q The study reach.
A I saw a number of locations that looked amenable to making such determination. The riffle habitats would be more problematic. But as long as you're measuring changes in depth between survey location, you could do that.
Q I think I'm being told I may have mispoke, that I said .4, but I meant to say .04.
A I understood your .04.
Q Okay. Thought so.
So in your view, did I understand your response, that you could in the field in a moving stream, you could detect a difference of 0.4 --
MR. LAZAR: Objection. Mischaracterizes his testimony.
MR. BERLINER: I'm asking him a question.
HEARING OFFICER DODUC: Help me by asking the question again.
BY MR. BERLINER:
Q You can answer yes or not to this question.
Are you saying that, based on your experience, you could, in the field, conduct a measurement that would detect a difference in the stream of .04 feet?
A Yes. Depending on the location.
Q Okay. If the location were in the study reach of the river, could you do it?

A   Yes. I think there are a number of sites that I saw where that would be possible.
Q   Are you aware that was impossible for SGI to do it?
A   No. They didn't testify it was impossible, I don't think.
Q   Do you recall they testified it was a calculated value?
A   Calculated value based on the change in the peizometer heights, is that what you're referring to?
Q   Yes.
A   I understood it that's how they conducted the -- their estimate. I'm not certain that's the way I would do it. But be that as it may --
Q   Okay. Water depths in the lower Big Sur River in the lagoon in '07 under critically dry conditions averaged about 0.5 feet or more in a majority of the habitats, referring to runs and pools.
MR. LAZAR: Could you clarify where this is coming from?
MR. BERLINER: Yes. Paragraph -- sorry. Page 3, paragraph five.
MR. DETTMAN: Of my testimony?
BY MR. BERLINER:
Q   Yes, sir.
A   Could you point out what line that is?

Q You're discussing rearing habitat --
A Uh-huh.
Q -- in the river?
A Uh-huh.
Q And so I'm going to ask you a question about rearing habitat.
A Okay.
Q And there was testimony from Dr. Hanson earlier that he analyzed rearing habitat in the river in 2007. Do you recall that?
A I recall that testimony, but I don't -- yeah, I do recall that testimony.
Q And to help you, do you recall that he indicated that 92 percent of that -- now you remember?
A I don't know what location that was though. I believe it was the VT transects; is that correct? I mean the PT transects.
Q Yes.
A It appeared to me when I looked at the detailed data behind those that some of those were located -- there were eleven transects, as I recall. It only looked like four of them were actually riffle habitats, and I couldn't tell because I wasn't there.

But on the remaining seven, it looked like they were relatively deep water transects that tended to maintain their depth, despite changes in surface stage and flow.

So whether or not the characterization that 92 percent of the measurement points were deeper than a half a foot, I'm not sure that really means anything, unless we can see how those transects were selected in relation to the rest of the habitats in the stream. So I think it is a stretch to call it to jump from those transects to the entire stream without further evaluation.

Q And I was not trying to go to the entire stream.

A Okay.

Q Would a change in elevation of .04 feet be within the natural variation within that stretch of the river?

A Yes. I would think so on a diurnal or die yield basis, given the evapotranspiration, that that might be definitely possible.

Q Referring to your testimony -- and I'll try make this simple. On page 4, paragraph 7 and page 12, paragraph 29 -- you don't have to look at it. People were asking where I was referring to. I just thought I would make it simple.

You testified that habitat quality and quantity for juvenile steelhead rearing varies in response to a number of factors, some of which we've talked about before: substrate, bolders, silt, sand, overhead cover, woody debris, et cetera.

Is it your understanding that the bypass flows developed by Dr. Hanson were based on adult or juvenile passage conditions in the lower river and were intended to allow steelhead movement among habitat units.

A That's my understanding that's what they would be limited to, yes.

Q And as far as juvenile movement, do you agree that 0.3 foot depth criterion is appropriate?

A In general, yes. Although I would want to see in any analysis like that you want to see the actual width that that percentage represents. Because if it's one foot wide, you know, one fish could get down through that. But that would certainly not be what I would recommend, primarily because there are a number of Avian predators on the stream. And I saw a number of those in my one-day visit. So I can imagine they're a fairly common problem for the steelhead. And having a wider stream with deeper water definitely would help reduce the level of predation.

Q So your long answer is a yes?

A My long answer is yes, but qualified.

Q And is it your understanding that the proposed bypass flows were not presented as comprehensive criteria for rearing conditions throughout the river?

A Well, that's a bit a tough one, because when I looked

at the actual testimony and I read it, it sounded and read as if the .3 criteria was being used to represent rearing habitat in the river. So -- or at least in the study reach. And that's what I formed my opinion on.
Q I'm drawing a distinction between the eight miles of the river and the roughly thousand feet or so that are impacted by the El Sur Ranch pumps.
A Yeah. In that reach, in the study reach, it's particularly important to have water that's deeper than a half a foot. And the reason for that is because the fish as they grow do tend to move downstream in the spring. And so in a natural setting with a well populated stream, we would expect to see relatively large numbers of larger fish in addition to the smaller ones. And those larger fish need significantly more depth, significantly more velocity to basically live in and to avoid the smaller fish which are then forced into the half-foot deep water in the riffles. So I think you need more than just that narrow corridor of a third of a foot, so to speak.
Q You're talking about pools and runs now; right?
A Not just pools and runs. But, you know, runs -- specifically the pools. The pool depths really aren't going to be all that different at flows that are -- we're talking about here. What's going to be different is the run habitat and the riffle habitat in particular because

they're the most sensitive to flow changes.
Q And do you understand that the ten cfs bypass flow was also intended to reduce the affects of groundwater on the DO concentrations within the lower river and to provide inflow into the lagoon to help maintain the lagoon mouth opening? I'm not asking if you agree. I'm just asking if you understand that was the basis of the recommendation.
A No, I didn't understand that. I thought was primarily designed to provide passage conditions.
Q In your testimony, you made a recommendation about a condition that should be attached to the permit that would address DO; correct?
A I did.
Q And is the condition that you are asking for dependant upon a showing that the operations of the ranch affect DO when that condition is in effect?
A Well, I wouldn't necessarily want to make the ranch responsible for fixing someone else's problem. So -- but assuming that the ranch is primarily responsible for the lower DO, then I think it makes sense to tailor their operations so they don't influence the dissolved oxygen in a way that's detrimental to the fish or the biota.
Q I take it the opposite would also be true. If the ranch operation is not responsible for the DO, then they should not be responsible; is that correct?

A   I think if that can be shown, yeah, that's certainly logical and I would say fair.
Q   You indicated that you take some measures to oxygenate water on the Carmel River; right?
A   Well, sort of indirectly. We manage the releases from Los Padres as a very limited opportunity to make releases from various depths in that reservoir. There's only three choices. You have surface supply, a siphon that draws water out at about ten feet, and then the lowest port in the reservoir which has nice cold water, but oftentimes pretty noxious if you're a fish and often has high levels of sulfite and carbon dioxide and low levels of DO, but it's nice and cold.
Q   So you aerate some of that water in order to --
A   Yeah. The releases there are made in a way that the water aerates. There is a fish ladder that was put in. And part of the reason it was put in the way it was was that it helps to aerate the water. Down lower in the system on the -- at the Sleepy Hollow rearing facility, I think I testified we placed a cooling tower in and indirectly that cools the water off not only in the facility, but when the flows are extremely low, it actually cools the water off in the river. And it may affect DO in the river also at times, but that's not what it was primarily designed to do.

Q So you would agree, though, that improving DO through artificial means can have a place in river management; correct?
A Yes. I believe that's possible. Certainly has been done in California.
Q Many times; right?
A I don't know about many times. Controversially, every time.
Q You indicated that adult steelhead kelts are present in the Big Sur throughout the year. And I'm referring to page ten, paragraph 22. And you state your opinion that flows for maintaining habitat and presumably allowing for movement of kelts should be considered in setting bypass flows; right?
A Yes. I think for the kelts, depending upon the time of year, if they would -- were definitely headed to the ocean, then you would need flows to get them past all the shallow points and back into the lagoon and then into the ocean.

At some point in time, late in the season -- and this is not probably well studied -- it may actually be advantageous to keep them in the stream environment for a period of time, because the conditions there are better for them than being in the ocean where there are even more predators than there are in freshwater. And they're in sort of a weakened state.

So the key during the late season -- and I'll call that basically after September 15th, let's say, through the first flows of the year, the first inflows that really produce water like we saw I believe it was 53 cfs on October 17th or something in 2004 -- that brief period of time I think that the kelts would be okay in the lower river as long as there was sufficient dissolved oxygen and the temperatures weren't too extreme.

Q Are you recommending that flows of 142 cfs be provided up through September?

A No. I'm recommending that there be enough water so that the fish can exist, not necessarily migrate during that brief window. So you might find that the flows -- I wouldn't be surprised if the flows for the juveniles during that period of time are suitable for the few kelts that would be in the river to exist until the next big flow occurred.

Q Are you aware of any reports of fish kills on the Big Sur River?

A Fish kills, no.

Q Okay.

HEARING OFFICER DODUC: You are an hour and 15 minutes in your cross.

MR. BERLINER: Just about done.

BY MR. BERLINER:
Q Now in your testimony on page 11, paragraph 24, you discuss the use of equivocal language by experts. And I appreciate that you're trying to defend Fish and Game's work, but here we've got actual data. We've got actual data, actual actions, and actual assessed impacts. And these data were assessed by two separate teams of experts working independently.
Isn't there a difference between an expert using equivocal language to express uncertainty in a given relationship or causal mechanisms based on site-specific data as compared to speculation based on an extrapolation of concerns from one river to another?
MR. LAZAR: Objection. Mischaracterizes his testimony. His testimony was about scientific uncertainty and not a variety of experts in this particular situation here.
HEARING OFFICER DODUC: I actually understood his question, and I'm curious of the answer. So the objection is overruled.
MR. DETTMAN: One of the problems we have as biologists is that nature is constantly throwing variability at us. So it's very difficult to make assessments and be 100 percent sure of an outcome.
And so the uncertainty is not only just in terms

of cause and effects, but it's also if you affect a change, can you be certain that you'll get the end result that you desire.

I think it's because of those two areas that we have this problem of saying things in uncertain ways and that be accepted. You know, the principle of uncertainty is that -- in my mind, is that given all these unknowns, you want to make sure that whatever bypass flow or whatever action you take that it will not be to the detriment of the fish. So everyone who works in this field tends to, I believe, overestimate how much water is actually needed.

And I know my attorney is squirming right now.

But this uncertainty that's created is then created for a very good reason. It's because these curves that we develop and the measurements that we take are just an approximation of what the fishes experience and the way they react to the change we make.

So I think this setting creates -- is a perfect setting for disagreements. And that's reason we have so many different opinions and ranges of opinions, not just for this case, but for every case that I've been involved with. There's always a full range of from one end of the spectrum to another.

Does that answer your question?

BY MR. BERLINER:
Q Let me give you an example. Let's say you read a paragraph that talks about temperature. Says temperature on a river in the summer is likely to be an adverse impact on salmonids. So you go out and you take temperature data and you conclude that, on your river, temperature is not a problem.
Can't you state conclusively as a biologist, let's say, working for the agency that's operating that river that temperature is not a problem on your river?
A Unfortunately, no.
Q Unfortunately no?
A Yeah.
Q Really?
A Yeah. And the reason is is because, number one, the standard itself is developed basically on the best available information that we have. And it oftentimes is not sufficient to form a firm cause and effect or even take an action you get this result.
So perfect example for temperature is, you know, you can have a temperature of 20 degrees and that's perfectly suitable if all these other conditions are met. And so you need to not only monitor that particular variable, but several others that are important and will influence the outcome that you're trying to create.

So in this case, it's clear to me that it's likely that the diversions are affecting dissolved oxygen. And it's also likely that dissolved oxygen may be a problem in extremely dry years just even under natural circumstances if this loss that's being ascribed in that reach is truly a natural phenomenon. But so far I've not seen any measurements that indicate that's a completely natural phenomenon. In fact, if anything, the data upstream suggests that the stream up to VT1 is just fine in all cases.

So something is occurring in that reach that affects the dissolved oxygen, which also affects the temperatures that are required. You know, we didn't spend a lot of time trying to rebut the temperature information. But it was ripe for rebuttal. And the reason was is because the dissolved oxygen are so low that you wouldn't want to have any temperatures outside the optimum. And the optimum for these fish is more like 13 degrees centigrade. So, you know, all these factors need to be considered at once.

And I feel for the Board because they have to weigh all this and balance it all.

But the important thing is someone needs to be sure that the habitat in that portion of the river is suitable in all the factors that we measured and probably some that haven't.

Q So are you saying that -- saying temperature is likely to be a problem if you haven't measured it; is essentially the same as temperature is likely to be a problem even if you have measured it?

MR. LAZAR: Objection. It's confusing. Please restate.

HEARING OFFICER DODUC: Yes, I'm confused, Mr. Berliner.

MR. BERLINER: All right. I'll move on.

BY MR. BERLINER:

Q Have you reviewed the CEQA documents in this case?

A I have reviewed portions of -- I think I testified on cross I've reviewed portions of the draft EIR.

Q Do you recall the CEQA analysis did not identify any significant impacts of El Sur Ranch operations on DO?

A No, I'm not aware of that. No.

Q In performing your -- and I'm just about done --

HEARING OFFICER DODUC: Okay. You've said that several times, Mr. Berliner.

MR. BERLINER: Well, you have to give me some leeway, because Mr. Dettman has very long answers.

BY MR. BERLINER:

Q In performing the passage measurements that you did back in April, is it correct that you identified two

transects at a critical riffle?
A Two transects at a braided riffle reach, yeah.
Q And is it correct that after you laid your transect -- do I understand your notes that you then selected locations both upstream and downstream of your transect to make depth measurements?
MR. LAZAR: I'm going to object. I don't think this is in his rebuttal testimony
HEARING OFFICER DODUC: Mr. Berliner, can you point us to
MR. BERLINER: Sure. This is CBD-111.
MR. LAZAR: That was asked about as part of the direct testimony. We offered to submit those as Exhibits 111 and 112. However, they were provided -- they were to be provided as part of our direct testimony, Madam Chairperson, you'll recall. And Mr. Dettman did not have them available. We offered to provide them as part of our rebuttal exhibits.
HEARING OFFICER DODUC: I'm sorry. Do you plan to submit them as part of your rebuttal?
MR. LAZAR: Madam Chairperson, we spoke about this on Friday, at which point we identified Mr. Dettman did not have two tables attached to one of his charts. And we offered to the Board to provide them as rebuttal exhibits.

HEARING OFFICER DODUC: And so Mr. Berliner is authorized to ask questions about them.

Please go ahead.

BY MR. BERLINER:

Q After you laid the transect, do I understand it that you took then measurements at various locations along the transect both upstream and downstream of the transect line?

A Yes. When you put -- when you lay a transect across the "crest" of the riffle, you're supposed to put it across the shallowest portion and takes measurements of shallowest portion of the riffle.

I adopted the Thompson method, and I've used this a couple of different instances now, especially in situations like this one where the channel is not stable at all.

Where you take an offset from the transect line when the shallowest depth is either just upstream or just downstream of the table. So you could envision this as the fish moves up. He's at the tape or she's at the tape. That's not the shallowest point or cell that you're measuring. It's just upstream or it's just downstream of that. So it's a modification to the Thompson method.

Q And did you move as much as six feet up or down?

A In one or two cases, yes.

Q And your goal in doing this was to find the shallowest spots; correct?
A Find the shallowest pathway the fish would have to move through. That's correct.
Q And if were a fish, wouldn't you look for the deepest pathway to move through?
A You certainly would.
Q And this is not standard practice in using the Thompson criteria; right? This is something you adapted?
A I adapted it. The data -- in the situation like this, the Thompson method really wasn't developed. And that's part of the problem. Wasn't developed for the location and the type of geomorphology at that site.
Typically, these riffles that -- and I've seen them on the Carmel where the stream width is perhaps 60 feet. Crest of the riffle is 250 feet long. And these always, always occur where there is a known problem with bank erosion, where the stream, as the flow declines, sets up what we call a longitudinal riffle. In other words, it's not -- typically riffles in streams are basically oriented across the current. And these are oriented with the current. And that creates a long, long reach of the river that's extremely shallow. So this approach that I've used measures the depths across that long crest. And we had one of those situations at one of these sites.

Having said all that, the Thompson criteria -- I think there was testimony about it being -- you had to consider -- I think Dr. Hanson said you had to consider the actual width. And I agree with him on that. I think it's very possible that fish can move up a section that may be five or ten feet wide. That as long as it meets the seven-tenths of a foot and that may only be 15 percent of the cross section. So you have to interpret the data that is generated by the Thompson method, whether you use the traditional one or the one I've adapted.

MR. BERLINER: And I have just a question or two for Mr. Shutes. You've been sitting here very patiently.

You're not testifying as an expert, are you?

MR. SHUTES: No, I'm not.

MR. BERLINER: I have no further questions.

HEARING OFFICER DODUC: Thank you, Mr. Berliner.

Mr. Lazar, would you like to move your exhibits into evidence?

MR. LAZAR: Yes, I would. At this time I'd like to move Mr. Shutes' rebuttal testimony in as CSPA-6.

I would like to move in Mr. Dettman's testimony as CSPA-110.

I would like to move in Mr. Dettman's exhibits to his rebuttal testimony as CSPA/CBD 106, 7, 8, and 9.

I would like to move in the tables that were corresponding to CSPA/CBD-103. I would like those entered in as CSAP/CBD 111 and 112.

I also would like to offer into evidence the slide shows that we made for Mr. Dettman's direct and rebuttal testimony. I neglected to offer his direct slide show as an exhibit. I may do that at this point if the Board is interested in accepting that.

HEARING OFFICER DODUC: Go ahead.

MR. LAZAR: In that case, I would like to submit Mr. Dettman's rebuttal slide show as CBD/CSPA-114 and his direct slide show as CSPA/CBD-115. And if I'm transposing CSPA and CBD there, please correct me.

STAFF GEOLOGIST MURPHEY: What about CSPA/CBD 106 through 108?

MR. LAZAR: I believe I asked you to have those submitted, 106, 7, 8, and 9 as exhibits for Mr. Dettman's rebuttal testimony.

STAFF GEOLOGIST MURPHEY: Okay. Thanks.

MR. LAZAR: Thank you.

HEARING OFFICER DODUC: Any objections?

We will move those into evidence.

(Whereupon the above-referenced documents were admitted into evidence.)

HEARING OFFICER DODUC: And it will be of great help to us if all the parties would submit your revised exhibit identification index.

And when would you like that, Mr. Murphey?

STAFF GEOLOGIST MURPHEY: How about Wednesday afternoon by 4:00 p.m.

MR. LAZAR: Sure.

HEARING OFFICER DODUC: Ms. Mahaney has something to add.

SENIOR STAFF COUNSEL MAHANEY: And also if you would serve your rebuttal exhibits and exhibits that have not yet been served electronically on each other and to us so we have them in a postable format by the same time frame.

HEARING OFFICER DODUC: Everyone got that? Okay.

Let's talk about the closing briefs. We will accept closing briefs. They will be limited to 25 pages, double spaced.

And according to the court reporter, the official transcript will be available approximately two weeks from today. She's nodding her head. So the briefs -- the closing briefs will be due about 30 days after the transcript is available. Once we receive the official transcript, we will inform the parties when the briefs are due.

And I believe Mr. Berliner has a question.

MR. BERLINER: I do.

The parties had spoken among themselves and we're trying to come up with a plan for briefing. And I was wondering if you would be interested this hearing that.

HEARING OFFICER DODUC: I would be very interested in hearing that. This would be all the parties have spoken together?

MR. BERLINER: Well, I've spoken with Mr. Lazar and with Ms. Ferrari. Not spoken with Mr. Johnson or Mr. LeNeve.

HEARING OFFICER DODUC: Okay. Proceed.

MR. BERLINER: I'd be happy to speak with Mr. Johnson since he's here. Mr. LeNeve is not.

So why don't I just tell you, and if Mr. Johnson has concerns, we can discuss that and the other parties.

HEARING OFFICER DODUC: Mr. Johnson has been so agreeable today.

MR. BERLINER: He's tired, which we all are.

We, too, thought it would take about two weeks to get the transcript. We then thought because of the technical nature a lot of this that a ten-day turn around for errata would be appropriate and suggest that about 30 days after that would be Friday, September 16th -- whatever that Friday is -- about September 16th to submit the closing briefs. And --

HEARING OFFICER DODUC: I'm sorry. You're requesting two weeks to submit erratas?

MR. BERLINER: Just ten days.

HEARING OFFICER DODUC: Ten calendar days.

MR. BERLINER: We're not quite sure -- so basically we're thinking we might need a week or something for all the parties to get the erratas as done, because we're going to have to consult with our experts to make sure the language is just right. It's been a lot of reading.

HEARING OFFICER DODUC: Okay. I'm sorry. Continue.

MR. BERLINER: So we were thinking September 16th might be about right for that.

And we were hoping for a little bit higher page limit of either 30 to 40 pages. We would prefer 40 as the applicant, frankly. But that would be depending upon agreement with the other parties. We assume everybody will want the same page limit.

HEARING OFFICER DODUC: Since we will have to be the ones who read them, I think we will decide on the page limit.

We won't designate a specific due date right now, because it's all based on when the transcripts are due. When the official transcripts are due, we'll allow a week for you to do your errata and then for the closing briefs to be submitted 30 days after that. And we'll --

MR. BERLINER: You'll issue something?

HEARING OFFICER DODUC: We'll issue a notice so everyone knows. Just because you asked so nicely, we'll increase the page limit to 30.

MR. BERLINER: You usually get more with sugar than vinegar. Thank you very much.

HEARING OFFICER DODUC: Does staff have any procedural issues the address at this time?

SENIOR WATER RESOURCES CONTROL ENGINEER LINDSAY: Just to be clear, Ms. Mahaney, you were asking for -- we want all of the exhibits electronically, not just one the ones that were passed out. I just don't want any confusion. Everything that has come in on rebuttal, we want it electronically.

SENIOR STAFF COUNSEL MAHANEY: What I wanted to make clear is we want a copy of everything you have ever submitted electronically, but I think we have most of all the direct testimony. There were some exhibits that came through on cross-exam as well as on rebuttal.

So bottom line is we want it electronically if you have not already provided to it to us electronically, but also serve it to others as well.

HEARING OFFICER DODUC: I'm a bit late, but did you have any questions for Mr. Lazar's rebuttal witnesses?

No.

The Board will take this matter under submission. The Board staff will prepare a proposed order for consideration by the Board.

The participants in this hearing will be sent notice of the Board's proposed order in this matter and date of the Board meeting at which this matter will be considered.

After the Board adopts an order, any person who wishes to will have 30 days within which to submit a written petition for reconsideration by the Board.

And with that, thank you all for your cooperation and participation in the hearing. The hearing is adjourned.

(Whereupon the hearing recessed at 5:29 PM)

CERTIFICATE OF REPORTER

I, TIFFANY C. KRAFT, a Certified Shorthand Reporter of the State of California, and Registered Professional Reporter, do hereby certify:

That I am a disinterested person herein; that the foregoing hearing was reported in shorthand by me, Tiffany C. Kraft, a Certified Shorthand Reporter of the State of California, and thereafter transcribed into typewriting.

I further certify that I am not of counsel or attorney for any of the parties to said hearing nor in any way interested in the outcome of said hearing.

IN WITNESS WHEREOF, I have hereunto set my hand this 25th day of July, 2011.

____

TIFFANY C. KRAFT, CSR
Certified Shorthand Reporter
License No. 12277