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PUBLIC HEARING
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS
STATE OF CALIFORNIA

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

---o0o---

Held in
Resources Building
Sacramento, California
Tuesday, November 9, 1993

VOLUME X

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Reported by: Kelsey Davenport Anglin, RPR,
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01 SACRAMENTO, CALIFORNIA
02 Tuesday, November 9, 1993, 9:00 a.m.
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04 HEARING OFFICER del PIERO: Ladies and Gentlemen,
05 this hearing will come to order, please. For those of
06 you that have not been here before, this is a
07 continuation of the hearing regarding the Amendment to
08 the City of Los Angeles' Water Rights Licenses for the
09 diversion of water from streams that are tributary to
10 Mono Lake.
11 My name is Marc del Piero. I'm Vice-Chairman of
12 the State Water Resources Control Board. I've also
13 been acting in the capacity of Hearing Officer in this
14 matter. With me today is my good friend and colleague
15 Mr. John Brown who is also a member of the State Water
16 Resources Control Board.
17 When last we left yesterday, we had concluded
18 presentation from witnesses on the behalf of the L.A.
19 Department of Water and Power. They will be actually
20 coming back for both redirect and recross at a
21 subsequent date.
22 Mr. Birmingham, I understand you have two
23 witnesses that are available only today that are here
24 today; is that true?
25 MR. BIRMINGHAM: That is correct, Mr. del Piero.

01 HEARING OFFICER del PIERO: Will it be you or
02 Ms. Goldsmith introducing them?
03 MR. BIRMINGHAM: Ms. Goldsmith.
04 HEARING OFFICER del PIERO: Good morning,
05 Ms. Goldsmith.
06 MS. GOLDSMITH: Good morning, Mr. del Piero.
07 MR. FRINK: Mr. del Piero --
08 HEARING OFFICER del PIERO: I'm going to swear
09 them in a second. Just relax.
10 MS. GOLDSMITH: That was my first comment, too.
11 HEARING OFFICER del PIERO: Why don't you go ahead?
12 MR. FRINK: I just wanted to kind of exhort
13 everyone to move it along today. I did a rough count.
14 We've got 138 witnesses to go. Some of those may have
15 dropped out. But if we go at the rate of one witness
16 per day, which seemed to be what we were approaching
17 yesterday, and 15 hearing days per month, we'll still
18 be here August 1 beginning the rebuttal portion of the
19 hearing. That could go for a couple of months. I
20 don't think that would please Judge Finney, anybody in
21 the room, certainly not Staff or the Board.
22 A couple of suggestions, maybe, on ways to speed
23 things up, and I talked to Ms. Goldsmith about this
24 and she was in agreement, to make more of an effort to
25 make witnesses available for cross-examination as a

01 panel. In some ways, it's more awkward, but usually
02 you ask a question once instead of asking it repeatedly
03 to several witnesses before you hit the person who's
04 most qualified to answer.
05 Secondly, sometimes our cross-examination seems to
06 focus on trivial details instead of the major issues,
07 and if we could make more of an effort to focus on the

08 key issues.

09 And finally, I think we've all got to recognize
10 that there are qualified experts that are going to
11 disagree no matter how long we cross-examine them, but
12 in any event, this is just kind of my plea to everyone
13 to try and move it along so we're not still here a year
14 from now.

15 HEARING OFFICER del PIERO: Ms. Goldsmith, you
16 want to introduce your witnesses?

17 MS. GOLDSMITH: Yes. Before I do, I'd like to
18 make a slight amendment of Mr. Frink's comments about
19 my assent. I certainly agree that redundant
20 cross-examination is occurring and perhaps can be
21 avoided. I do think that it's important to allow
22 parties the flexibility as to whether or not they
23 present their witnesses as a panel or singly. I am
24 presenting Dr. Kimmerer and Dr. Melack this morning as
25 a panel in the interest of time because I feel that

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01 they can be presented that way, but that's not the case
02 with all our witnesses and probably not with the
03 witnesses of other parties.

04 This morning I'd like to introduce and call as our
05 witnesses Dr. John Melack and Dr. Wim Kimmerer.

06 Dr. Kimmerer -- neither of them, I believe, has
07 yet been sworn.

08 HEARING OFFICER del PIERO: Is there anyone
09 else -- I guess we're going to have just you two
10 gentlemen today for the bulk of the cross-examination,
11 so why don't you stand and if you'd answer in the
12 affirmative, do you promise to tell the truth during
13 the course of this proceeding?

14 THE WITNESSES: I do.

15 HEARING OFFICER del PIERO: Thank you very much.
16 Please be seated, and I'll let you begin.

17 DIRECT EXAMINATION BY MS. GOLDSMITH

18 Q Dr. Melack, would you state your name and spell it
19 for the Reporter?

20 A BY DR. MELACK: John Michael Melack, J-O-H-N
21 M-I-C-H-A-E-L M-E-L-A-C-K.

22 Q How are you employed, Dr. Melack?

23 A I'm a professor at the University of California
24 Santa Barbara.

25 HEARING OFFICER del PIERO: Speak into the mike,

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01 please.

02 MS. GOLDSMITH: Are these on?

03 HEARING OFFICER del PIERO: Yes. They're on if
04 you talk into them.

05 Q BY MS. GOLDSMITH: L.A. DWP Exhibit 23, which I
06 believe you have a copy of, is your curriculum vitae.
07 Is that a true and correct statement of your
08 qualifications, education, and experience?

09 A Yes, it is.

10 Q Could you briefly give the highlights of your
11 experience and qualifications concerning studies of
12 Mono Lake?

13 A Very briefly, I did my Ph.D. work in eastern
14 Africa on saline lakes beginning in 1971, and then

15 began working at Mono Lake in 1978 and have continued
16 there ever since. That's included, hence, publishing a
17 variety of papers as well as serving on a number of
18 advisory boards including the National Academy of
19 Sciences Study.

20 Q L.A. DWP Exhibits No. 25 through 31 list a number
21 of papers and publications. Are these papers and
22 publications of which you have partial authorship?

23 A Yes.

24 Q And do they contain information and analyses that
25 you relied on in forming your conclusions concerning

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01 Mono Lake?

02 A That's correct.

03 Q L.A. DWP 32 and 33, Exhibits 32 and 33, are papers
04 that were authored by others. Are these papers on
05 which you relied in forming your opinions and preparing
06 your testimony?

07 A They were used to suggest certain kinds of data
08 analysis that we used.

09 Q L.A. DWP Exhibit 22 purports to be your
10 testimony. Is it true and correct?

11 A Yes, it is.

12 Q Do you have any additions or changes?

13 A No.

14 Q Could you briefly summarize your testimony for us?

15 A Could I get a sense of timing here in where are we
16 in terms of --

17 Q 20 minutes.

18 HEARING OFFICER del PIERO: We're here until we're
19 done.

20 MS. GOLDSMITH: He's concerned about the 20
21 minutes.

22 DR. MELACK: I was told I should try to keep my
23 summary to 20 minutes.

24 HEARING OFFICER del PIERO: You should try to keep
25 your summary to 20 minutes inasmuch as one of the -- I

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01 always like saying this because it always gets a laugh.
02 One of the prerequisites for serving on this Board is
03 you have to be able to read, so since you've presented
04 your documentation and presentation in writing in
05 advance, we've done that. And so you have 20 minutes
06 to summarize it.

07 DR. MELACK: Terrific.

08 Okay. In many ways, the ecology of the open
09 waters of Mono Lake is so well-known that you can use
10 that information to come to, I think, very informed
11 judgments about how the lake is currently functioning.
12 In particular, over the last 14 years, we've conducted
13 an intensive year-round sampling and analysis program
14 which has provided us with a very great source of
15 information. And based on that, then, we can evaluate
16 the changes through time in the populations of the
17 algae and brine shrimp and can, I think, come to a
18 fairly reasonable conclusion that the lake is certainly
19 what we judge as a healthy ecosystem, and I'll describe
20 a little bit later some of those data and the basis for
21 saying it's healthy. But I think it's clear that not

22 only my evaluations, but the National Committee
23 deliberations also concurred that Mono Lake, by any
24 standard of an ecologist, would be judged as a
25 functioning, healthy ecosystem as it's been in

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01 existence over the last 14 years which, for the record,
02 spans lake elevations from 6372 to 6381.

03 I'd like to make two other introductory summary
04 comments regarding this deliberation and then proceed
05 to present some information I think that would support
06 my claims about the lake being a healthy ecosystem.
07 The first is when one tries to evaluate changes,
08 ecological changes, one has to establish some kind of
09 criteria, and that's always a difficult question and,
10 it often becomes somewhat arbitrary.

11 In the case of the Draft EIR done for Mono Lake,
12 the criteria of 25 percent change from some reference
13 level was used for the open-water community. And I
14 would contend that this, although perhaps reasonable as
15 an arbitrary decision, doesn't hold up to the realities
16 of what the lake actually experiences. And if you
17 look at the real data, you'll find that that's a much
18 too narrow bound of criteria and that, in fact, one
19 should have extended that bound quite a lot further
20 and, in fact, used even a different criteria which is
21 the criteria of long-term trends, not simply a
22 variation around the mean.

23 The second point is that when you look at a system
24 like Mono Lake, you have to think of it as an
25 ecosystem. In other words, as a functioning collection

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01 of organisms in a particular environmental setting and,
02 therefore, you can't simply look at one single factor,
03 for example, salinity, which tends to be done. You
04 can't say the salinity is "X" and, therefore, the lake
05 is in good or bad shape. You have to, in fact,
06 evaluate the populations in the context of the other
07 species and their physical and chemical environment.
08 If you do that, in fact, what you find is that in the
09 case of the key organism in the open water, that is the
10 brine shrimp, *Artemia monica*, that salinity by itself
11 does cause negative effects on the population as
12 salinity increases, but these effects are mitigated and
13 modulated by effects on food supply and other factors.

14 So I think it's important that we keep in mind
15 that we're really looking at a complicated ecosystem,
16 not simply a physiological experiment.

17 With that, in the way of introduction, I'd like to
18 present a little bit more information about the lake as
19 it currently exists, and I'm going to restrict my
20 attention to the open water part of the lake; that is,
21 the lake where animals and plants are free floating or
22 free swimming in contrast to those which are attached
23 to the bottom near shore.

24 I'd like to bring your attention to the first
25 figure which is designed to show two things. One is to

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01 remind us that the ecology of Mono Lake is driven by
02 only a very few species, as is very typical of

03 high-saline bodies of water. If you look all over the
04 world, you'll find saline lakes, and many of these are
05 like Mono Lake, highly productive and contain very few
06 species. In Mono Lake's case, there's really only one
07 major species of animal living in the waters itself off
08 the shore, the Artemia monica population. This animal
09 is then -- uses for its food free floating algae or
10 phytoplankton.

11 The resource which tends to limit the growth of
12 the algae and, in turn, the production of the shrimp is
13 nitrogen, and we find that, in particular, ammonium is
14 an important form of nitrogen which occurs in the lake
15 and is produced by a decomposition of organic matter in
16 the sediments and by the excretion of the brine shrimp.
17 So when one thinks about the biological dynamics of
18 Mono Lake, one has to take into account the fact that
19 its resource base is depending on a supply of nitrogen
20 and, of course, light, and those resources feed --
21 supply resources to phytoplankton or algae which are
22 then, in turn, eaten by the brine shrimp. And we have
23 a very tightly coupled system between the algae and the
24 shrimp and the nutrients.

25 The next figure emphasizes the changes through
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01 time in any given year of the Artemia population. I
02 think it's important to remember that we're looking at
03 changes now. We're thinking about change, and we're
04 thinking about change that occurs every year and we're
05 trying to see long-term changes that might be caused by
06 human affects rather than natural causes.

07 What I'm showing you here is a typical annual
08 cycle of the Artemia's life history, which is that the
09 shrimp, every year, hatch from small resistant eggs
10 called cysts, which reside in the bottom of the lake.
11 During the period from January through May, these
12 hatch. They develop into adults. These adults male
13 and female produce young, live young, which, in turn,
14 mature, and then both generations produce cysts. So
15 every year the population goes from essentially zero to
16 some large number, tens of thousands per square meter,
17 and then declines to zero again. And every year the
18 cysts and the sediments are the source that, in fact,
19 becomes the basis for the next year's generation.

20 So, now, although these general patterns of
21 cyst-catching Artemia growth and decline occur each
22 year, there have been large differences from year to
23 year that we've observed. We've also observed
24 differences in the amount and production of the algae.

25 And what I'd like to now talk through a little bit
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01 is some of the reasons why we've preserved these
02 variations in the amount of algae present, in their
03 productivity, and in the amount of shrimp present. So
04 I think it's important to bear in mind causes for
05 variation when one tries to evaluate whether or not
06 there's an ecological impact currently being imposed on
07 the lake by changing water diversions.

08 The lake naturally, and I don't want to go into a
09 limnological lecture here, but it's important to
10 realize that lakes in the north temperate zone

11 typically are what's called stratified thermally. That
12 is, they heat up in the surface waters during the
13 summer and then mix during the winter period. And this
14 annual cycle of mixing and stratification affects the
15 supply of light and nutrients to the algae.

16 In the case of Mono Lake's history over the last
17 15 years, we have experienced that annual cycle. We've
18 also experienced periods in which due to large flows of
19 fresh water into the lake, the lake became chemically
20 stratified and did not mix from top to bottom each
21 year. The jargon used to describe that condition of
22 partial mixing is meromictic, and it basically means
23 the lake is no longer injecting these nutrients from
24 deep water into the surface waters on an annual basis.
25 And this led, then, to very dramatic changes in the

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01 abundance of algae and their productivity.

02 So the first major lesson that we've learned,
03 then, from this 14-year data set is that adding water
04 in large quantities such as occurred during the 1983
05 snow melt season, which was very large because of the
06 very large El Nino in California as well as other parts
07 of the world, resulted in a large input of fresh water
08 which raised the lake level, which diluted the surface
09 waters, which reduced the vertical mixing, which, in
10 turn, led to a large decline in the abundance of algae
11 and the productivity of the phytoplankton.

12 The second major point that has come out of these
13 long-term records is that the Artemia populations
14 change dramatically from year to year depending on the
15 size of the first generation: that is, the generation
16 which emerges from cyst hatching. In the years where
17 we have small spring generations, we tend to have very
18 large summer generations. In years where we have low
19 spring generations, we tend to have moderate summer
20 generations, and this is because the food supply of the
21 shrimp is more or less depleted by the size of the
22 first generation.

23 So again, we have evidence here of the importance
24 of food supply affecting the brine shrimp population
25 dynamics which comes back to my initial point that we

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01 have to evaluate the ecosystem of Mono Lake in terms of
02 its interacting populations, their resource supply, and
03 their temporal dynamics.

04 Now, to look more rigorously at these changes
05 through time, I want to look at some time surveys data;
06 that is, data that run through this 14-year record, and
07 evaluate the kind of patterns that we observe in those
08 records and think about these records in the context of
09 how might you judge the ecological health, if you will,
10 of Mono Lake, which I think is one of the issues here.
11 How do we tell whether an ecosystem is healthy or not?
12 And I would submit that there are various ways of doing
13 that. Most are based on either the number of organisms
14 present, number of species present, and their
15 variations in time and space.

16 In the case of Mono Lake, we have very few species
17 there, although they have sustained their populations

18 through time. So I think we should look instead at not
19 the loss or gain of species, but instead the change in
20 abundance through time.

21 And the next transparency, the next picture, shows
22 this. It would be easier if I could actually walk up
23 and point here. Can I take one of these microphones
24 and walk up and do that?

25 HEARING OFFICER del PIERO: I don't know if it
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01 will -- just talk loud.

02 DR. MELACK: That one may reach. Is that
03 permissible to do that? Thank you.

04 What I'm showing here is a record of changes in
05 the abundance of aology measured with a unit called
06 Chlorophyll-A, which is the amount of the photostatic
07 pigment and, on the bottom panel here, the abundance of
08 Artemia, that is the brine shrimp, in thousands of
09 animals per square metered lake area. The dark blue
10 lines show the actual measured data which were sampled
11 every two weeks to every month over this period. The
12 dashed line shows the 12-month moving average which
13 smooths out some of these variations that occur in any
14 given year.

15 The message of these data -- we look first at the
16 algae. During the period of -- I'm sorry. This is
17 Figure 10 in my direct testimony. During the period of
18 meromixis or reduced vertical mixing, we see a very
19 pronounced decline in the abundance of algae in the
20 lake. This is now high lake levels, reduced vertical
21 mixing, lower algal abundance. Prior to that, during
22 lower lake levels, 6372 to 6375, we have higher
23 chlorophyll levels and then, again, once we mix the
24 lake and, again, have declining lake levels, the
25 chlorophyll populations actually increase again. So
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01 there's a correlation here, if you will, between
02 vertical mixing and amount of algae.

03 It's also, I think, very important to recognize
04 that if you look at these data and you look at only a
05 three-year record, you can find evidence of very marked
06 declines and very marked increases in the abundance of
07 the algae. I think this is a very strong warning to
08 any management decision that you can't make a decision
09 based on a short time series. You can be very easily
10 misled. You have to look at at least five years, and
11 preferably longer, to evaluate whether or not a system
12 is changing.

13 If we now look at the abundance of the brine
14 shrimp, again, we see large variations, as I mentioned
15 earlier, from high numbers to almost zero each year,
16 which is typical of the cycle or the life history.
17 More importantly, though, if you look at the dashed
18 line, what you find is that over this whole 14-year
19 period, there's really no trend whatsoever. The
20 populations just basically bound along more or less on
21 an even keel which would, by my eyes, suggest that the
22 lake is actually in very good shape, even in the face
23 of large changes in algal abundance and primary
24 production. So the shrimp, in fact, seem to be

25 modulated against changes in algal abundance which vary
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01 quite substantially due to this natural predation of a
02 period of meromixis.

03 Now, an additional point I'd like to make is in
04 terms of evaluating these data. You can not just look
05 at time series, you can also look at various statistics
06 of variance and variability, and there's a variety of
07 these you can use. The easiest ones are ones that look
08 at the natural range and compare that to the overall
09 average, and if you do that, what you find is that for
10 the phytoplankton, you compare the percent variation,
11 long-term range of variation to the mean. The
12 variation's about 180 percent over this period. It
13 doesn't mean a whole lot to you, but it's maybe worth
14 pointing out that this number is certainly much greater
15 than a 25 percent variation which was used in the Draft
16 EIR criteria.

17 It's also low by comparison to many other lakes.
18 It's low by comparison to Lake Tahoe, for example, Lake
19 Washington, Lake Huron. So even other large lakes
20 have, in fact, more variability than does Mono Lake.

21 Secondly, if you look at the productivity;
22 that is, the growth of the algae, the growth of the
23 phytoplankton, and the growth of the brine shrimp, we
24 again find that the range, the annual range in values
25 compared to the mean extends from, in the case of the

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01 algae, about 200 percent to about 50 percent of the
02 mean. And in the case of the brine shrimp, about 170
03 percent to about 70 percent. Again, we're looking at
04 natural variability associated with largely changes in
05 nutrient supply and climatic factors which are causing
06 the lake to experience variations. And these
07 variations must, then, be taken into account if one's
08 actually going to evaluate the health of the system.

09 One last major area here is the use of models,
10 mathematical models, as a way to judge how Mono Lake
11 has been functioning. What I've been emphasizing to
12 date in this summary is real data. Now, model results
13 have also been used and, I think, sensibly in the EIR,
14 although the use of models is a dangerous exercise
15 unless the models are properly considered. And
16 whenever you build a model, you have limitations and
17 assumptions built into it, and one has to be very, very
18 careful when one uses model results. I am of the
19 opinion that perhaps some of the model results that
20 were used in the Draft EIR were not properly
21 considered. My own research group has developed two of
22 these models, so I'm not criticizing others. I'm
23 criticizing myself here, and it's a function of what
24 models can do for us.

25 We built two models. One was a physical model

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01 based on vertical mixing on dynamics. The second was a
02 plankton model based on analysis of the brine shrimp,
03 the algae, the nutrients in the lake. And I'll
04 emphasize here, then, the second of these, the plankton
05 model, and point out that by combining a detailed

06 analysis of population dynamics with an analysis of
07 algal growth and nitrogen cycling, we were able to --
08 excuse me, assess the way that not only salinity, but
09 also food supply and nutrient supply affected the
10 Artemia populations. And we found that, in fact, the
11 long-term impacts of changing salinity were very much
12 modulated by changes in food supply.

13 I would hasten to add, though, that use of these
14 models beyond their validated range; that is, outside
15 the range of known information is difficult and is made
16 difficult because we don't know, in fact, how the lake
17 may change in species composition or in overall
18 ecological condition.

19 So I would be, I guess, interjecting a lot of
20 caution in the use of model results as a basis for
21 evaluating ecological impacts, especially when you have
22 at your disposal a very long data set which is based on
23 real observations.

24 HEARING OFFICER del PIERO: Doctor, your 20
25 minutes are up.

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01 DR. MELACK: Yeah. How's that?

02 HEARING OFFICER del PIERO: That's fine.

03 (Laughter.)

04 MS. GOLDSMITH: Are you done?

05 DR. MELACK: Yeah.

06 MS. GOLDSMITH: Can we put up the last exhibit?

07 DR. MELACK: Sure. You can put up the last
08 exhibit which basically summarizes the information I've
09 been talking about and indicates the changes to this
10 period of lake level. The solid line and the vertical
11 panels show the concentration of chlorophyll; that is,
12 the algal abundance, and the little histograms there
13 with the little animal pictures show the abundance of
14 the Artemia. And, again, these emphasize the fact that
15 the lake has experienced changes through time, but the
16 Artemia itself has maintained, I would say, a healthy
17 stable population during this period.

18 HEARING OFFICER del PIERO: Thank you.

19 Dr. Kimmerer, is he going make a presentation,
20 also?

21 MS. GOLDSMITH: Yes, he is.

22 HEARING OFFICER del PIERO: Why don't you begin,
23 Sir?

24 MS. GOLDSMITH: Can I ask him a couple of
25 questions, please?

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01 HEARING OFFICER del PIERO: Sure. Certainly.

02 Q BY MS. GOLDSMITH: Would you give us your name and
03 spell it for the Reporter, please?

04 A BY DR. KIMMERER: Yes. My name is William J.
05 Kimmerer, K-I-M-M-E-R-E-R.

06 Q How are you employed, Dr. Kimmerer?

07 A I'm a scientist with the consulting firm of
08 Biosystems Analysis, Incorporated.

09 Q Is L.A. DWP Exhibit 42 a true and correct copy of
10 your curriculum vitae?

11 A Yes, it is.

12 Q Would you briefly summarize your experience and
13 education for us?

14 A Yes. I have a bachelors degree in chemistry and a
15 Ph.D. in biologic oceanography from the University of
16 Hawaii and about 15 years of experience in oceanography
17 and principally in modeling of lower trophic levels of
18 ecosystems.
19 Q Is L.A. DWP Exhibit No. 41 a true and correct copy
20 of your testimony here today?
21 A Yes, it is.
22 Q Are there any changes that you want to make to it?
23 A No.
24 Q Would you briefly summarize your testimony for us?
25 A Yes. And I'll do it in quite a bit less than 20

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01 minutes. My testimony's fairly short.
02 First of all, my expertise in this area is not as
03 a Mono Lake expert or as a brine fly expert, but as a
04 modeler, and just a little bit further on what
05 Dr. Melack said about modeling, I'd like to talk
06 briefly about how a modeler thinks about these sorts of
07 issues.
08 A model is simply a compendium of what we think we
09 know about a system, and it can be a representation,
10 either a picture representation or a word description,
11 or, in many cases, a mathematical description or a
12 computer representation of what we think the ecosystem
13 is doing. And in the case of the alkali flies, what we
14 have to do is we have to build models that are based on
15 what we think we know and, actually we know relatively
16 little about the brine flies compared to what we know
17 about the brine shrimp.
18 Dr. Melack said that in the case of the brine
19 shrimp, there's quite a bit known about their life
20 history, their life cycle, and what limits their
21 abundance in the population size. Unfortunately, we
22 know considerably less than that about the alkali fly
23 population. We know absolutely nothing about what
24 happens to them as adults and, therefore, we -- we're
25 not really in a position to write a model that

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01 describes how the population changes over time.
02 What we do know is we know that -- or we think we
03 know that substrate limits the number of alkali flies
04 in the larval stages, and we think we know that there
05 are salinity effects -- or is reasonably certain that
06 there are salinity effects on the growth rate and the
07 development of the alkali flies through their larval
08 cycle. And that's really it.
09 So given that limitation, we're not justified in
10 writing a model that purports to describe how the
11 population will change over time and that,
12 unfortunately, is what the Draft EIR contains is an
13 attempt at a population model. It has a large number
14 of assumptions, many of which are poorly stated or
15 poorly backed up, but the main point is the model
16 itself is totally inappropriate and unfit for the
17 purpose at hand.
18 Now, going back to the -- to the effects of
19 variation in lake level on the alkali fly population,
20 there are basically two. One is that as lake elevation

21 drops from its current stand, or rises from its current
22 stand, you'll see changes in the availability of hard
23 substrate which we believe limits the size of the
24 population of larval alkali flies. And therefore, we'd
25 expect to see a proportional change in the population

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01 size, all else being equal. Of course, we don't know
02 that. If we reduced the -- if we reduced the lake
03 elevation from the alternative -- the preferred
04 alternative in the Draft EIR, 6383.5, to the L.A. DWP
05 management plan alternative, that would decrease the
06 substrate by about 11 percent. At the same time, the
07 growth rate of the alkali flies would decrease by about
08 2 percent, and so the overall production would decrease
09 in proportion.

The population of alkali flies is rather large.
11 As with the brine shrimp, it appears not to be in
12 serious trouble. It appears to be a healthy population
13 as far as anybody can tell, and so outside of any
14 effects of alkali fly abundance or production on the
15 availability of food to birds, my opinion is that
16 there's relatively little effect on the alkali flies
17 themselves other than just a change in numbers that
18 would result from changes in lake elevation. That's
19 it.

20 MR. FLINN: Madam Reporter, would you mark that
21 part of the tape, please? We want to refer to that in
22 cross-examination. Thank you very much.

23 THE REPORTER: Sure.

24 HEARING OFFICER del PIERO: Thank you very much.
25 Ms. Cahill? Or is it Mr. Thomas? Okay.

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01 CROSS-EXAMINATION BY MS. CAHILL
02 Q Hello, Dr. Melack, Dr. Kimmerer. I'm Virginia
03 Cahill representing California Department of Fish and
04 Game. I hope to complete my questioning in less than
05 20 minutes.

06 Dr. Melack, when you talk about a healthy lake, is
07 that the same as an ecologically healthy lake in terms
08 of functioning as it did in its pre-diversion state
09 with its original natural biota?

10 A BY DR. MELACK: That -- the answer to your question
11 is really a little difficult to give because there's
12 essentially nothing known about the lake in its
13 pre-diversion condition. My judgment is based on
14 looking at many saline lakes around the world and
15 seeing them experience very wide changes in salinity.
16 Let me give you one example.

17 In east Africa we looked at lakes that had
18 salinities as low as 10 to 20 grams per liter, up to 70
19 to 80 grams per liter. In this full range soda lakes,
20 much like Mono Lake, the lakes did extremely well,
21 sustained millions of flamingos, sustained large
22 populations of phytoplankton and, indeed, they would be
23 judged as healthy. And so my judgment's really based
24 on analogy, which is to say that yes, indeed, I would
25 say that Mono Lake is as healthy now as it was earlier.

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01 Q Let me focus on what we do know about Mono Lake

02 not by analogy to others. Was the species diversity in
03 Mono Lake higher prior to diversion?

04 A Species diversity of the plankton community?

05 Q Whatever species you'd care to address. Was there
06 a greater species diversity prior to diversion?

07 A The only evidence that we have of that species
08 diversity in the lake itself were data gathered in the
09 mid and early sixties by David Mason which showed that
10 there were one or two species of rotifer present in
11 the lake then, and they're not there now.

12 Q Are you aware of any other species that were
13 present in the lake then that are not present now?

14 A Not in the open-water plankton, no.

15 Q Are you aware of any indication that the
16 pre-diversion lake ecosystem was not functioning
17 normally within a natural range of variations for
18 hundreds, if not thousands, of years?

19 A If you'd look at lake history over time spans of
20 hundreds and thousands of years, there's no lake I know
21 of on the earth's surface which didn't undergo very
22 large changes from dryness to large volumes of water,
23 even lakes on the scale of Lake Tanganyika. So I think
24 it's really a misnomer to ask the question the way
25 you're asking it. It's not even appropriate to think

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01 in those terms.

02 Q But so far as you know, in, let's say, the early
03 1900s, the lake was functioning in a natural fashion?

04 Q I'm sorry, but you're putting -- you're not making
05 scientific sense. You're talking fantasy.

06 Q Can your model accurately predict shrimp
07 productivity under pre-diversion conditions?

08 A I don't believe so. And I say that for two
09 reasons because to say a model can accurately predict
10 something, a model must, in fact, be validated against
11 conditions that one knows. One can't simply write a
12 mathematical construct and extend it beyond the bounds
13 of validation. Now, it's really impossible to validate
14 a model for conditions that don't currently exist.

15 Q Why is it that your data set begins in -- is it
16 1979?

17 A It begins then because I was hired at the
18 University of California in 1977, and I began my
19 research there in 1978. And I initially developed some
20 methodology and began a routine data collection
21 sampling scheme in 1979.

22 Q And the lake levels in the period that you've
23 studied have a variation of approximately what, ten
24 feet?

25 A From 6372 to 6381.

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01 Q And since 1940, what has been the overall
02 variation in the lake elevation?

03 A The lake has fallen dramatically. It's fallen 14
04 meters from 1941 to 1981, and then since then, it rose
05 about three meters, and now it's fallen again at about
06 two.

07 Q And can you give that to me in feet, since I think
08 your earlier answer was in feet?

09 A 14 meters is -- a little more than three times 14.
10 Q So the variation you've observed is approximately
11 a fourth of the total variation that there's been. You
12 did not observe the lake at three-quarters of its
13 elevation in this century?
14 A No.
15 Q And let me ask you again, you're aware of only two
16 species that were present prior to diversion that are
17 not there now?
18 A Be very careful how you say that. I said that
19 open-water plankton species. I didn't say species.
20 Okay?
21 Q All right. Are you aware of species other than
22 open-water plankton species that were present in the
23 lake prior to diversion that are no longer present?
24 A I don't think I'm qualified to talk about bird
25 species diversity which may change or may not have

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01 changed.
02 Q Aside from birds, you distinguished between open
03 water and species that might be present, I understand,
04 within the water along the shoreline. Are you familiar
05 with any species in that category that used to be
06 present that are not now?
07 A That's a little hazy because if you look --
08 there's a gradient along the shore between wetland and
09 lake, and if you start including the swampy region
10 along the shore, you look at fresh water species.
11 Their dynamics haven't been very long examined. And I
12 don't personally know very much about that, but I think
13 certainly, the possibility exists for there to be other
14 species present in fresh water habitats in Mono Lake
15 that currently exist. But in terms of actual salt lake
16 species of any consequence, I don't know any evidence
17 for salt lake species being any different near shore
18 now than earlier.
19 Q Okay. So with regard to salt -- how did you
20 categorize them?
21 A Salt lake species.
22 Q Salt lake species, you know of only two that are
23 no longer present that were present prior to diversion?
24 A With the caveat that I'm really thinking mostly
25 about the offshore waters.

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01 Q Thank you.
02 Dr. Kimmerer, in your testimony, you make a
03 reference to anecdotal evidence of high populations of
04 alkali fly. To what were you referring?
05 A BY DR. KIMMERER: I was referring to records of large
06 numbers of fly pupa on the surface that were so
07 abundant that people could scoop them up.
08 Q Let me show you an article which is in -- has been
09 submitted as Department of Fish and Game Exhibit 99. I
10 know you have this, but it's probably easier if I --
11 have you seen this article before?
12 A No, I have not.
13 Q Would you take a moment to look on Page 9? There
14 is a photograph, and if you would read beginning about
15 halfway down the text to the side of that photograph
16 where the sentence begins, "The dead and decaying

17 individuals." You might want to start with the
18 sentence before for it to make sense.
19 A "Dead and decaying individuals, this is flies,
20 cast ashore mixed with suds and larvae to form food for
21 an army of small flies, the larvae of which I found
22 alive in the water. These flies are so thick that they
23 form a black zone or band two or three feet wide next
24 to the water all around the lake. A belt of flies 100
25 miles long, as one writer puts it."

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01 Q And the photograph -- could you read the caption
02 under the photograph?
03 A It says, "South beach of Mono Lake showing dark
04 zone of live flies."
05 Q And is this consistent with the other anecdotal
06 reports you are familiar with?
07 A I don't know that its consistent or inconsistent.
08 Q Do you have any reason to doubt the truth of this
09 account or --
10 A No.
11 Q -- this photograph?
12 Mr. Piero, I don't know if it would be appropriate
13 to move admission of DFG 99.
14 HEARING OFFICER del PIERO: You can move it now,
15 or you can move it later on. It's up to you.
16 MS. GOLDSMITH: I'd like to move its admission at
17 this point.
18 MS. GOLDSMITH: I would object to its admission at
19 this point. I don't think there is a foundation for
20 it, and I would prefer that you did it --
21 MS. GOLDSMITH: Okay. Thank you.
22 HEARING OFFICER del PIERO: Thank you very much.
23 Mr. Dodge -- oh, Mr. Flinn.
24 MR. FLINN: The low end of the food chain falls to
25 me, Mr. del Piero.

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01 HEARING OFFICER del PIERO: Somehow I could have
02 anticipated that, Mr. Flinn.
03 (Laughter.)
04 MR. FLINN: And while I am sorting out my notes,
05 I would ask, John, if you could --
06 HEARING OFFICER del PIERO: Evolution continues.
07 Take heart.
08 (Laughter.)
09 MR. FLINN: Several million years.
10 -- if you could set up the items there.
11 MR. DODGE: You'll see my food preference when I
12 cross-examine on the California gull.
13 HEARING OFFICER del PIERO: Uh-huh.
14 CROSS-EXAMINATION BY MR. FLINN
15 Q My question -- I'm going to start, Dr. Melack,
16 with you and go on. I want to start with your general
17 questions about your written testimony here. You wrote
18 this?
19 A BY DR. MELACK: I did.
20 Q And I take it you were personally responsible for
21 its content, not DWP's lawyers?
22 A Yes. I was responsible.
23 Q And would it be fair to say that you exercised

24 your own best independent scientific judgment as to
25 what to emphasize to the Water Board in this written
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01 testimony?
02 A That's correct.
03 Q And you understood this was an important public
04 policy issue when, in your testimony, you wanted to
05 highlight the things that you thought was most
06 important for this Water Board to know?
07 A That's fair enough.
08 Q And, in fact, the Department of Water and Power,
09 and ultimately, its ratepayers, have paid you a lot of
10 money or your university a lot of money over the years
11 to develop this?
12 A As long as you qualify the money was paid to
13 students, not me.
14 Q Your salary is not supported at all by the grants
15 that DWP gets you?
16 A Very little. Very, very little.
17 Q Now, you say, on Page 19 of your testimony, quote,
18 my analysis is derived primarily from actual
19 measurements of conditions in the offshore water of
20 Mono Lake." The actual measurements you're referring
21 to are those from 14 years of data that you collected
22 from 1979 to 1992; is that right?
23 A Yes.
24 Q Okay. Now, we've got our own example of some of
25 your testimony here. It's not as fancy. I'm going to

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01 walk over here and try and keep my voice up. If it
02 falls, someone holler. It's not as fancy as the nice
03 ones that the L.A. ratepayers have supplied us, but
04 I'll try and make do.
05 This is from Figure 1 of your testimony. You do
06 recognize that, don't you?
07 A Yeah.
08 MR. BIRMINGHAM: Excuse me, Mr. Flinn. Your
09 statement that the L.A. ratepayers aren't supplying
10 this. Does this mean you're not going to make an
11 application under 1021 --
12 MR. FLINN: Not currently supplying.
13 HEARING OFFICER del PIERO: Gentlemen, let me
14 point out the jurisdictional authority for that is
15 somewhere else not in this room.
16 MR. BIRMINGHAM: May I ask the Reporter to mark
17 that admission that we're not going to have that
18 application?
19 HEARING OFFICER del PIERO: I'm sure there's a
20 judge somewhere who would love to take that matter up
21 with both of you, but not --
22 MR. DODGE: The authority relates -- I've given
23 Mr. Flinn relates to Dr. Melack and Dr. Kimmerer, not
24 Section 102125.
25 MR. FLINN: We can fight about the five dollars --

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01 HEARING OFFICER del PIERO: That's living proof,
02 Mr. Birmingham, that the food chain continues with us,
03 also. Mr. Dodge is interested in pursuing that.
04 Q BY MR. FLINN: Your written testimony, Dr. Melack,

05 describes four different periods that cover this record
06 of lake elevations. You recall that from your written
07 testimony?

08 A BY DR. MELACK: I do, yes.

09 Q On Page 7 you tell us that the -- we were
10 monomictic up until 1982; is that right?

11 A That's correct.

12 Q So I'm going to draw a line here, the '82 border,
13 and I'm going to shade blue on Figure 1 for the
14 monomictic period. Okay? And then we were meromictic
15 from '83 to '87. Is that right?

16 A Not exactly. The lake -- we made a distinction
17 between the period of meromixis and the period in which
18 there was gradual deeping and eventual turnover, so the
19 lake didn't really turn over until the end of 1988. So
20 there was a gray period in between, in between '87 and
21 '88, that we call transition to holomixis.

22 Q Am I reading your testimony correctly where -- on
23 Page 7, where you say, "The period can be divided into
24 four time periods"?

25 A That's correct, yes.

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01 Q Monomictic '64 to '82. Maramictic '83 to '87. Am
02 I reading that right?

03 A That's correct, yes.

04 Q So if I were to draw a line on this graph
05 following your written testimony --

06 A That's fine. Sure. Sure.

07 Q I can draw a line here at '87 and I make the
08 meromictic period red there, and then you say, "From
09 '88 to '89, we were in this transition period." Am I
10 reading that right?

11 A That's correct.

12 Q I'll make that red, too, but I'll hash it the
13 other way.

14 And then from 1989 to 1992, we are back to
15 monomictic, right?

16 A Correct.

17 Q Okay. Now, you say in your direct testimony that
18 this monomictic condition is rare. You recall that?

19 A No. I didn't say that. I said the meromictic
20 condition is rare.

21 Q I misspoke, yes. The meromictic condition. The
22 red condition is rare.

23 And your direct testimony also said that that has
24 a negative effect on the food supply for the shrimp?

25 A What I said was that it reduces the algal

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01 abundance in basic primary production. Whether or not
02 that has a negative effect would be indicated by
03 whether or not the shrimp are doing well or not doing
04 well. And it turned out the shrimp didn't seem to
05 respond dramatically to that change.

06 Q What do shrimp eat?

07 A The shrimp eat phytoplankton.

08 Q And what does the meromixis do to phytoplankton
09 productivity?

10 A It reduces the abundance. But you cannot say that
11 that has a negative effect unless you see evidence that

12 there is, in fact, a negative effect.
13 Q We'll get to the negative effect.
14 In your testimony you say that during this period
15 from meromixis -- monomixis to meromixis transition,
16 monomixis, that the population was, quote, remarkably
17 stable." Do you recall that testimony in your written
18 work?
19 A Yeah.
20 Q Okay. Now --
21 A Population of brine shrimp.
22 Q Yes. The population of brine shrimp.
23 Now, are you familiar -- would you flip down
24 the -- no. Flip up the chart? No, no, no, John, the
25 other chart. Flip that up. No. The other chart

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01 here. I'll just do it.
02 Are you familiar with something called Auxiliary
03 Report Number 13 submitted to Jones and Stokes?
04 A Give me the title.
05 Q I just know it as the Mono Basin Auxiliary Report
06 Number 13, and it's got your name on it. It's a
07 modeling analysis of Artemia dynamics of Mono Lake.
08 A Yes.
09 Q And you're the Melack that's referred to on this
10 document?
11 A That's correct.
12 Q And that's not an accident, that was
13 deliberately -- you're listed as a co-author of this
14 article?
15 A That's correct.
16 Q Okay. On Pages 3 and 4 -- and I'm going read it
17 aloud because it may not be visible to everybody else,
18 you and your co-authors tell us, "Over the past two
19 decades, Mono Lake has been the subject of extensive
20 research making it one of the best-studied saline lakes
21 in the world. A major component of this research has
22 been done by University of California Santa Barbara
23 researchers and consists of an extensive monitoring
24 program conducted 1982 to 1992."
25 A couple of preliminary questions that UC Santa

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01 Barbara, that's you and your team, right?
02 A Yeah.
03 Q Okay. And this 1982 to 1992, is that historical
04 record that's in your direct testimony; is that right?
05 A Yeah. It's referring to a shorter period of that
06 testimony.
07 Q "During this time, both the lake level and
08 salinity changed," and then there's the part we put in
09 bold. "Despite this extended data record, the direct
10 observation of effects on salinity in the Artemia
11 population is difficult and unlikely to be detected
12 even if present. The past decade included a period of
13 unusual climatological conditions at Mono Lake, changes
14 in the physical mixing regime of Mono Lake associated
15 with the onset, persistence, and breakdown of meromixis
16 dramatically alter plankton dynamics and most likely
17 obscured effects due to changes in salinity."
18 Was that language language that you approved in
19 this document of which you were co-author?

20 A Yeah. I think it's actually appropriate.
21 Q Good. Given that salinity effects are obscured by
22 the historical record on which you testified your
23 analysis is primarily derived, let me ask you is it not
24 correct that we have available to us other data from
25 your group about -- on shrimp populations? Could you

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01 answer that? Strike that -- let me withdraw the
02 question.
03 Do we have -- we have data from experiments that
04 you conducted on the response of shrimp to salinity,
05 don't we?
06 A Yes.
07 Q And I have blown up here Table Number -- Table --
08 Figure 2 from the EIR Auxiliary Report Number 12 from
09 Dana, Robert, Jellison -- excuse me, Dana, Jellison,
10 and Melack and, again, that's the -- you're the John
11 Melack that's listed here?
12 A That's correct.
13 Q And this again was research that L.A. ratepayers
14 paid for; is that right?
15 A Yes and no. I mean, it turns out that the bulk of
16 that research was actually paid for by a grant from the
17 Packard Foundation.
18 Q Okay. Now, am I reading these graphs correctly --
19 there are 12 of them by count, that on the horizontal
20 axis we have salinity? Is that right? In every one of
21 these?
22 A That's correct.
23 Q Okay. And 50 micrograms per cubic liter, that's
24 the -- excuse me. 50 grams per liter, total dissolved
25 solids. Is that the measure there?

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01 A That's correct.
02 Q Okay. And is approximately 50 correspond to the
03 pre-diversion lake elevation, close numbers?
04 A Yes, it does.
05 Q And 100 is down close to the 6372 range, the low
06 end of DWP -- close to the low end of DWP's management
07 range?
08 A That's correct.
09 Q Now, I just want to see if I can read these and --
10 first of all, there's both some data points and some
11 straight lines and curves. Those straight lines and
12 curves were placed there by you and your team, weren't
13 they?
14 A Yes.
15 Q And then again they're not an accident, they're
16 deliberate additions to these charts?
17 A Yes.
18 Q And am I just, to sort of read these things, that
19 this first one up in the upper left-hand corner percent
20 non-hatching cysts as we go from 50 to 150 following
21 your curve, we get a greater percentage of non-hatching
22 cysts as salinity increases?
23 A You should be careful, though, because actually,
24 although you're quite correct the axis starts at 50,
25 the actual data points don't begin until about 70. So

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01 the actual record of real measurements goes from about
02 70 grams per liter up to, I think, it's about 160.
03 Q Okay. Now, is it a mistake that these curves go
04 all the way to 50, or is that deliberate to extend
05 those curves all the way to 50?
06 A When you fit a curve with that many points, you
07 can certainly extend that curve down.
08 Q That wasn't my question. I didn't ask you whether
09 you could extend it. My question was a much simpler
10 one. Was that a mistake, or was it deliberate?
11 A It was deliberate.
12 Q Okay. And, again, following the deliberate curve
13 for their second one, the mean day of hatch, am I
14 reading this correctly that as you increase salinity,
15 you get a longer duration for the hatch? Takes longer
16 to hatch?
17 A Yes. Yes. Yes.
18 Q And can you pronounce that word N-A-U-P-L-I-A-R?
19 A Naupliar.
20 Q Naupliar survival decreases with salinity?
21 A With salinity.
22 Q With increased salinity?
23 A That's correct.
24 Q And as I go through each one of these, we again
25 see basically negative effects on either reproduction,
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01 on the size of the animals, on their adult survival
02 with salinity changes?
03 A That's certainly correct, and I actually
04 acknowledge that quite freely in my direct testimony
05 and today that, in fact, you do find, if you do
06 laboratory bioassays, you do, in fact, find very
07 convincing evidence that increased salinity decreases
08 the reproductive capability of the brine shrimp.
09 Q Okay. Now, having agreed with the conclusion that
10 any salinity effect was obscured by meromixis, you
11 deliberately chose not to put these graphs in your
12 testimony that you wanted to emphasize to the Water
13 Board; is that right?
14 A That's a clear distortion of the evidence. Okay?
15 Let me explain why.
16 Q My question wasn't whether that was a distortion
17 of the evidence. Again, I'm trying to --
18 MS. GOLDSMITH: Mr. del Piero --
19 MR. FLINN: I'd like to finish my question.
20 HEARING OFFICER del PIERO: Wait. Wait. Wait.
21 Dr. Melack, when I talk, everybody's quiet.
22 DR. MELACK: I'm sorry.
23 HEARING OFFICER del PIERO: You wish to object?
24 MS. GOLDSMITH: I do.
25 HEARING OFFICER del PIERO: On what grounds?

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01 MS. GOLDSMITH: I believe Dr. Melack should be
02 allowed to finish his answer.
03 HEARING OFFICER del PIERO: Actually, I'll allow
04 Dr. Melack to complete his answer when he responds to
05 the question. Okay?
06 So if you want to respond to the question asked,

07 Dr. Melack, either affirmatively or negatively, I'll be
08 happy to allow you to expand on your response.
09 MS. GOLDSMITH: Mr. del Piero, I believe he did
10 respond and perhaps the Reporter could read back --
11 HEARING OFFICER del PIERO: I'll be happy to have
12 the Reporter read it back.
13 Mrs. Anglin, please read back the last question
14 Mr. Flinn asked.
15 THE REPORTER: Sure.
16 (Whereupon the record was read as requested.)
17 HEARING OFFICER del PIERO: Is there a response?
18 Ms. Anglin, is there a response after that question?
19 (Whereupon the record was read as requested.)
20 MS. GOLDSMITH: Mr. del Piero, in the event that
21 you don't think that that's a response, I'll object to
22 the question as being argumentative.
23 HEARING OFFICER del PIERO: That's probably an
24 objection that I'll sustain.
25 Now, Mr. Flinn, if you want to reask the question

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01 in a less argumentative fashion, then I'll direct
02 Dr. Melack to respond.
03 MR. FLINN: Sure. No, I'll move on to another
04 point given the limited time here.
05 What I'd like, John, if you could, somewhere, pass
06 out the document --
07 HEARING OFFICER del PIERO: Except before you go
08 on.
09 Dr. Melack, Mr. Brown and I both share the same
10 interest that he just indicated it to me, and so I'll
11 ask you the question because I have the prerogative.
12 We'd like you to respond to the question. Obviously,
13 we aren't asking it in an argumentative fashion. Did
14 you intentionally choose not to incorporate that
15 information into your submittal to the Board?
16 DR. MELACK: Actually, I did include it. In fact,
17 if you look on Page 4 of my testimony, I state that
18 salinity bioassay laboratory experiments of the effects
19 of salinity on individual organisms indicate gradual
20 effects of increasing salinity on nearly every
21 life-history parameter, hatching, mortality, growth,
22 and reproduction of the only macrozooplankter in Mono
23 Lake, the brine shrimp, *Artemia monica*. And with that
24 sentence, I then cite two or three papers, I cite Dana
25 and Lenz 1986, and I cite Dana et al., which is the

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01 source of, in fact, these plots.
02 I then proceeded to point out that, as I did in my
03 brief summary to you today, that physiological
04 laboratory assays must be put in an ecosystem context.
05 And this use of this exhibit, this quote, is a very
06 good example of how you can take things out of
07 context. In fact, the message being given in that --
08 HEARING OFFICER del PIERO: Doctor. Doctor, this
09 is not a forum for you to testify your reasoning. It's
10 a request for information. We got it. Thank you very
11 much.
12 DR. MELACK: Sorry.

13 HEARING OFFICER del PIERO: Mr. Flinn, why don't
14 you proceed now?
15 MR. FLINN: Yes.
16 Q BY MR. FLINN: Dr. Melack, we have put up a document
17 from Auxiliary Report Number 13, and this document is
18 Table 17 following Dr. Jellison's July 24th, 1992,
19 letter to Jones and Stokes. In the document, the
20 complicated reference there is something of a mystery,
21 and I'll try and clear that up a little bit.
22 Do you recognize that from the report of which I
23 understand you're a co-author?
24 A BY DR. MELACK: Yeah. Although, I'm not sure -- can
25 I ask you a question?

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01 HEARING OFFICER del PIERO: Yes, Dr. Melack, you
02 can, although keep in mind I haven't sworn an oath
03 today. I reserve the prerogative of making up the
04 answers as I go along.
05 (Laughter.)
06 DR. MELACK: The documentation that's being used
07 here is documentation that is, in fact, what is being
08 referred to correctly in terms of the numbers of
09 auxiliary reports. Unfortunately, those reports didn't
10 reflect the actual final documentation provided to
11 Jones and Stokes, so some of these data are, I would
12 judge, preliminary in that context.
13 HEARING OFFICER del PIERO: Well, that's not a
14 question.
15 DR. MELACK: Okay. That's a statement. I guess
16 the question was should I clarify that chronology? I'm
17 sorry, that was the question, or is that irrelevant?
18 HEARING OFFICER del PIERO: Dr. Melack, you're
19 obliged to answer the questions. This is
20 cross-examination. And in regards to that, I'd
21 appreciate it if you answered them as succinctly but as
22 completely as you can recognizing that you can't go on
23 for hours on a single question. We do have time
24 limitations here.
25 At the same time, the Board is interested in

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01 getting adequate information to be able to render both
02 an intelligent and appropriate decision in terms of the
03 direction to proceed from the Court of Appeals, and
04 that's what our desire is. And that's the best advice
05 I can give you.
06 Mr. Flinn, proceed.
07 DR. MELACK: Thank you.
08 Q BY MR. FLINN: I want to focus on this top chart
09 here. Am I correct that this is the result of the
10 model run by your team, not Jones and Stokes, but your
11 team at UC Santa Barbara, of the effects of different
12 lake levels on the -- this is your plankton model
13 results; is that right?
14 A BY DR. MELACK: That's correct.
15 Q The top chart is the monomictic condition, right?
16 A That's correct.
17 Q Okay. Now, am I right in reading -- the columns
18 NHV and NHH, are those measures of ammonium?
19 A Yeah.
20 Q Okay. And am I reading that correctly that as the

21 lake gets less saline from -- this median bar is 6377,
22 and that as we go up to 6390, we get lower ammonium
23 production in your model? The lower ammonium
24 availability?
25 A Lower ammonium concentrations.

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01 Q Low -- concentration. And that negatively affects
02 the brine shrimp's food supply, right?
03 A Not necessarily. What determines the growth rate
04 of the algae is the supply rate of ammonia, not simply
05 the concentration.
06 Q But you have the same figure going up as you get
07 more saline, right?
08 A Excuse me?
09 Q You have the same figures with regard to ammonium
10 concentration going up as the lake gets more saline?
11 We go from 6372 to 6360, that figure goes way up,
12 right?
13 A The concentration -- the relative -- the percent
14 relative change is positive.
15 Q Okay. Meaning there's greater concentration,
16 right?
17 A There is greater concentration, that's correct.
18 Q And is that the effect that you talked about of
19 the excretions -- increased excretions by the brine
20 shrimp as the water gets saltier?
21 A To a large extent, that's correct.
22 Q And that was this feedback mechanism that you were
23 telling us about in your oral testimony, that the lake
24 gets up, and the -- so brine shrimp excrete more, and
25 thus, there's more ammonium and thus more food, and

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01 the -- so the brine shrimp have more food to eat. Is
02 that basically this feedback mechanism you were telling
03 us about?
04 A That's part of it. One piece of it. Yes.
05 Q Let's go over here to lake-wide totals the "PP"
06 stands for "primary production;" is that right?
07 A That's right.
08 Q And the "SP" stands for "secondary production;" is
09 that right?
10 A That's correct.
11 Q Is the secondary production a measure of the brine
12 shrimp?
13 A It's a measure of the growth rate.
14 Q Yes. Okay. And am I reading this correctly that
15 at 6390 -- notwithstanding the decrease in ammonium
16 concentration, at 6390 we have a 50 percent increase in
17 this brine shrimp growth rate?
18 A That's what those results show, yes.
19 Q Okay. And again, although you mentioned your
20 modeling, and you gave us all our caveats, this was a
21 document, this graph was a document you chose
22 deliberately not to highlight in your testimony.
23 MS. GOLDSMITH: Objection. Argumentative.
24 HEARING OFFICER del PIERO: I'll sustain that

25 objection. If you wish to reask the question, you
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01 can. That's twice, Mr. Flinn.
02 MR. FLINN: I appreciate that, and I tried to
03 appreciate it a little bit differently. But rather
04 than trial and error --
05 HEARING OFFICER del PIERO: Came out the same
06 way.
07 MR. BIRMINGHAM: The inflection was a little
08 different. You're doing well, Pat.
09 Q BY MR. FLINN: Do you have an opinion -- can you tell
10 us in this meromixis-meromixis -- monomixis-meromixis
11 issue focusing on the meromixis, what the difference in
12 density between the less dense water on the top and the
13 more dense water on the bottom is?
14 A BY DR. MELACK: In what sense do you mean? The
15 numbers or --
16 Q The numbers or -- how big of a difference does it
17 take to get this condition?
18 A It might be easier for people to understand
19 salinity differences not density units, but it takes a
20 gram or two per liter. But you get strong
21 stratification with five to ten grams per liter
22 differences.
23 Q Okay. Now, finally -- one other question, we
24 passed around that exhibit, did we, John? 219? Would
25 you hand the witness Exhibit 219 first?

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01 HEARING OFFICER del PIERO: Thank you.
02 Q BY MR. FLINN: While that's being passed out, would
03 you identify Exhibit 219 -- yes. This is National
04 Audubon Society in Mono Lake Committee Exhibit 219.
05 Would you identify this as a copy of a paper of
06 which you are a co-author?
07 A BY DR. MELACK: That's correct.
08 Q And that is paper dealing with meromixis and
09 nitrogen in Mono Lake?
10 A That's correct.
11 MR. FLINN: I would move the admission of Exhibit
12 219.
13 MS. GOLDSMITH: No objection.
14 HEARING OFFICER del PIERO: Fine. So ordered.
15 Q BY MR. FLINN: Would you turn to the next to the last
16 page of that exhibit, Page 1038?
17 A BY DR. MELACK: Um-hum.
18 Q And would you read the second full sentence that
19 appears on that page?
20 A Beginning "Nitrogen fixation"?
21 Q That's correct.
22 A. "Nitrogen fixation in benthic algal mass is nearly
23 double at pre-1941 salinities than at current
24 salinities."
25 Q Is that a --

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01 A Sorry. And then it proceeds to say, "On D. Herbst
02 personal communication."
03 Q And did you review this document before it was
04 published?

05 A Yeah. Yes.
06 Q And did you accede to that citation and that
07 assertion in this document?
08 A Yes.
09 Q Okay. Now, you tell us that-- in your written
10 testimony, that in DWP's management plan, the lake will
11 be healthy, as you use the term. Do you recall that?
12 A I do.
13 Q What ranges do you understand the lake is going to
14 fluctuate under DWP's management plan, particularly the
15 low end? How do you expect that to get?
16 A Somewhere in the vicinity of 6372.
17 Q Now, if you were told -- asked to assume that
18 there are errors in DWP's management plan with respect
19 to the hydraulic or hydrologic modeling such that if
20 their plan were followed, the lake would fall farther
21 than minimum proposed in the plan, would that affect
22 your conclusion that the lake is safe with the DWP
23 management plan?
24 A It would depend on the extent to which it fell
25 below that level.

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01 Q Let me ask you this, then, Dr. Melack. Did you
02 ever hear of something called a "trial operation plan"?
03 A Yeah.
04 Q In 1989, isn't it true that you signed on to a DWP
05 proposal to draw the lake down to 6370 just to see what
06 would happen?
07 MS. GOLDSMITH: Objection.
08 THE WITNESS: No.
09 HEARING OFFICER del PIERO: On what grounds?
10 MS. GOLDSMITH: Relevance.
11 MR. FLINN: Your Honor, I will establish that this
12 trial operation plan was submitted to Judge Finney in
13 connection with the -- they asked Judge Finney to order
14 them to draw the lake down pursuant to this trial
15 operations plan, that Dr. Melack described this as a
16 scientifically sound proposal. And I believe that
17 it -- and he said so under oath in a declaration, and I
18 believe it goes to his credibility. That if he says
19 that drawing the lake -- go ahead.
20 HEARING OFFICER del PIERO: I'm going to overrule
21 your objection.
22 As to the issue of credibility, I'm not going to
23 rule in regards to credibility. The evidentiary
24 requirements of this hearing are far more lenient than
25 in a court. Okay? It's the purpose of this Board to

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01 generate as much factual information as possible. If
02 you wish to pursue this matter, you need to lay an
03 appropriate foundation, Mr. Flinn.
04 MR. FLINN: Okay.
05 HEARING OFFICER del PIERO: And I'll be listening
06 very intently to hear you do that.
07 MR. FLINN: Sure.
08 Q BY MR. FLINN: You do recall the trial operation

09 plan?
10 A BY DR. MELACK: Sure. But you're misrepresenting the
11 context of which we signed up to it.
12 Q I will show you the trial operation plan, but I
13 will read from it. Page Two, it says, quote, the key
14 feature is a program of continuing monitoring and
15 research while the lake is managed to permit a decline
16 to a minimum of 6370 feet." I'll show it to you and
17 ask you if I have read that sentence correctly.
18 A Yeah. But you didn't read the rest of the
19 paragraph which basically says that we're -- the
20 minimum operating level would be 6372.5 and the 6370 is
21 simply an extreme drought minimum to take into account
22 the reality that we don't have absolute knowledge of
23 hydrology.
24 Q So it's your understanding that L.A., under this
25 plan, would be allowed to divert until the lake got to

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01 6372 and then they'd have to stop?
02 A I don't remember the exact details of the plan,
03 but more or less that was correct, that we were --
04 Q Dr. Melack, going back to Table 1 from your
05 testimony, Judge Finney ordered all water available
06 with the exception of a tiny amount for study starting
07 in mid 1988 to go to Mono Lake. Do you understand
08 that?
09 A Yes, I do.
10 Q And you understand that notwithstanding that
11 order, the lake fell approximately three and a half,
12 four feet or more?
13 A Sure. During an extreme drought in California.
14 HEARING OFFICER del PIERO: Mr. Flinn, your time
15 is up. We're going to take a break. If you wish
16 additional time, you can petition afterwards.
17 MR. FLINN: I am done with Dr. Melack. My only
18 few questions now are -- I would like five minutes with
19 Dr. Kimmerer.
20 HEARING OFFICER del PIERO: You need to make a
21 showing, but you'll do that after the break.
22 (Whereupon a recess was taken.)
23 HEARING OFFICER del PIERO: This hearing has again
24 come to order.
25 MR. FLINN: My application for an additional ten

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01 minutes of time is based on the fact that I, at such a
02 length, I will equal, not even unexceeding the length
03 of the oral testimony which is substantially shorter,
04 and the written testimony that I had to address. And I
05 would also point out that Dr. Melack's written
06 testimony in terms of just physical length was
07 substantially longer than other witnesses, and that's
08 the reason I needed the time.
09 HEARING OFFICER del PIERO: Your request is
10 granted.
11 Q BY MR. FLINN: Dr. Kimmerer, at the very end of your
12 oral statements, you may recall I asked the Reporter to
13 mark something that you said and over the break, I
14 wrote down from her transcript what you said. And I
15 want to read it back to you.
16 You said, quote, my opinion is that there is

17 relatively little effect on the alkali flies themselves
18 other than just a change in numbers that would result
19 from changes in the lake elevation."

20 Now, Sir, with that in mind, am I not correct that
21 you began your involvement with Mono Lake just back in
22 1991; is that right?

23 A BY DR. KIMMERER: Would you mind telling me who you
24 are and who you represent?

25 Q I apologize. My name is Patrick Flinn, and I am
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01 one of the attorneys for the National Audubon Society
02 and the Mono Lake Committee.
03 A Thank you.
04 Q With regard to that opinion that you expressed at
05 the end of your testimony, am I not correct that you
06 began your involvement with Mono Lake as recently as
07 1991?
08 A That's it, yes.
09 Q Okay. And how many times have you been to Mono
10 Lake?
11 A Once.
12 Q You've been to Mono Lake once. And how long were
13 you there?
14 A Several days.
15 Q Several days. And what kind of physiological or
16 scientific study of the alkali fly have you done in
17 terms of its physiology or its ecology?
18 A If you recall at the beginning of my direct
19 testimony, I said I was not an expert on either Mono
20 Lake or the alkali flies.
21 Q The opinion that you said that there is very
22 little effect on the alkali flies themselves other than
23 just a change in numbers as a result of change in lake
24 elevation was not made in the capacity of an expert on
25 Mono Lake or an expert on the alkali fly; is that

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01 correct?
02 A That's correct.
03 Q Let me move on. You testified that the Jones and
04 Stokes model was something that you, in your expertise
05 as a modeler, sort of reject out of hand as unreliable
06 and shouldn't be used by this Board?
07 A Yes.
08 Q As an expert in modeling, you did develop your own
09 model that relates to the alkali fly?
10 A Yes.
11 Q I'm going to pass around -- I believe it's
12 National Audubon Society and Mono Lake Committee
13 Exhibit 218 --
14 HEARING OFFICER del PIERO: Proceed, Sir.
15 Q BY MR. FLINN: I'll represent to you that the
16 vertical dashed lines, the ones that are straight up
17 and down in the middle of that graph, were placed there
18 by someone other than yourself. But other than those
19 vertical dashed lines, can you identify Exhibit 218 for
20 us?
21 A Yes. I believe it's the output of the model that
22 I developed for the Mono Lake alkali flies.
23 Q So this is one graph showing a plot of production,
24 excess production, in terms of larvae and salinity as
25 functions of lake elevation for 50 percent high-quality

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01 soft substrate that you did running your model?
02 A I think that's accurate, yes.
03 Q What would it take to make you more certain?
04 A To see the whole report.
05 Q Okay. Was the whole report submitted to Jones and
06 Stokes as an auxiliary report?

07 A Yes, it was.
08 Q And this -- was this figure attached as an
09 auxiliary report?
10 A Yes.
11 Q Which number would that be?
12 A Sorry. I have no idea.
13 Q I'll put this question out perhaps to the Staff or
14 to others. I was told by the person who gave me this,
15 Dr. Herbst, that this document was not an auxiliary
16 report and is not in the record, and that's the
17 reason --
18 A I'm sorry. I guess I misunderstood the auxiliary
19 report. I mean part of the testimony or part of the
20 Jones and Stokes Draft EIR.
21 Q You understand that there's the Draft EIR, and
22 there was a series of 20 or plus auxiliary reports --
23 A Okay. I misunderstood that. No. This is not an
24 auxiliary report.
25 Q Okay. But your best recognition of this is of a

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01 chart from a report you wrote of your running of your
02 model?

03 A Yes.

04 MR. FLINN: On that basis, I would ask that
05 Exhibit 219 -- excuse me, 218 be admitted.

06 MS. GOLDSMITH: Objection. I don't believe an
07 adequate foundation's been made.

08 MR. FLINN: For purposes of this hearing, your
09 Honor, I would argue it is adequate. We don't have,
10 given the pressures of time, the ability to get the
11 whole report. It's not something we ever got a copy
12 of.

13 He recognized it as best he could. Obviously, on
14 redirect, he can have some problem with it --

15 HEARING OFFICER del PIERO: I'm going to allow it
16 to be recognized, and he does have the opportunity to
17 object or dispute it later on. But at least at this
18 point in time, his testimony is that he thinks this is
19 what was produced by the model he worked with. I'll
20 accept it based on that. I would point out -- I'm
21 sorry.

22 MR. FRINK: Yes, I have a comment. It is included
23 in the record that the Board already introduced. It
24 would be a part of SWRCB Exhibit No. 2, Division of
25 Water Rights files 0.50, Special Studies Mono Lake.

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01 MS. GOLDSMITH: Withdraw my objection.

02 HEARING OFFICER del PIERO: Mr. Flinn, proceed.

03 MR. FLINN: That makes things a lot easier.

04 Q BY MR. FLINN: I just want to see if I'm interpreting
05 this graph correctly. If I can walk over to it.

06 There are -- there is a kind of a sloping line
07 here, a curved line falling from approximately the
08 upper left-hand corner down to the lower right-hand
09 corner is that sloping line a line showing salinity?

10 A Yes.

11 Q And that corresponds with changes in the lake
12 level from 6320 to 6440. Is that correct?

13 A That's right.

14 Q And am I reading this model correctly that you
15 show the -- roughly the production and excess pupae
16 maximized at somewhere between 6380, or a little bit
17 below, and 6390, perhaps?

18 A Under the assumptions of this particular run of
19 the model, that's right.

20 Q Okay. Do you -- that's approximately, isn't it?
21 What the Jones and Stokes model run found in Figure
22 L-21 in Appendix L, in terms of where we have
23 maximization at lake level versus lake level?

24 A I don't remember exactly where that maximum was.
25 I assume it was somewhere around there.

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01 Q Okay. Now, this model here that you developed, it
02 assumes, does it not, that there is no increase in the
03 density by which the flies can live on hard substrate
04 as salinity decreases?

05 A That's right.

06 Q Okay. And if there were to be evidence that, in

07 fact, you can pack more flies on to the same size rock
08 if there's less salinity, that would tend to make your
09 model be on the conservative side in terms of
10 productivity; is that right?
11 A I don't know what you mean by "conservative" here.
12 Q You would tend to show fewer -- less lower
13 productivity at a given lake level than would otherwise
14 be present?
15 A You would show a steeper change in productivity
16 with the lake level elevation. Is that what you're
17 saying?
18 Q Wouldn't our graph move to the right there with
19 the assumption that you would get greater densities if
20 lower salinities were included in this model?
21 A It wouldn't move to the right. It would move up.
22 Q The peak would move to the right?
23 A Possibly.
24 Q Okay. Now, likewise, your model does not include
25 any effect of the difficulty that -- strike that. Let

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01 me back up.
02 Are you aware that as the salinity increases, the
03 bodies of the alkali flies just get smaller than they
04 would be at lesser salinities?
05 A Yes. As with the brine shrimp, there are a number
06 physiological changes that occur.
07 Q And would you dispute that the smaller the fly,
08 the harder it is for them to go around and get food?
09 A I don't know if that's true or not true.
10 Q If you assume that this is true, that a smaller
11 fly is harder -- it's harder for a smaller fly to get
12 food than a larger fly, your model would not include
13 that effect of salinity; is that right?
14 A No. I don't believe that's right. We included a
15 function of, well, the effect of salinity on growth
16 rate which would include the ability of the larvae to
17 obtain food.
18 Q Only growth rate, not absolute size?
19 A Right.
20 Q Okay. Assuming that -- not only does -- the
21 growth rate is not only affected by salinity but their
22 absolute size -- that specific salinity effect was not
23 included in your model; is that right?
24 A That's partly right.
25 Q Now, the next question I have has to do with what

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01 was assumed to be substrated. I take it that your
02 model assumed hard substrate was comprised of hard
03 rocks and pumice blocks and things like that in the
04 lake bed; is that right?
05 A Right.
06 Q And soft substrate was considered to be very poor
07 habitat and thus -- strike that.
08 And the availability of this hard substrate in
09 your model is a limiting factor of the productivity of
10 the flies; is that right?
11 A That's correct.
12 Q Okay. Now, your model did not contain any factor

13 allowing for possibility that flies use submerged
14 vegetation as a substrate with equivalent or close to
15 equivalent densities as they do hard substrate?
16 A That's right. And again, this figure is taken
17 somewhat out of context. If you look at the report
18 that contains this figure, I believe it discusses the
19 idea that at higher lake elevations than what we've
20 seen historically, we don't really know what the
21 availability of substrate was because of this question
22 as to whether aquatic vegetation, was suitable
23 substrate, which it may be, and the issue of how much
24 of this vegetation was present at any previous time in
25 history, which we don't know.

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01 Q Now, assuming that the photograph that Ms. Cahill
02 showed you and the historical reports are accurate,
03 that there once were these vast quantities of flies are
04 true, would the use of "vegetation" as a hard substrate
05 be an, at least, an explanation for why there would be
06 some flies at those higher elevations?

07 A Well, first of all, I'm not satisfied that we know
08 that there were more flies at a higher lake elevation
09 than there are now or that there had been in recent
10 times, so it's a bit hard for me to answer that
11 question.

12 That photograph that's in this exhibit, of course,
13 the reproduction is poor. It's hard to tell what it
14 shows, but -- I was astounded on my one visit to Mono
15 Lake as how many flies were along the shoreline then,
16 too. So -- and I took some photographs to clearly show
17 the flies from quite a distance, so I'm not convinced
18 that there was a time when the long-term mean fly
19 abundance was substantially higher. It may have been
20 true. It may not have been true. I don't know.

21 Q Dr. Kimmerer, you misunderstood my question. I
22 didn't ask you whether you were convinced of the truth
23 of those historical accounts, or I didn't ask you
24 whether or not you thought that was a clear copy of the
25 photo.

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01 I asked you to assume the correctness of those
02 reports. And my question is assuming the correctness
03 of those reports, would not the use of submerged
04 vegetation as a substrate, as an equivalent substrate
05 habitat, explain such high levels at high lake levels?

06 A Yes. If previous levels of fly abundances are
07 higher than they are now, that's one way to explain it.

08 Q Okay. Now, does your model that you run contain
09 any assumptions about the effects on the availability
10 of food for the flies with increasing salinity? Or
11 does it assume food source is constant?

12 A It assumes that the effects of food are those that
13 we saw -- those that were seen in the experimental
14 results on growth rate and size of the flies.

15 Q And you're confident of that?

16 A Of what?

17 Q What you just said? You have no doubt about that
18 validity of that assumption in the model. Strike
19 that.
20 You have no doubt that that assumption was used in
21 the model?
22 A I believe that's correct. That's my recollection
23 of what we did.
24 Q Okay. Now, you testified both written and orally
25 that if we looked at the difference between 6383.5 and
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01 DWP's proposed lake level, that there would be an 11
02 percent decrease in hard substrate and a 2 percent
03 decrease in growth rate. Do you recall that?
04 A Yes. That's a calculation that I made since doing
05 this model.
06 Q Okay. Have you calculated what the actual effect
07 on percentage -- on productivity would be?
08 A No.
09 Q Is there a reason why you didn't do that
10 calculation?
11 A I just didn't do it. I had no reason to do it.
12 MR. FLINN: I'm through.
13 HEARING OFFICER del PIERO: Thank you very much,
14 Mr. Flinn.
15 Mr. Roos-Collins? Where is he?
16 He's absent. You have no questions.
17 Ms. Scoonover?
18 MS. SCOONOVER: We have no questions.
19 HEARING OFFICER del PIERO: Ms. Niebauer? Good
20 morning and welcome back.
21 MS. NIEBAUER: Thank you. Erika Niebauer
22 representing United States Fish and Wildlife Service.
23 CROSS-EXAMINATION BY MS. NIEBAUER
24 Q Dr. Melack, I have a couple of questions for you.
25 You stated in your direct testimony that you were
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01 appointed as a member on the National Academy of
02 Sciences committee that prepared that important study
03 entitled Mono Basin Ecosystem Effects After Changing
04 Lake Level.
05 Can you tell me what the importance of that
06 particular report is as it relates to the written
07 testimony that was filed in this proceeding?
08 A BY DR. MELACK: I'm not quite sure of the context of
09 your question. Let me start to answer and see if it's
10 correct. If not, you can redirect me.
11 When the U.S. Congress asked the National Academy
12 to do that study, it was at the encouragement of
13 people's interest in Mono Lake as a natural resource,
14 and I felt that the process of selection of members of
15 that committee, which is based on a national search for
16 experts with no remuneration so it is all volunteer,
17 results in a very scholarly, thoroughly reviewed
18 document. In fact, after the documents are written,
19 they're reviewed by outside reviewers, and so in
20 contrast to all other documents that we have on the
21 table in front of us; that is, the EIR and the Corey
22 report, this document went through much more vigorous
23 review. So I felt that it deserves attention because
24 it does represent a greater effort by the National

25 Academy to produce a credible document.

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01 Q And I think that your testimony actually stated
02 that that was one of the most or the most unbiased
03 study of Mono Lake issues to date; is that correct?

04 A Yes.

05 Q And you, as you've just stated, you compare that
06 NES report with the Corey report and the DEIR. My
07 question for you -- is that correct?

08 A Well, in terms of major review documents, they're,
09 I think, comparable, yeah.

10 Q Would you classify yourself as a research
11 scientist?

12 A Yes.

13 Q Were the members, the other members of the
14 committee that helped prepare that NES report, would
15 you classify them as research scientists as well?

16 A That's correct.

17 Q But there are many scientists that aren't research
18 scientists; is that correct?

19 A I think not.

20 Q Most are research scientists?

21 A I think if you're a scientist, you must be doing
22 research, otherwise you're no longer functioning as a
23 scientist.

24 Q Let me ask you this question, then. Maybe that's
25 a bad way to phrase it. Are there not some scientists

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01 who review research that has been prepared by other
02 scientists such as yourself?

03 A Well, we all do that. That's part of the
04 process. You actively do research and you review other
05 people's research. It's sort of a give and take.

06 Q I guess what I'm trying to get at, Dr. Melack, and
07 I'm not trying to be cute or ingenious or anything, but
08 I'm trying to establish what is the difference between
09 you, your credentials, and the credentials that those
10 scientists who reviewed your work, analyzed it, and
11 synthesized it in the DEIR, what is the difference
12 between those two types of scientists?

13 A I wouldn't make a distinction about -- let me
14 answer your question, then. This might take a couple
15 of minutes here. The processes are very different.

16 In the case of the EIS report, what they do is
17 they pick people in a variety of areas, not necessarily
18 people who have any experience at Mono Lake in this
19 case, but who are recognized ornithologists,
20 germologists, hydrologists, and those people are asked
21 to review the information that one can use to evaluate
22 an environmental issue in this case. The people doing
23 the Corey report were just as much active scientists as
24 the people doing the EIS report, the people doing Draft
25 EIR, not the consulting company, but the people doing

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01 research that went into that are just as active
02 scientists.

03 My context of that is how the document is
04 eventually reviewed and when you use the word
05 "scholarship," that implies an academic world view

06 which means that it's reviewed in the academic context,
07 as are scientific publications that are put out in the
08 open literature. That review process is different than
09 the review process of an EIR. It's still a review
10 process. I wouldn't call it a scholarly one. It's an
11 equally strong review process. Corey's report wasn't
12 reviewed by any outside agency or any outside
13 individual, so the people doing it are the same, but
14 the review process is different.

15 Q Okay. Thank you.

16 When was that NES study or report published?

17 A 1987.

18 Q So six years ago. Has additional research been
19 conducted on the aquatic productivity and wildlife
20 resources of Mono Lake since that time? Since 1987?

21 A Oh, yes.

22 Q Did that report, the NES report, acknowledge the
23 inadequate data base on which the report was based and
24 recommend that additional research be conducted?

25 A I think that's -- every scientist always says

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01 that. I'm sure it said that.

02 Q Was one of the goals of that study to specify the
03 critical lake level needed to support then current
04 wildlife populations?

05 A You mean the congressional mandate to do that?

06 Q I think in the front of the actual report there's
07 a listing of a number of goals, and I believe that that
08 was part of the congressional mandate. I'm asking you,
09 do you recall --

10 A I'm not sure of the exact wording of how that was
11 written. That result was -- wasn't a lake level, it
12 was a range of gradient of change that was actually
13 presented.

14 Q Just a minute.

15 MR. BIRMINGHAM: We have a copy of the document
16 right here. Perhaps Dr. Melack would like to read
17 that.

18 HEARING OFFICER del PIERO: Gee, I've never seen
19 some of them appear all at once.

20 Q BY MS. NIEBAUER: The preface at Page 7, Number 2,
21 could you -- I'll read that I guess. Number 2 says,
22 "The critical water level of Mono Lake needed to
23 support current wildlife populations." The question
24 is, was that one of the goals of that report?

25 A Yes. Yeah, it was.

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01 Q Was the NES study charged with discovering the
02 optimal or the most secure or, in your terminology, the
03 healthiest lake level for wildlife populations?

04 A I don't think in the sense that you're asking it.
05 It wasn't charged to pick a particular lake level. It
06 was charged with evaluating the evidence and trying to
07 evaluate where we knew enough to say, "This was safe,"
08 and, "This is unsafe." It didn't target a lake level
09 level, as you notice in the document itself.

10 Q Well, the question is, was the charge of the
11 report to discover what was the best for current
12 wildlife populations or for wildlife populations?

13 A Not -- no. That wasn't the way it was actually
14 carried out.
15 Q Did the 1987 NES study make a recommendation as to
16 the lake level that was necessary to support then
17 current populations of wildlife?
18 A What it did, it presented a figure in the summary
19 conclusions which showed Figure 6.3 which has solid
20 lines, dashed lines, and dotted lines, and for
21 different parts of the community, brine shrimp, brine
22 flies, et cetera. It showed levels that the resource
23 was being maintained, was slightly effective, and the
24 resource was severely affected. And that was as far as
25 this committee was willing to go in terms of

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01 identifying lake levels that might be causing harm to
02 the ecosystem. That's on Page 210.

03 Q On page -- Page 206?

04 A Um-hum.

05 Q The first paragraph, summary and conclusions,
06 second sentence?

07 A Um-hum.

08 Q Talking about the resources of the Mono Basin
09 ecosystem, aquatic bird, shoreline, upland environments
10 are affected by changes in lake level, and it reads,
11 "Some of those resources would be adversely affected if
12 lake level rose above the current level, 6380, and
13 others would be adversely affected by lower lake
14 levels;" is that correct?

15 A Yes.

16 Q Was there an overall recommendation that was made
17 by the report that essentially the 1987 lake level was
18 necessary to support then current wildlife
19 populations? Do you recall that?

20 A I don't recall that kind of wording, no.

21 Q Now, let me move on here. Drs. Denman, Belk, and
22 Serina Bolin published an abstract in the Bulletin of
23 Zoological Nomenclature in September of 1990 in which
24 they stated that Artemia monica is a clearly defined as
25 endemic to only one unique salt lake. Do you know that

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01 to be true?

02 A I'm not absolutely sure. I know that certainly
03 the largest populations occur in Mono Lake, but I've
04 also thought that people have found species from ponds
05 near Fallon, Nevada, which seems to breed with Mono
06 Lake species. So I'm -- frankly, I wouldn't call
07 myself an expert in population genetics of Artemia.

08 I understand their work there, and I'm under the
09 impression that you can find populations which can, in
10 fact, breed with Mono Lake brine shrimp from a few
11 other ponds, but certainly on a population scale, those
12 ponds are much smaller than Mono Lake.

13 Q Do you know of any lakes in which Artemia monica
14 is found other than Mono Lake?

15 A And perhaps small ponds in the vicinity. No.

16 Q You made a statement in response to questioning by
17 Virginia Cahill, Department of Fish and Game counsel,
18 that there were two rotifers, I believe you said, that
19 were found at Mono Lake previously but that are

20 currently gone.
21 A Um-hum.
22 Q Do you recall making that statement?
23 A Yes.
24 Q And you also made a statement in response to
25 questioning regarding other species that were

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01 previously found at Mono Lake that were no longer
02 there. The statement that you made was that you were
03 only qualified to address open-water species. Do you
04 recall making that statement?
05 A Um-hum.
06 Q Does a healthy functioning ecosystem such as Mono
07 Lake typically include more than just open-water
08 species? In the case of salt lakes, the benthic
09 communities certainly are important as part of the
10 ecosystem. They're relatively minor, usually, in
11 abundance and contribution, but it's a little hard to
12 say. It depends on what your criteria for healthy is.
13 If you looked at animals which fed on open-water
14 plankton, they would be quite content if they only had
15 open-water plankton. But I think it's certainly true.
16 The benthic communities are typically part of most
17 lakes, sure.
18 Q So then the answer to the question does a healthy
19 functioning ecosystem typically include more than just
20 open-water species is yes?
21 A Um-hum.
22 Q Well, if that's so and if you've said that you're
23 only qualified to speak to open-water species, then can
24 you tell me, are you qualified to give an opinion
25 regarding the overall health of Mono Lake?

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01 A I think so, because I certainly understand what's
02 going on in the -- I've studied it as an expert, and a
03 research scientist is different than being able to read
04 literature about that region.
05 MS. NIEBAUER: Thank you. That's all I have.
06 HEARING OFFICER del PIERO: Is Mr. Gibson here?
07 Okay. Mr. Hasleton is not here.
08 Is there anyone else who wishes to cross-examine
09 the witnesses?
10 Ms. Goldsmith, redirect?
11 MR. FRINK: Excuse me, Mr. del Piero.
12 HEARING OFFICER del PIERO: I keep forgetting
13 about you guys.
14 MR. FRINK: It's easy to do.
15 HEARING OFFICER del PIERO: Out of sight, out of
16 mind, looking over the top of your heads.
17 CROSS-EXAMINATION BY THE STAFF
18 Q BY MR. HERRERA: I have a few questions of
19 Dr. Kimmerer to begin with.
20 Dr. Kimmerer, you were a subcontractor to Jones
21 and Stokes in the preparation of the Draft EIR?
22 A BY DR. KIMMERER: Yes, I was. Let me rephrase that.
23 My company was.
24 Q You were charged by your company to prepare
25 material for Jones and Stokes?

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01 A Yes.
02 Q What was your initial involvement with that? What
03 was your initial proposal? Your company proposed to do
04 for Jones and Stokes?
05 A We were asked to do -- to work on the modeling
06 aspects of the preparation of the EIR.
07 Q Can you be a little more specific? Work on the
08 modeling aspects?
09 A Well, initially, we were going to work both on the
10 alkali fly population modeling and the brine shrimp
11 modeling. We later -- well, we realized that that was
12 not appropriate, the latter, because of the amount of
13 time and money available and the amount of work that
14 had been done already and the fact that it was in good
15 hands, in my opinion.
16 Q Is that -- on the shrimp modeling?
17 A Yes.
18 Q So you did not get further involved other than
19 your initial involvement on the shrimp modeling?
20 A Sure.
21 Q Now, again, you mentioned that you reviewed or you
22 worked on the fly model that was prepared by Jones and
23 Stokes. Could you discuss a little more what your
24 involvement was with that? What you actually did?
25 A Yes. Dr. Herbst and I got together and basically

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01 spent time putting together this model. He being the
02 expert on the alkali flies, and I being familiar with
03 modeling techniques. And we put together a production
04 model that we suggested to Jones and Stokes was about
05 as far as we could go with the available data, and I
06 wrote that up as a report and submitted it. And that's
07 it.
08 Q You reviewed -- in other words, you reviewed Jones
09 and Stokes' model and prepared some of the material
10 that suggested changes to that model?
11 A No. I wrote a model to start with. Jones and
12 Stokes took that model and added a bunch of stuff to it
13 that, in my opinion, was not appropriate and came up
14 with their model.
15 Q And when did you review that material that you
16 suggest is inappropriate?
17 A After the Draft EIR. I'm sorry. I got a copy of
18 it, but I really reviewed it after the Draft EIR came
19 out.
20 Q Were you given an opportunity to review it before
21 the Draft EIR came out?
22 A I'm not quite sure. I believe I got a copy of it,
23 but I get a lot of things to review. I don't review
24 them all.
25 Q I find that kind of surprising, something that

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01 you'd been involved in that you didn't review it if you
02 had the opportunity before the draft came out. Is
03 there any particular reason? You didn't have the
04 time --
05 A I didn't have the time.
06 Q You just didn't have the time to review it?
07 A I've got a stack of things this high that I should
08 be reviewing now.

09 Q I can feel for that.
10 And you developed -- you developed your own model,
11 and that was submitted to Jones and Stokes about when?
12 In fact, I could tell you the date of the letter -- the
13 cover letter to Jones and Stokes. It's part of our
14 exhibit that was earlier identified. It was dated
15 August 17th, 1992.
16 A Yeah. That sounds about right.
17 Q Okay. Was this model also prepared with input
18 from Jones and Stokes?
19 A Yes. They provided input on, as I recall, the
20 relationship of elevation to salinity and the
21 relationship of hard substrate area and soft substrate
22 area to lake elevation.
23 Q Okay. And in the development of your model, was
24 anybody else involved in the review of this model?
25 A Russ Brown of Jones and Stokes was involved.

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01 Q But outside of Jones and Stokes --
02 A And from L.A. DWP as well.
03 Q Was that L.A. DWP's staff?
04 A Yes.
05 Q And Ed Herbst, I assume --
06 A Yes. David Herbst and I worked -- we produced the
07 model together.
08 Q Was this sent out for any other review?
09 A No, it was not.
10 Q I think that concludes my questions to
11 Dr. Kimmerer.
12 Dr. Melack, I've just got a few for you.
13 Earlier -- earlier on, you were discussing -- we were
14 discussing with Mr. Kimmerer his involvement in the
15 preparation of the Draft EIR. Would you describe your
16 involvement -- were you a subcontractor to Jones and
17 Stokes in the preparation of the Draft EIR?
18 A BY DR. MELACK: I don't think so. Our funding was
19 actually through the Department of Water and Power. It
20 wasn't a subcontract derived from Jones and Stokes.
21 Q You were charged to do specific things, though, to
22 prepare information for the Draft EIR, or could you
23 elaborate on what your involvement was there?
24 A Yeah. We and you and Jones and Stokes met several
25 times outlining a plan of action which involved model

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01 development, primarily, which we then did. So it's a
02 joint decision between you, them, and us.
03 Q And was it not the charge of your group or -- and
04 Jones and Stokes and ourselves to look at developing or
05 possibly working with your models to discuss or develop
06 some sort of way to predict or analyze the possible
07 effects of various lake levels?
08 A Definitely. Yeah. That was certainly one of our
09 goals.
10 Q And how did that go? Was that successful, or --
11 were we able to work with the higher lake levels, lower
12 lake levels that are outlined in the Draft EIR?
13 A I think it varied. We were -- in the case of the
14 physical model that we developed, which was -- we had a
15 large head start on, we were able to produce useful

16 predictions of meromixis, not over the full range of
17 potential lake levels because we were constrained by
18 the existing physical chemistry of the lake that we had
19 in hand.

20 In the case of the plankton model, we were, I
21 think, less successful because of the inherent
22 comprehensive modeling plankton communities and
23 associated limnology. And so from my assessment, I
24 think we started from the position of strength with the
25 Artemia population, but we had difficulty assembling

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01 the nutrients and algal populations into what I would
02 consider to be a truly predictive model, which is very
03 much the state of the art. It's very hard to make
04 predictive models of plankton population.

05 Q In your testimony, you suggest lake models of 6372
06 to 81 -- I believe that's correct -- is a healthy
07 environment for shrimp. That was the basis for much of
08 your investigation because you did have, for lack of a
09 better term, hard data or actual data to represent
10 those conditions. Again, these were lake levels you
11 had that sort of hard data on.

12 Now, in predicting other possible effects, you
13 recognize that you were, during a rare event, as you
14 termed it, meromixis, as the foundation for that
15 information, how did that affect, again, your
16 limitations on extrapolating that information for,
17 let's say, higher lake levels?

18 A Okay. Higher than 6381?

19 Q Yes.

20 A The fact that it was meromictic I don't think had
21 much effect on that extrapolation. What it had an
22 effect on was that we had less years, we still had
23 several years, we had less years to look at what you
24 might say the normal condition. But in terms of beyond
25 the period of record, whether it was miramictic or not,

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01 is less of an issue.

02 I think, in fact, the opposite is really true,
03 that with not having the lake be meromictic, if you
04 take that aside and do that as a treatment, if you
05 will, an interpretable agreement, what we saw then was
06 how does Mono Lake respond to a large reduction in
07 primary production? That reduction could have been
08 caused by salinity. It could have been caused by
09 meromixis. It could have been caused by a number of
10 things. So in a sense, what we were able to observe
11 was how the lake responded to a major predation in
12 terms of its brine shrimp response.

13 So I would argue that, in fact, the meromixis was
14 a very useful predation and, in a sense, gave us a
15 strong indication of what could happen if our
16 predictions of salinity effects are correct.

17 Q Well, if we're talking about, again, maybe in a
18 little simpler form here, the meromixis has occurred by
19 a rapid influx of fresher; is that correct?

20 A That's correct.

21 Q And that's that rare event. Now, if the -- as the
22 Draft EIR suggests, these various lake level

23 alternatives would not be achieved in a rapid fashion.
24 Would that still give your meromixis scenarios? And
25 I'm not sure that those would prevail. Have you looked

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01 at that?

02 A Yeah. You're asking a little different question.
03 If you're asking when we did the simulations with the
04 model called DYRESM with the incidence of meromixis,
05 for that simulation, we used the lamp input,
06 hydrological input data over the 50-year period, which
07 included various water supplies. Is that what you're
08 asking me? I'm not quite sure.

09 Q What I'm getting at is that yeah, you have a
10 meromixis that occurred from a rapid influx of water.
11 And yet if we're looking at operational scenarios as
12 suggested by the EIR where that would not occur, again,
13 how would that -- if your evaluation is stating that
14 you're not going to go through a meromictic period, if
15 we're operational, as the EIR suggests --

16 A Well. Maybe I should -- I guess I'm not sure if
17 we're getting off track or not. The -- my point a few
18 minutes ago about the effect of meromixis and our
19 ability to interpret the ecosystem response was really
20 in the context of if we examine the evidence that we
21 have or suggest that -- if you take the bioassay
22 experience and you predict a decrease in production
23 with increased salinity, if you decrease production in
24 the whole lake by some mechanism, in this case by
25 decreasing nutrient supply, that then provides you with

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01 a very powerful basis for evaluating primary production
02 effects on the ecosystem. Regardless of whether the
03 lake is meromictic or not, the effect is still the
04 effect of reducing production.

05 That effect then gave us an ability to evaluate
06 how the lake changed when the production decreased by
07 50 percent or more. That's what I was trying to say,
08 and it's kind of irrelevant whether the lake is
09 meromictic or not to make that particular judgment.

10 Q Well, one of the things that struck me, and I
11 don't remember the particular comments, but in your
12 earlier testimony, you suggested that as the nitrogen
13 levels were going down, the shrimp population were
14 going up, but at the same time, so was the lake level.
15 And you were having a little bit -- you were trying to
16 qualify that question a little bit earlier, I believe
17 your testimony is.

18 If we're suggesting again that the nitrogen levels
19 were going down and lake levels were going up and yet
20 shrimp populations were increasing, could you explain
21 that a little bit more? We had a dilution factor of
22 what you suggest was the controlling factor to shrimp.

23 A When you say "my testimony," you mean --

24 Q Earlier today?

25 A My response to the questions by Mr. Flinn? Is

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01 that what you're referring to?

02 Q I believe so, yes.

03 A And he showed a -- in fact, this exhibit over here

04 where he based on our model predictions, we showed --
05 at different lake levels, we showed different changes
06 in different concentration of ammonia.
07 Q And ammonia was coming down and populations were
08 going up as lake level was rising.
09 A That figure is a model simulation. It's not based
10 on the actual data that we have.
11 Q It could be. I don't recollect.
12 A That was a model simulation. We actually haven't,
13 today, talked about the actual data in that 14-year
14 period, which would directly address your question.
15 And we could do that. I'm not sure we want to do that.
16 Q I don't think so. I'm just curious when we're
17 saying one thing, we didn't discuss the dilution factor
18 here at all.
19 Again, did you -- there's other various questions
20 that we discussed pre-1941 conditions as to shrimp
21 populations. How would you characterize the shrimp in
22 pre-1941 conditions? Was that a healthy ecosystem?
23 A I don't have the slightest idea. If I were just
24 to guess, I would suggest that it was, but I have no
25 basis in fact to say that.

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01 MR. HERRERA: I think that concludes my
02 questions. Thank you, Dr. Melack.
03 HEARING OFFICER del PIERO: Mr. Canaday?
04 Q BY MR. CANADAY: Dr. Melack, you testified to what
05 lake elevations that your 14-year record corresponds
06 to. Can you relate that to the salinities that you
07 studied? The range?
08 A Yeah, I can. It probably would help if I try to
09 remember that the highest were up in the vicinity of
10 90 --
11 Q 98?
12 A I was going say 98 grams per liter, and the lowest
13 would have been in the surface waters. Just after the
14 meromixis began, they were as low as -- I'm not exactly
15 sure. I'm guessing 72 or so grams per liter, 75 or so.
16 That's in one of these reports. I just don't remember
17 exactly what number it was, but it's in that vicinity.
18 Q Okay. Is some of your reluctance to using
19 scientific judgment to express an opinion on the impact
20 of brine shrimp productivity and algae productivity and
21 primary productivity at lake levels higher than 6381
22 the fact that you have no data for that? Is that
23 correct? Actual field data?
24 A That's why -- I'm not saying I won't do it, but
25 I'm a little bit more reluctant to have to do that and,

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01 therefore, I'm trying to say when you look at the model
02 results, you have to be cautious.
03 Q But based on 14 years of record and the
04 information you have at hand and the expertise you had
05 at Mono Lake, in your professional opinion, do you
06 expect that the brine shrimp productivity would
07 significantly decline at higher lake levels and lower
08 salinities?
09 A It depends on how high you get. It depends --
10 Q Let's say --
11 A You get there.

12 Q 6383.5.
13 A Oh, no. I wouldn't think that there would be any
14 difference from the record I showed you today if you
15 went through that level.
16 Q 6390?
17 A I'm less sure, but I wouldn't think that there
18 would be very large changes.
19 Q 6410?
20 A Then I would have to say that Mono Lake would be a
21 different lake, and I wouldn't be willing to speculate.
22 Q The NES report that's been talked about today that
23 was completed by the august group of scientists, wasn't
24 the focus of that report based on the fact that the
25 lake level was going to be declining?

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01 A That's a fair statement, yes. That was a
02 concern. How things changed as the lake level fell.
03 Q Right. And so the emphasis of the research and
04 the recommendations was not based on evaluating a lake
05 level that may be rising from that particular point of
06 reference in the document. is that correct?
07 A Yes and no. We certainly evaluated prior lake
08 levels. There's ample data in there for higher lake
09 levels as well.
10 Q But only up to a point of 6381; is that correct?
11 A I don't think so. That's my memory. I thought we
12 had --
13 Q As far as lake productivity?
14 A As far as the lake productivity, on these figures
15 here, that was 6420 and above, 6430.
16 Q So scientists were willing to make projections
17 based on data that their data sets were significantly
18 lower than that on the lake level, but yet they were
19 willing to make value judgments based on the data at
20 hand; is that correct?
21 A I think I got your question. Will you just
22 restate it, though, just one more time, please?
23 Q Well, in your earlier testimony, you said that
24 it's important to base evaluations and recommendations
25 or analyses based on the data sets at hand. And you

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01 suggested that this is the most unbiased study, the NES
02 report that had been done, but yet there are -- here's
03 a group of scientists making recommendations for lake
04 levels, and the focus of the study was that lake levels
05 that were declining from the point. But yet they were
06 willing to make, based on the data at hand, data up to
07 1986, make projections of the values of the resources
08 at higher lake levels. Is that correct?
09 A Well, perhaps. I think you ought to be careful,
10 though, how you say that. If you look at the resources
11 at hand which I'm speaking of, brine flies, brine
12 shrimp, if you look at those two, what the NES report
13 does is it says, "Resource maintained." That's a
14 pretty neutral statement. The resource is maintained
15 at levels from 63 -- I guess for Artemia, it would be
16 6368 up to -- this goes to about 6425.
17 We're saying it's maintained. I mean, that's -- I
18 think -- yeah. To that extent, your statement is

19 correct. People are willing to say that the resource
20 is being maintained. It's not threatened in that
21 range. It's not a very strong statement, but that's
22 what it's saying. Resource maintenance.
23 Q You don't dispute that recommendation?
24 A No. I wouldn't entirely dispute that, no.
25 Q Getting back to the EIR that was produced by Jones

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01 and Stokes and getting back to earlier statements you
02 made about scientists doing research, am I to assume
03 that, from your statements, that the staff at Jones and
04 Stokes could not be considered scientists?

05 A I said -- what I was trying to imply is that they
06 weren't academic scientists as were the scientists that
07 composed the Corey board or the NES board. They still
08 could be scientists, they're not research scientists.

09 Q Do you know that for a fact that they're not
10 research scientists?

11 A I know among the ones who I interacted with that's
12 the case. Whether it's true across the board, I
13 certainly do not know.

14 Q So what you're saying is that -- is that unless
15 you're attached to a university under some grant that,
16 therefore, you're out of the mainstream of science?

17 A I wasn't making any value judgment at all. I was
18 simply making a statement. I wasn't judging pro or
19 con. I was simply stating that there's different kinds
20 of individuals. In fact, I quite carefully said that
21 there was no distinction among the people involved,
22 just that they had different kinds of jobs.

23 Q So then you're telling me you would admit that
24 they are scientists, then?

25 A Some are certainly. Some are engineers.

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01 Q Um-hum.

02 A There's a difference there I would make as a
03 distinction.

04 Q Dr. Kimmerer, did I hear your testimony earlier
05 that you are under the employ of a consulting firm? A
06 BY DR. KIMMERER: Yes.

07 Q Do you consider yourself a scientist?

08 A Yes.

09 MR. CANADAY: Thank you. That's all I have.

10 MR. FRINK: Staff has no further questions.

11 HEARING OFFICER del PIERO: No further questions.

12 CROSS-EXAMINATION BY THE BOARD

13 Q BY HEARING OFFICER del PIERO: I need a
14 clarification. Something that -- Dr. Kimmerer, you
15 were an employee of a contract firm that produced the
16 initial draft model on the flies; is that true?

17 A BY DR. KIMMERER: That's true. I produced the
18 draft.

19 Q In your capacity as an employee of a contractor?

20 A Yes.

21 Q When was that?

22 A It came out this August 1992.

23 Q And you -- was that consulting firm subcontracted
24 to Jones and Stokes at the time?

25 A Yes.

01 Q They were? And the draft model that you prepared
02 was pursuant to the contract that was entered into?
03 A Yes.
04 Q That was being -- that was ordered by the Court of
05 Appeals?
06 A Right.
07 Q Okay. And you were employed in that capacity to
08 produce that?
09 A Well, it was one of my jobs.
10 Q Okay. I just -- I'm trying to get this straight.
11 When did you get a copy of the draft from Jones and
12 Stokes, the Environmental Impact Report?
13 A I really don't recall. I get lots of things to
14 review, and --
15 Q When did -- circulation of the draft is required
16 to be done pursuant to the guidelines of SEQA.
17 Mr. Frink, do you know what the date was that that
18 was circulated?
19 MR. CANADAY: May 26th, 1993.
20 Q BY HEARING OFFICER del PIERO: May 26th. Okay. Were
21 you still employed to review that work?
22 A BY DR. KIMMERER: My contract with -- or our contract
23 with Jones and Stokes had finished by that time, and I
24 was --
25 Q Your contract did not require you to review the

01 document?
02 A No.
03 Q It did not?
04 A No.
05 Q Do you recall when you received the model after
06 Jones and Stokes had added the other stuff to it?
07 Those were your words?
08 A Yeah. I received the Draft EIR --
09 Q I'm not talking about the Draft EIR. I mean the
10 model which is your work product.
11 A I believe they sent me a copy sometime before
12 that, but I really don't remember when.
13 Q Would it be in your records?
14 A Yeah. I'd have it somewhere.
15 Q Would it be in Jones and Stokes' records?
16 MR. CANADAY: Yes.
17 Q BY HEARING OFFICER del PIERO: And when did your
18 contract terminate with Jones and Stokes?
19 A BY DR. KIMMERER: Shortly after I submitted that
20 report in August 1992. I'm not sure of the termination
21 date of the contract, but the work was completed. And
22 we ran out of money so we stopped. I don't know the
23 actual contract completion date.
24 Q Okay. You stopped because you ran out of money in
25 terms of reviewing the documentation that had been

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01 ordered by the Court of Appeals?
02 A I was not asked to do any further work for Jones
03 and Stokes.
04 HEARING OFFICER del PIERO: Okay. It's a quarter
05 to 12. We'll start with redirect at one o'clock. This
06 hearing's adjourned.

07 (Whereupon the lunch recess was taken.)
08 HEARING OFFICER del PIERO: Ladies and Gentlemen,
09 this hearing will again come to order.
10 REDIRECT EXAMINATION BY MS. GOLDSMITH
11 Q Dr. Melack, I'd like to ask you a few questions on
12 redirect.
13 First of all, has the Los Angeles Department of
14 Water and Power ever attempted to constrain the
15 publication of data which has been produced by you or
16 your group?
17 A BY DR. MELACK: No. Not at all. In fact, if
18 anything, they have encouraged us to produce some
19 publications in the fully reviewed scientific
20 literature.
21 Q Is your use of the term "fully reviewed" the same
22 as is also referred to sometimes as "peer reviewed"?
23 A That's correct. When we publish papers, what we
24 do is we submit them to an editor of a journal, and
25 that editor sends in anonymous review. And then

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01 they're criticized and sent back and eventually
02 published in journals, and that's the standard way
03 scientific information is deemed legitimate or valid.
04 Until papers are actually reviewed and published, they
05 remain in the realm of personal communications or
06 unpublished data. Such information can be used but
07 does not pass the same stamp of approval that a peer
08 review article does.
09 Q And has most of the data that you've collected
10 been published in one form or another in peer review
11 journals?
12 A I wish I could say most of it. Most of it, yes,
13 but in all of it mainly because we're behind. But we
14 do aim to publish everything we do in peer review
15 journals.
16 Q And is there any interference in that process
17 other than the constraints of time?
18 A Interference by -- no. The constraints are just
19 merely time.
20 Q Turning to questions that were raised at an
21 earlier time by U.S. Fish and Wildlife Service, is a
22 criteria of 85 grams per liter an appropriate or
23 relevant water quality standard to apply to a saline
24 lake like Mono Lake?
25 A I would say not. Those criteria are really

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01 arbitrary and depend on the particular organisms that
02 live there and the ecosystem at issue. And in the case
03 of Mono Lake, we have clear evidence that the lake
04 functioned very nicely. Salinity's higher than that.
05 If I looked at the Dead Sea in Israel, one would
06 see salinity at 300 grams per liter and clearly, the
07 ecosystem is functioning. So it depends on your
08 ecosystem. There's no arbitrary way -- that cut-off is
09 a legitimate criteria.
10 Q In his cross-examination of you, Mr. Flinn asked
11 you questions concerning a quotation which he put up on
12 a chart taken from Auxiliary Report Number 13 in which
13 there was a question about salinity effects being
14 obscured. And you stated in your answer that it was

15 important not to take that statement out of context.
16 Can you tell us what the meaning of that statement
17 is in the proper context?
18 A Yes. What I've been trying to do here, both in my
19 written testimony and in my oral testimony, is to raise
20 the issue that when one tries to look at environmental
21 change, one has to look at it in the context of the
22 whole ecological system and, therefore, one can't look
23 at a single factor like salinity and say that's the
24 dominant factor causing all of our changes. And
25 therefore, when one has a data set like we have which

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01 shows natural variability, in this case caused by some
02 climatic changes, those effects can, in fact, override
03 other effects, and the argument is really not to say
04 that salinity isn't a factor. It is a factor. We know
05 it's a factor. That data show it's a factor, but it's
06 only one factor. And food supply, vertical mixing,
07 water supply rates, species composition are also
08 factors. And so the evaluation of a particular
09 influence really depends on the ecosystem context. And
10 that was really the point of that quote. It wasn't to
11 emphasize that we couldn't see salinity effects,
12 period. It was to say that they need to be put in the
13 context of the overall ecosystem.

14 Q Is that true for all of the different sorts of
15 factors which affect the ecosystem such as temperature
16 or --

17 A Yeah. But the real challenge of ecology, like the
18 challenge of economics, is to look at very complicated
19 systems and evaluate what's really the key factors and
20 how these factors interact with one another. So the
21 thrust of this has been to try to make the
22 decision-making process sensitive to the realities of
23 complicated systems and not let us be lulled into the
24 feeling of security by picking on any factor and then
25 basing our decisions on one single factor which can be

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01 very misleading and often, in fact, wrong.

02 Q Is this confounding effect or complicating effect
03 of the interaction of various factors true of all lake
04 levels or just --

05 A It's true of all ecosystems, and Mono Lake is no
06 exception.

07 Q Now, Mr. Flinn also put some graphs from -- there
08 was a report by Dr. Jellison which showed a 50 percent
09 increase in secondary production and if I could put
10 those up and identify the graph a little more clearly.
11 I believe it's Table 17 from the Auxiliary Report
12 Number 13.

13 How would you evaluate the accuracy of the
14 salinity results and effects that are shown?

15 A These are simulation model results based on a
16 variety of equations that Bob Jellison and I put
17 together, and when you do such an analysis, what you
18 then do is you vary some of the values that you assign
19 to the terms in those equations. And one of the
20 approaches is called the sensitive analysis where you
21 systematically change parameters and look at how the

22 system responds to those variations. You also compare
23 your results to known conditions.
24 In the case of a sensitivity analysis that we did,
25 we found that the values that we predict would vary

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01 between 10 and 20 percent depending on what we varied.
02 So the aggregate effect of the sensitivity analysis
03 which suggests those values are probably plus or minus
04 about 15 percent.

05 In addition to that, you compare your results to
06 the natural variability, and so as I mentioned in my
07 testimony, and it is documented in the direct written
08 testimony, if you look at secondary production in Mono
09 Lake over the last -- it's an eight-year record, the
10 variation is from about plus 70 percent to minus about
11 40 percent. In other words, from a mean value, we
12 observed over this eight- to ten-year period variations
13 of between 40 and 70 percent. So in other words, a 50
14 percent increase or decrease could be judged as within
15 the natural variability.

16 On the other hand, if that increase persisted
17 through time many years after another, in other words,
18 if there was a clear trend of values going higher and
19 higher, then one would be more comfortable with the
20 notion that, in fact, there was a significant effect.
21 But this particular simulation was a one-year
22 simulation. It wasn't really based on a trend.

23 So again, I was mostly just trying to raise the
24 issue of caution, and when you make a decision, you
25 base your decision on the best available information.

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01 And when you use models, you have to be careful that
02 you include in your appreciation of those model results
03 the uncertainties of those models just like you do with
04 any other kind of data. And it's not saying the models
05 are wrong or right or bad or good. It's just something
06 that the reality is that they intrinsically have
07 uncertainties and those uncertainties are part of life,
08 and we have to, then, bear those in mind when we make
09 our judgments.

10 Q Mr. Flinn also asked you about NAS and MLC Exhibit
11 No. 219, which is a paper by Jellison, Miller, Melack,
12 and Dana, and he had you read a sentence from the end
13 of the paper which says, "Nitrogen fixation and benthic
14 algal mass has nearly doubled at pre-1941 salinities
15 than at current salinities," which is cited, "D. Herbst
16 personal communication."

17 Does this mean that there would be twice the
18 nitrogen fixation if the lake returns to the
19 pre-diversion levels?

20 A No, it doesn't. And the reason is that the area
21 of benthic algal mats and the species composition of
22 those mats and the what's referred to the oxidation
23 reduction status in those mats and the amount of trace
24 metals present all affect nitrogen fixation rates. It
25 is a very complicated process. It's very sensitive to

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01 a whole range of environmental conditions one of which
02 is salinity, but in general, people find salinity as

03 being one of the less important factors. You have many
04 factors involved, and you also have the issue of what
05 area is even covered by benthic algal mats, and that's
06 an issue as well. Although the lab experiments by
07 themselves are valid scientifically, the extrapolation
08 of those data to the lake at a different level is pure
09 guess work.

10 Q Now, you were asked by Ms. Niebauer concerning
11 your opinion that the lake's ecosystem is healthy. And
12 the focus of that line of questioning, I think, was
13 whether or not your opinion is limited to the phalagic
14 zone or extends more broadly. Is your opinion that the
15 lake's ecosystem is healthy limited to the phalagic
16 zone only?

17 A No, it's not. My own research is generally
18 limited to there, but I have long-term contact with
19 everyone studying Mono Lake and have had many contacts
20 with David Herbst, for example, who's done a great deal
21 of the research. And we keep in touch with unpublished
22 documents and, in fact, that's why we cited an
23 unpublished work, because we work in close contact. So
24 I think that my own knowledge base clearly extends
25 beyond the phalagic zone and includes all the recent

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01 research going on in the linal zone as well.

02 Q I have one question for Dr. Kimmerer.

03 There was some discussion, a great deal of
04 discussion, as a matter of fact, before lunch
05 concerning what was said to you, what you were asked to
06 do, and what the development process was for the brine
07 fly model that was included in the DEIR.

08 Have you had a chance to investigate that question
09 over the lunch hour? Have you learned anything?

10 A BY DR. KIMMERER: Yes. My recollection at the time
11 was -- before lunch was I had received something from
12 Jones and Stokes, and I couldn't remember whether I was
13 asked to review it or not asked to review it. I was
14 clear that it wasn't part of any contract.

15 I did discuss this with Dr. Russ Brown, who is
16 here today. He was my contact with Jones and Stokes,
17 and he confirmed my suspicion that I had not been asked
18 to review it. I got a copy of the model in March just
19 as an informational copy because I worked on the -- the
20 production model that was used as a basis for this
21 model in the Draft EIR.

22 Q You were not asked to review it?

23 A I was not asked to review it.

24 MS. GOLDSMITH: That's all I have on redirect.

25 HEARING OFFICER del PIERO: Ms. Cahill?

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01 RE-CROSS EXAMINATION BY MS. CAHILL

02 Q Dr. Melack, in response to a question by Mr. Flinn
03 as to whether you had incorporated certain graphs into
04 your testimony, you directed our attention to Page 4 of
05 your direct testimony in which you state that,
06 "Salinity bioassay laboratory experiments of the
07 effects of salinity on individual organisms indicate
08 gradual effects of increasing salinity on nearly ever
09 life-history parameter of the only macrozooplankter in

10 the Mono Lake brine shrimp."

11 In order to make it clear, would it be correct to
12 say that these gradual effects of increasing salinity
13 are adverse effects on the organism?
14 A BY DR. MELACK: You're getting to the realm of
15 semantics here. Adverse is a value judgment, and if
16 science is supposed to be value blind, I guess I should
17 say that I wouldn't use that adjective.

18 You could say that the populations, as was
19 described, I think, quite well by Mr. Flinn in his
20 cross-examination, that the plots show that
21 survivorships decline and growth rates decline. In
22 that sense, you use a word like "decline rates" or
23 "longer duration times," then I would be more
24 comfortable, but I wouldn't use the word "adverse" or
25 something like that. I think that's inappropriate for
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01 a scientific document.

02 Q In order to let the reader know that these effects
03 are effects that would -- the lay person would consider
04 to be adverse, what is the scientific way of expressing
05 that, that these are not beneficial to the organism?

06 Is "decline" the word that you --

07 A Yeah. I would say -- of course, you have to be
08 careful because in some cases they -- longer generation
09 time is a -- it would slow up the reproduction rate of
10 the population. Again, I think you're losing the
11 forest for the trees in a way because you're missing a
12 whole line of this argument, which is that individual
13 factors in and of themselves don't tell the whole
14 story.

15 Q Those factors, based on those laboratory results,
16 taken as a whole, would they tend to show that there
17 was a trend toward a more healthy or less healthy
18 situation for the brine shrimp with increasing
19 salinity?

20 A Let me try to not be at all evasive. If you
21 extrapolate the data to salinities to 130 grams per
22 liter or more, it's clear that brine shrimp population
23 will not survive in the lake if that lake level is
24 below 6360. So there's no question that at some point,
25 you have a clear negative effect on that population.

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01 In the realm of salinities that we're currently talking
02 about, changes of a few percent, it's very hard to say
03 whether those are positive or negative effects. So
04 it's a question of the range in which you're talking,
05 whether or not you would really deem it as a true
06 negative or positive effect.

07 I'm not trying to mitigate the effect being real,
08 but I think you just have to be careful about how you
09 conjure these two points because they vary depending on
10 which range of lake levels you're talking about. In a
11 range from 6372 to 6385, you probably won't even see a
12 salinity effect.

13 Q But the trend is -- if you've used the word
14 "negative" in most of those cases, the trend with
15 increasing salinity was toward negative impacts?

16 A But it's kind of irrelevant because --

17 Q Just yes or no.

18 A The trends for the physiological assays is
19 negative, that's right.
20 Q Thank you.
21 Dr. Kimmerer, I have just one last follow-up with
22 you. You quite rightly stated in response to a
23 question by Mr. Flinn that the copy of the Condor
24 article that I gave you was not very clear, and because
25 the original is so much clearer, I would like to show

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01 it to you. And I will try to have better copies made
02 for all counsel.
03 But would you take a look at this, please?
04 MR. THOMAS: Are you going on the stand?
05 MS. CAHILL: Mr. del Piero, I'll bring it up to
06 you, too. It is true the original makes quite a
07 difference.
08 Q BY MS. CAHILL: Dr. Kimmerer, having reviewed what
09 that statement says about a band -- a dark band of
10 alkali fly completely around the lake and having viewed
11 the photograph, would you conclude that it is possible
12 that in the pre-diversion condition, the abundance of
13 alkali fly was greater than it is today?
14 A BY DR. KIMMERER: It's possible.
15 Q And, in fact, based on your review of that
16 photograph, do you conclude that it's likely that at
17 some time pre-diversion, there was a population of
18 alkali flies that was greater than what exists today?
19 A With or without that photograph, I would conclude
20 that at some time in the past there have been higher or
21 lower populations than there are now.
22 Q Thank you.
23 A That photograph doesn't really say much to me to
24 answer that question one way or the other.
25 MS. CAHILL: Thank you. That's all I have.

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01 HEARING OFFICER del PIERO: Thank you very much.
02 Mr. Flinn?
03 MR. FLINN: If I could have one moment?
04 RE-CROSS EXAMINATION BY MR. FLINN
05 Q Dr. Melack, I want to revisit meromixis a little
06 bit here, follow up on some questions that you answered
07 to the lawyers who followed after me. If we were to
08 draw on table -- Figure 1 here, your lake level chart,
09 a kind of a -- your smoothed brine shrimp population
10 curve, it would be sort of wavy but relatively constant
11 through this period; is that right?
12 A BY DR. MELACK: We can show that, actually. It's on
13 one of the other exhibits.
14 Q But it's not against lake level?
15 A Yes, it is.
16 Q It is? You have one against lake level?
17 A The last one, Figure 11, the overlay is lake
18 level.
19 Q Oh. Is this the one?
20 A Yes.
21 Q Okay. Great. Much handsomer than ours.
22 Now, am I sort of right that we've got this
23 monomixis period here in which the shrimp were having
24 to endure salinities substantially higher than they

25 endured when the lake was in its pre-diversion

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01 condition? Is that right?

02 A Oh, sure, yes.

03 Q Okay. And then you said that this meromixis
04 substantially reduced food supply, right?

05 A Initially, yeah. Where those bars are kind of
06 grayish, that means there's less food. When the bars
07 are bluer, there's more food.

08 Q As we got bluer, we got back down to the monomixis
09 salinity levels again, right?

10 A That's correct.

11 Q So we were sort of out of the -- out of the
12 salinity frying pan but into the nutrient fire?

13 A Those are your words.

14 Q We never had both at the same time, did we? We
15 never had both the light gray or light blue bars at the
16 same time we had the higher salinities, did we, in
17 your 14-year historical record?

18 A Well, we do it careful because those data there
19 are showing you annual average values and, in fact, if
20 you look at individual years, we do, in fact, have
21 situations where there were much, much lower algal
22 abundances in early parts of the growing season. And
23 so we -- and we could, therefore, evaluate food
24 independently of meromixis, so that -- based on those
25 data in front of you, you're correct but, in fact, we

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01 have other data which would allow us to do other sorts
02 of analyses.

03 Q Didn't you tell us that we shouldn't even take
04 five years or less than five years as a trend? We
05 certainly shouldn't take less than one year as any kind
06 of a trend, should we?

07 A That's a different issue. What we're talking
08 about when you talk about food supply and shrimp
09 abundance, is we're talking about a mechanism that
10 affects the population. That's a different kind of
11 analysis than a trend. You're talking apples and
12 oranges here. So maybe you should clarify where you're
13 coming from.

14 Q I will clarify it. We never had, for a period of
15 an entire year, an entire season, a condition of both
16 the low nutrient and the high salinity at the same time
17 for a whole year, for a whole season; isn't that right?

18 A During this period of record, that's right, yeah.

19 Q Now, we talked about the model. Just for
20 clarity's sake, this document, which is Table 17,
21 following the letter, this is produced by your team not
22 Jones and Stokes, right?

23 A Yes.

24 Q Okay. And so the decision to use 6390 and to draw
25 these graphs was a decision your team made and you

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01 approved of, right?

02 A I wouldn't say that. The decision to use those
03 elevations was a joint decision made by the State Water
04 Board and the courts and everyone involved. We picked
05 certain levels as being appropriate levels to evaluate.

06 Q And 6390 was one of them?
07 A Yes, exactly.
08 Q And you told us a lot about uncertainty. You told
09 us about how you can't -- just recall to us your
10 uncertainty testimony. Is there a better model of what
11 would happen at lake levels outside of your historic
12 record than the one your own team did?
13 A There's no better model, no. Although -- well, at
14 this minute, there is a better model. There was not a
15 better model at that point.
16 Q At this minute?
17 A In other words, we didn't stop working on this
18 problem when we turned in the results to Jones and
19 Stokes. We've continued to try to improve upon the
20 model based on more data and more experimental results.
21 Q In the record available to the Water Board, that's
22 the best thing we have?
23 A That's the best we had available. That's correct.
24 Q So assuming that the Water Board has to live with
25 these uncertainties you've warned us all about, you

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01 would commend to them the best model, wouldn't you?
02 A What I would also commend to them is the
03 importance of looking at real data if one has an option
04 to look at real data versus model results.
05 Q And did you, yourself, take data for more than
06 five years with the lake level at 6390 or thereabouts?
07 A No, of course not. Those data don't exist.
08 Q Okay. Now, you did answer some questions, I
09 believe it was Mr. Canaday or Mr. Herrera, in which you
10 were asked would bad things happen to the shrimp
11 population as the lake rose, and he asked you 6383.5 or
12 6390 and 6400 or 6410. And I recall you saying
13 something like you wouldn't perceive much of a change
14 at 6390.
15 Do you generally recall that testimony?
16 A Yes, I do.
17 Q Okay. Now, if we were to follow the best model
18 available to the Water Board currently, the change
19 between 6377 and 6390 in monomictic conditions is, in
20 fact, in a positive direction, isn't it?
21 A Yes.
22 Q Now, in answer to other questions, and I don't
23 know who asked them. It might have been Ms. Cahill,
24 but I'm not sure. In answer to other questions, you
25 were asked about studying the lake at a higher lake

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01 level and you said, I believe you described the lake
02 level above 6400 or 6410 as a "different lake."
03 Do you recall that testimony?
04 A Yes.
05 Q Now, let me ask you to assume, and I'm not going
06 to examine you on the public trust doctrine. I'm going
07 to ask you to make some assumptions. I'm going to ask
08 you to assume that the California Supreme Court has
09 instructed all of us in the room that a public trust
10 value is the preservation of Mono Lake in its natural
11 state. And I am further going to ask you to assume
12 that the natural state means the lake above 6410.

13 Do you follow me so far?
14 A Um-hum.
15 Q I take it that the so-called healthy lake that
16 you're telling us about today is a different lake than
17 the lake the Supreme Court has commanded us is a public
18 trust value.
19 HEARING OFFICER del PIERO: Is that a question,
20 Mr. Flinn?
21 MR. FLINN: Yes. I want to make sure that I'm
22 following his definition of --
23 HEARING OFFICER del PIERO: Dr. Melack?
24 MR. FLINN: Do you understand that question?
25 DR. MELACK: It didn't sound like a question. It

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01 sounded like a statement. What's the question?
02 MR. FLINN: Madam Reporter?
03 THE REPORTER: Sure.
04 MR. FLINN: Could you read it back?
05 (Whereupon the record was read as requested.)
06 DR. MELACK: Yeah. Just like I'm a different
07 person ten years from now. That's a kind of a
08 nonsequitur, what you're saying.
09 Q Now, I want to turn to exhibit -- let me back up.
10 One more thing.
11 Do you have an opinion, Sir, as to the health of
12 the migratory duck population at Mono Lake currently?
13 A Do I have an opinion?
14 Q Yes.
15 A No. I don't have an opinion about that.
16 Q Okay. Exhibit 219, your meromixis and nitrogen
17 article, and you used the word "guesswork" in answer to
18 one of Ms. Goldsmith's questions. Do you recall that?
19 A I do, yes.
20 Q Okay. Now, when Dr. Herbst told you or
21 communicated to you that, quote, nitrogen fixation in
22 benthic algal mats is nearly double at pre-1941
23 salinities than at current salinities," and you saw fit
24 to include that in your paper, was Dr. Herbst guessing
25 that fact, or had Dr. Herbst actually done some

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01 scientific experiments to show that fact?
02 A You've really distorted the prior questioning.
03 The question was whether the whole lake supply of
04 nitrogen would be doubled at pre-diversion salinities,
05 and the answer to that question was, based on the
06 testimony I gave, that that would be pure guesswork.
07 The experiments that Dave did were laboratory
08 experiments, which he has yet to have published but
09 which he showed us the results of and which we deemed
10 were sufficiently accurate to include in that paper.
11 So I was not in any sense implying that Dave's work was
12 guesswork. I was simply saying, in answer to Jan's
13 question, that that was -- extrapolating those data to
14 the whole lake was guesswork.
15 Q Is it equally guesswork to say that there would be
16 no benefit in nitrogen fixation if you decreased
17 salinities to pre-41 levels?
18 A Say that again?
19 Q Would you be guessing just as much if you were to
20 testify that there would be no benefit in overall

21 nitrogen availability in Mono Lake if you reduced the
22 salinity to pre-diversion levels?
23 A Based on our existing knowledge, yes.
24 Q Dr. Kimmerer, a couple of follow-up questions. In
25 the interim I've had the availability -- I've had the

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01 chance to read the whole report in which the one
02 document was just a part. And I want to ask a couple
03 of follow-up questions because I think there was some
04 un -- lack of clarity in my prior questions.
05 I was attempting to ask you on direct examination
06 what -- whether four different assumptions were allowed
07 for in this model. Whether or not there was an
08 increase in habitat density as salinity decreased.
09 Whether or not there was an effect of the smaller adult
10 body size making it harder to get food, vegetation as a
11 hard substrate. And the final one I asked you was
12 whether or not there was a consideration of the effect
13 of salinity on the fly food source, and I recall you
14 telling me that that was considered.
15 Did I hear you wrong?
16 A BY DR. KIMMERER: I didn't hear that question. The
17 question that I heard was, was there an effect of body
18 size on the ability of the fly -- the larvae to find
19 food.
20 Q Okay.
21 A I answered that question.
22 Q Yeah. Let me reask it, then. Is it not correct
23 that you assumed -- your model assumes across all the
24 salinity ranges a constant food supply to the flies?
25 A It assumes that the -- that changes in the food

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01 supply are not -- are not affecting the flies other
02 than through growth rate which is included as an effect
03 and the body size.
04 Q Growth rate is assumed to change as a function of
05 salinity, right?
06 A Well, okay. On Page 4, all the assumptions and
07 all the -- the information that's used based on the
08 experimental results is listed, and so it's all right
09 here. If you want me to go through it, I will.
10 Q Actually, let me focus on a different thing. The
11 experimental data that you're referring to in which --
12 which showed that as you increase salinity, growth
13 rates decreased. You understood that to be the
14 experiment?
15 A Yes.
16 Q In those experiments, was the food supply kept
17 constant?
18 A It was not manipulated.
19 Q Right. So it was a constant food supply for the
20 flies?
21 A I don't know that it was constant, but it was not
22 manipulated.
23 Q So it was the same amount of food with cross
24 salinities?
25 A I didn't say that. If the salinity changes, and

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01 that changes the food supply during the experiment,

02 then the food supplies could have been different.
03 Q Okay. But you don't know one way or the other
04 about that, do you?
05 A It was not manipulated. Okay? It was not
06 expressly changed.
07 Q Do you know whether or not the food supplies
08 changed?
09 A No, I don't know.
10 Q Okay. If I ask you to assume that the food
11 supplies were not changed.
12 A Okay.
13 Q Then the effect of food availability as a function
14 of salinity would not be incorporated into your model;
15 is that right?
16 A The effect of food concentration would not be, but
17 availability also includes the ability of the animals
18 themselves to get food. So in that case, it could
19 still be affected.
20 Q Now, you conclude -- you discuss -- if I can find
21 it here -- on Page 8 of your report, that -- the bottom
22 paragraph under Changing Elevation. You say, "Changes
23 in lake elevation influence both biomass and
24 production, although there was little effect of lake
25 elevation on the time at which biomass saturates."

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01 Then you say, "The peak in production occurs at a lake
02 elevation of about 6384 feet." You cite Figure 6.
03 That's your conclusion from your model?
04 A That's my conclusion from this set of runs in this
05 model which has not been -- I've not done the full
06 sensitivity analysis. This is not a complete piece of
07 work here.
08 Q Okay. And again, assuming that the Water Board
09 does not have an infinite time, and we all don't have
10 an infinite budget, and assuming that this is the best
11 available data to the Water Board, then this would be
12 your conclusion?
13 A It wouldn't take an infinite amount of time and
14 money.
15 Q Assuming --
16 A Quite finite, actually.
17 Q Assuming that this is the best available
18 information to the Water Board, that's your conclusion?
19 A This is what -- this is what the model produces
20 given the assumptions.
21 Q I didn't --
22 A A model -- let me just explain this. A model is
23 just the result of the series of assumptions that you
24 put into it. If you make the assumption clear, then
25 either you agree with the assumption or you don't. If

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01 you don't agree with the assumptions, then that leads
02 you to do one thing about it, which is to try to revise
03 the model according to your new assumptions.
04 If you agree with the assumptions and the model is
05 done correctly, then you can't escape the conclusions,
06 okay? Given these assumptions, I assert that I believe
07 this model is done correctly. This is the conclusion
08 you'd arrive at.

09 Q Okay. Then you go on to say, "Production
10 decreases sharply above and below that. In particular,
11 the decrease below the present elevation of 6375 feet
12 is precipitous."
13 A Um-hum.
14 Q That has the same degree of certainty and
15 conclusiveness in your view that the prior sentence
16 has; is that right?
17 A Yes.
18 Q Okay.
19 A I think the term "precipitous," of course, is a
20 choice of words, but -- it's a steep choice. It's a
21 steep decline, precipitous may be an overstatement.
22 Q Who picked the word "precipitous" for this report?
23 A I did.
24 Q At the time you thought that was a good word?
25 A Yeah.

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01 Q Who -- you weren't being paid by DWP at the time
02 you wrote this report, were you?
03 A Indirectly? Yes.
04 Q But through Jones and Stokes?
05 A Yes.
06 Q And now you're being paid directly by DWP?
07 A Yes.
08 Q One final question to Dr. Melack. A duck
09 question. Since you don't have an opinion upon whether
10 or not the migratory duck population is healthy or not,
11 let me ask you to assume that it is not healthy. Does
12 that affect your conclusion about the health of the
13 ecosystem?
14 A BY DR. MELACK: Not at all because the migratory duck
15 population depends on resources scattered all over
16 North America, and I think it's going to be
17 hard-pressed to think that in contrast with the grebes,
18 that Mono Lake is a potential resource for those
19 migratory ducks.
20 Q Do you have any idea how many ducks there were
21 before diversion?
22 A I have read the same material that most people
23 have read about that.
24 Q What did you read?
25 A I read the Draft EIR, and I read various testimony

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01 of various people about the subject. At face value,
02 they're highly speculative numbers.
03 Q They're high numbers, aren't they?
04 A Sure there's high numbers, but "high" is a
05 relative word, Mr. Flinn.
06 Q Sure. Let's say they decline from a million to
07 less than 10,000. Under your definition of a healthy
08 ecosystem, that's okay?
09 A Hardly.
10 MR. FLINN: Thank you.
11 HEARING OFFICER del PIERO: Thank you very much.
12 Mr. Roos-Collins?
13 MR. ROOS-COLLINS: No questions.
14 HEARING OFFICER del PIERO: No questions.
15 Ms. Scoonover, I take it you have none?

16 MS. SCOONOVER: No questions.
17 HEARING OFFICER del PIERO: No questions.
18 Ms. Niebauer? No questions?
19 Anyone else have cross? Staff? Mr. Canaday,
20 don't go away mad. You have a meeting with Senator
21 Leslie?
22 MR. CANADAY: Yes, I need to brief Senator Leslie.
23 HEARING OFFICER del PIERO: You have a nice
24 afternoon, Sir.
25 MR. CANADAY: Thank you.

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01 HEARING OFFICER del PIERO: I wish it were me.
02 MR. CANADAY: It's more fun here.
03 (Laughter.)
04 MR. BIRMINGHAM: For Mr. Canaday's benefit, can I
05 move to strike that?
06 (Laughter.)
07 HEARING OFFICER del PIERO: Gives you some idea of
08 how exciting his social life is, doesn't it?
09 MR. DODGE: I have a procedural question.
10 HEARING OFFICER del PIERO: Thank God. We were
11 worried you were going comment on my comment.
12 (Laughter.)
13 MR. DODGE: One of Mr. Flinn's statements or
14 questions, and there seemed to be some doubt as to
15 whether it was that statement or question, led me to a
16 question about what illegal tag teaming is, and my
17 question is am I allowed to object to Mr. Flinn's
18 questions?
19 MS. GOLDSMITH: Mr. Dodge, be my guest.
20 HEARING OFFICER del PIERO: I don't know,
21 Mr. Dodge. Let me take that under --
22 MR. THOMAS: We'd like a ruling on that. I have
23 several thoughts on that matter.
24 HEARING OFFICER del PIERO: Why don't all of you
25 interested brief me on that, and I'll render a decision

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01 later on whether you can object to Mr. Flinn, although
02 I don't think that my ruling's going to have any
03 bearing on whether or not he objects to Mr. Flinn.
04 Okay.
05 Mr. Herrera?
06 MR. HERRERA: Yes. I just have a few more
07 questions here.
08 RE-CROSS EXAMINATION BY THE STAFF
09 Q Dr. Melack, going back to your statement in your
10 testimony that you were concerned about the Draft EIR's
11 use as a 25 percent criteria of significant effect.
12 Are you aware that in the example you gave of a natural
13 variability of upwards of 200 percent as common or as a
14 natural occurrence in the lake, are you aware that the
15 Draft EIR used the 25 percent criteria, not 25 percent
16 of 200 -- but as 25 percent of 200, I mean, which, in a
17 sense, is a 50 percent change?
18 A BY DR. MELACK: I'm aware that it was a plus or minus
19 25 percent. That's correct.
20 Q But in reality it was a 50 percent change in the
21 range, yes. Because there's 25 percent of 200? I was
22 wondering if you were aware of that point, that it
23 wasn't just 25 percent, it was 25 percent of the change

24 which is -- you're saying naturally occurred was 200
25 percent. The Draft EIR assumed that 200 percent was

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01 there, subsequently they evaluated 25 percent of the
02 200.

03 A I understand that. Although, just to clarify
04 something here, what was actually used in the Draft EIR
05 was not the observed natural variability. What was
06 used was instead results from model output and what was
07 taken -- there were -- model output over a course of
08 about ten years, those model outputs then were taken,
09 and the range of model outputs was used as the range of
10 natural variability. And then of that, 25 percent was
11 taken. So, in fact, what was used was a model output,
12 not real natural variability. But even if -- I mean, I
13 understand that. But even if they had used natural
14 variability, I guess my argument to you would be we
15 should use what we've observed. There's no basis for
16 taking 25 percent or 50 percent of that number. We
17 should use the full range that we observed.

18 Q In that full range, what would you consider
19 significant then?

20 A I would consider nothing that exceeded -- I would
21 consider nothing that did not exceed that -- am I
22 saying this right? I would consider only a variation
23 which exceeded that range as being significant.

24 Q So everything within -- any change within the 200
25 percent example that you gave is not considered

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01 significant?

02 A That's what I would say. That's correct.

03 Q Even over your long-term -- is 14 years considered
04 long-term?

05 A That's correct.

06 Q Okay. I have another question relating to -- you
07 also suggested long-term monitoring as part of the
08 future, and would be, I'm assuming that's for areas,
09 especially those areas that you don't have any hard
10 core or have any actual results or studies on.

11 Do you still suggest you need to do monitoring for
12 those areas that you have a 14-year basis to determine
13 the effects on it?

14 A Well, it depends on what range of elevations
15 you're dealing with.

16 Q Let's say the State Board selected 6377. Do you
17 still consider we need to do monitoring, long-term
18 monitoring at that level?

19 A At a reduced level. I think it's only sensible,
20 just like we monitor our own personal health, that you
21 monitor an ecosystem that you're interested in. You
22 never know what happens. Maybe there's an accident,
23 and somebody dumps a load of petroleum products into
24 Mono Lake. It would be nice to know what happens if
25 that happens. So I think it's prudent to monitor

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01 important natural resources even when we have a good
02 knowledge base. And if we extend our levels outside of
03 our knowledge base, it becomes even more critical.

04 Q So in other words what you're advocating is just

05 continued monitoring regardless of the lake levels?
06 A I'm advocating that, yes.
07 Q In your discussions as well, you indicated that we
08 need to look at the ecosystem as a whole. We need to
09 look at not just the specific instances of salinity or
10 nutrient loading or any of that effect. Does that take
11 into consideration the additional nutrient loading or
12 the additional ecosystem associated with the
13 fresh-water streams depositing or adding things to the
14 ecosystems in Mono Lake?
15 A By all means.
16 Q Are they considered part of that ecosystem
17 evaluation?
18 A The inputs of water and associated chemicals in
19 the streams is certainly part of the ecosystem as would
20 be if, for example, there's increased development and
21 nutrient supply from human activities. Any of those
22 things would constitute part of the analysis, sure.
23 Q In your studies, have you evaluated the effects of
24 the various instream flows there?
25 A We've evaluated the effect of the fresh water as

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01 it is affects mixing, and we've measured the
02 concentration of nutrients in the fresh waters as a
03 source of nitrogen and phosphorous to the lake.
04 Q You did evaluate, then, the nutrients that were
05 being contributed by the instream flows?
06 A That's correct, yes.
07 Q What range -- again, that was from 6372 to 81 is
08 the range you evaluated what the flows would be?
09 A Yeah. It was during the period over the last --
10 actually, roughly, about ten years we've done that.
11 But it included the very high flows during the El Nino
12 years and has included the drought flows, which were
13 essentially zero. That's correct.
14 Q We've heard a fair amount of testimony regarding
15 grazing activities in the watershed in which, in some
16 cases, it was extensive. That may have added a fair
17 amount of nitrogen to these streams. Would you
18 consider the nitrogen contribution these streams had to
19 be high, moderate?
20 A No. It's quite low, actually.
21 Q And why is that?
22 A Why is it low? It's low because most of the water
23 that comes out of the Sierra is melting snow, which has
24 extremely low nitrogen content and is basically flowing
25 through fairly unweatherable terrain. And there is a

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01 potential effect, you're right, on the water quality,
02 but we certainly haven't seen that.
03 Q Mr. Tillemans testified that there was an
04 incidence just in passing of 2,000 sheep that crossed
05 the county road on Lower Lee Vining Creek. I would
06 suspect that just their presence would add a
07 significant amount of nutrients?
08 A Your point is well-taken. I should add a certain
09 caveat here, and that is that we don't sample the
10 streams daily. We sample them every couple of weeks,
11 and so what you described is certainly a real

12 possibility. The odds are we wouldn't have sampled
13 that.

14 To really do that kind of analysis correctly, you
15 have to put out -- which is possible, a monitoring
16 device which samples the water regularly. You could
17 see an effect, perhaps, from that, but the data I have
18 certainly wouldn't allow us to make that judgment.
19 Although, it's a really interesting point you're
20 making.

21 MR. HERRERA: I think that concludes my questions.
22 Thank you.

23 MR. FRINK: I believe Mr. Smith has one quick
24 question.

25 Q BY MR. SMITH: One quick question. I see you have
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01 authored a couple of articles with Dr. Jellison?

02 A BY DR. MELACK: That's correct.

03 Q Would you consider him a research scientist?

04 A That's a loaded question. He was a Ph.D student
05 of mine, so I certainly would be very biased in my
06 interpretation of him.

07 Q Would you respect his opinion?

08 A Yes, for sure.

09 MR. SMITH: Thank you.

10 Q BY MR. FRINK: I wanted to follow up along that
11 line. I understand that a number of the papers that
12 you have done on Mono Lake were jointly authored with
13 Dr. Jellison; is that correct?

14 A That's correct, yes.

15 Q On Page 1 of your written testimony, you've stated
16 that, "A management plan which maintains lake level
17 elevations from 6372 to 6381 would be warranted." Is
18 that your recommendation to this Board that it adopt a
19 management plan calling for lake elevations of between
20 6372 and 6381?

21 A Based on the status of the off-shore community,
22 that's a fair range of elevations, yes.

23 Q Okay.

24 A That's a -- the answer is, therefore, not
25 categorically yes, it's yes in the context of these

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01 data that I'm describing in this chapter.

02 Q Okay. Would you have another basis for
03 recommending any alternative lake level or lake level
04 management plan?

05 A You're asking me to serve the function of this
06 whole --

07 Q I'm asking you what your recommendation, as one
08 who has studied at least some aspects of the Mono Basin
09 for a number of years, is what is your recommendation
10 to the Board as to the lake level alternatives that
11 they should aim to achieve?

12 A Okay.

13 MR. DODGE: I think the question, to the extent
14 the witness should be allowed to answer it, has been
15 asked and answered. He said based on the offshore
16 community, which is what he studied, that that lake
17 level would be consistent with his research. But to go
18 further than that and ask him to, in effect, make the

19 decision this Board is being asked to make, I think is
20 improper.

21 MR. FRINK: I'll withdraw the question --

22 HEARING OFFICER del PIERO: Actually, I have to
23 tell you, I know the Board members want an answer.

24 Do you have a more specific answer than the range
25 you gave? Your response to that question is either yes

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01 or no.

02 DR. MELACK: No.

03 HEARING OFFICER del PIERO: No. Then I'm going to
04 accept the range that you gave us as being a range
05 within which you believe, given the context of the
06 statement you made. Is that correct?

07 DR. MELACK: That's correct, yes.

08 Q BY MR. FRINK: I believe Mr. Smith asked you a
09 couple -- a couple of minutes ago if Dr. Jellison is
10 the sort of research scientist whose opinion you would
11 respect; is that correct? And you answered yes, you
12 would?

13 A That's correct.

14 Q Are you aware that in the hearing before this
15 Board in Mammoth Lakes on October 5th, that Dr.
16 Jellison recommended that the Board adopt an
17 alternative providing a water elevation in Mono Lake of
18 6390?

19 A I'm aware of that. Yes.

20 Q After working closely with him on a number of
21 papers and hearing that he has recommended a
22 significantly higher lake level than is recommended in
23 your testimony, would you want to reevaluate your
24 recommendation in any way?

25 A No, I wouldn't.

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01 Q Have you discussed with Dr. Jellison the reasons
02 for his recommendation?

03 MR. BIRMINGHAM: Excuse me, Mr. del Piero. I'm
04 going to have to object to this. Mr. Frink is bringing
05 into this evidentiary hearing a statement made during a
06 policy session at which we had absolutely no
07 opportunity to cross-examine Dr. Jellison. We'd be
08 more than happy to bring Dr. Jellison in here and let
09 him testify, but we were left with the impression that
10 the statements made in those policy sessions were not
11 evidentiary, and so I'm going to object to these
12 questions.

13 HEARING OFFICER del PIERO: Mr. Flinn?

14 MR. FLINN: I take a contrary view because I don't
15 believe the question was designed to elicit the fact of
16 Dr. Jellison's testimony or his view as an evidentiary
17 fact. The pending question is simply did he discuss
18 with his colleague a particular view and that may
19 well -- his discussions with his colleague is a fairly
20 typical thing for experts to do. They're a team
21 together. They discuss things. I think that the
22 pending question is admissible.

23 HEARING OFFICER del PIERO: I think the policy
24 statement submitted by Dr. Jellison during the course
25 of the policy statements, pursuant to the Board's own

01 rules, that document itself is not admissible as
02 evidence.

03 Alternatively, I'm going to overrule the objection
04 rendered by Mr. Birmingham because the questions that
05 Mr. Frink is asking go directly to conversations that
06 took place between not only colleagues, but co-authors
07 in terms of some of the documentation that's been
08 entered as evidentiary material by many parties
09 including the L.A. Department of Water and Power. I
10 know the other Board members are interested in knowing
11 whether you've had conversations with him about that
12 issue.

13 DR. MELACK: Fair enough. Let me respond two
14 ways. One is Bob and I have worked together a lot and
15 the testimony that I submitted, the written testimony,
16 I worked with Bob, and he actually, in a sense,
17 passively endorsed that testimony as a statement of the
18 state of knowledge that studies have given us and what
19 that says about the lake's functioning. So I don't
20 want to put words in Bob's mouth, but I know he agrees
21 with me that the lake certainly has been healthy and
22 surprisingly stable over these last 14 years.

23 His opinion about higher lake level is a
24 freely-expressed opinion. I might, perhaps, give you
25 another way of evaluating that. If you look at the

01 National Academy of Sciences' book on Mono Lake, and if
02 you read the foreword, I think it is, which was written
03 by the chair of that committee, in that foreword he
04 includes comments that he elicited from the members of
05 that committee subsequent to the completion of that
06 report. And he was asking people what their views of
07 Mono Lake were as an aesthetic, as a natural site. And
08 those comments were very positive, and people are
09 struck certainly by the beauty of Mono Lake.

10 And so I think it's only reasonable to expect that
11 Bob, who has lived there for 15 years, would clearly
12 endorse a whole variety of aesthetic features of the
13 Mono Basin as being positive at higher lake levels and,
14 at the same time, and quite consistently, agree that
15 the plankton communities are indeed healthy in terms of
16 lake levels substantially less than that.

17 So both are legitimate points of view and that Bob
18 is legitimately expressing, or could legitimately
19 express, both points of view.

20 Q BY MR. FRINK: Have you any indication from him that
21 the basis for his recommendation was solely visual or
22 aesthetic considerations?

23 A BY DR. MELACK: I'm not sure that's a fair question.

24 Q Did he state that, you know --

25 HEARING OFFICER del PIERO: Wait. Wait. Wait,

01 Mr. Frink.

02 Mr. Melack, I get to determine what's a fair
03 question.

04 (Laughter.)

05 HEARING OFFICER del PIERO: Mr. Dodge -- not
06 Mr. Dodge, not Mr. Birmingham, certainly not
07 Mr. Flinn. Just me. So if you'd be kind enough to

08 respond to the question, and I'll have Mrs. Anglin
09 reread it back to you. Okay?
10 (Whereupon the record was read as requested.)
11 DR. MELACK: Not that it was solely that, but I
12 certainly know that it wasn't based on the scientific
13 evidence we presented here. It was based on much more
14 than that. Personal friendships, personal experiences,
15 I know were a factor.
16 Q BY MR. FRINK: Have you taken into account in your
17 recommendations visual or aesthetic factors, or are
18 your recommendations based solely on the work you've
19 done regarding brine shrimp and the lake ecosystem?
20 A Throughout this whole proceeding, which has now
21 extended for many years, I've tried to take the
22 position that the decision making should be based on
23 the variety of evidence. And one should be scientific,
24 and so I've taken upon myself to try as much as
25 possible to provide to the decision-making people what

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01 I consider to be credible scientific evidence and,
02 therefore, what I presented here was that. It was an
03 attempt to be as objective as possible to make
04 available to the State Board as objective as possible
05 data with no -- as much as is humanly possible to
06 avoid, no bias associated with those interpretations.
07 Q But answering my question, did you take into
08 account visual or aesthetic considerations in making
09 your recommendation?
10 A No, I did not.
11 MR. FRINK: Thank you.
12 HEARING OFFICER del PIERO: Any other questions of
13 the staff? Questions by Board members?
14 Gentlemen, thank you very much for your time. We
15 appreciated it very much.
16 We have -- is it correct -- I'm not quite sure.
17 Mr. Birmingham, are you going to be doing the next
18 witnesses, or is it --
19 MR. BIRMINGHAM: I will be doing the next
20 witnesses.
21 HEARING OFFICER del PIERO: Okay. And you have
22 two, Sir?
23 MR. BIRMINGHAM: Mr. Frink has requested that we
24 present Dr. Hardy and Mr. Hanson as a panel.
25 HEARING OFFICER del PIERO: Is Dr. Hanson here?

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01 MR. BIRMINGHAM: He is here, and we will present
02 them as a panel.
03 HEARING OFFICER del PIERO: Let's go ahead and
04 proceed that way.
05 Mr. Frink?
06 MR. FRINK: Mr. del Piero, before we get into the
07 next panel of witnesses, I believe there will be one
08 housekeeping detail.
09 Mr. Birmingham, Los Angeles Department of Water
10 and Power, in connection with the testimony of these
11 witnesses has identified Exhibits 22 through 33. Do
12 you wish to offer those into evidence at this time?
13 MR. BIRMINGHAM: Pursuant to Mr. del Piero's
14 request at the conclusion of Dr. Chapman's testimony,

15 we were going to offer all of our --
16 HEARING OFFICER del PIERO: All of them at the
17 same time.
18 MR. FRINK: Okay.
19 MR. BIRMINGHAM: I understood that was the Hearing
20 Officer's --
21 HEARING OFFICER del PIERO: That's correct.
22 MR. BIRMINGHAM: Thank you, Mr. Frink.
23 HEARING OFFICER del PIERO: Why don't you go ahead
24 and call your next two witnesses, and I'll administer
25 the oath if they've not been --

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01 MR. BIRMINGHAM: They're next-door. May we take a
02 recess to bring out the material --
03 HEARING OFFICER del PIERO: We'll take ten
04 minutes.
05 (Whereupon a recess was taken.)
06 HEARING OFFICER del PIERO: Mr. Dodge?
07 MR. DODGE: Mr. Chairman, Mr. Birmingham and I
08 were talking over the recess, and we have a couple of
09 procedural issues to bring up. I think both of us are
10 in agreement. The first is that I had indicated
11 earlier that I was not aware until an hour ago, or a
12 few minutes ago, that these two witnesses were going to
13 be presented as a panel and that I was not ready for
14 Mr. Hardy. You indicated that I'd be allowed to
15 examine him tomorrow morning.
16 HEARING OFFICER del PIERO: That's correct.
17 MR. DODGE: The second issue, I would very much
18 like to send Mr. Flinn home and just --
19 MR. BIRMINGHAM: We do agree on that.
20 (Laughter.)
21 MR. DODGE: I asked Mr. Birmingham whether when we
22 finished with his fish witnesses he intended to call
23 another witness tomorrow, and he indicated he did not.
24 Now, if the Board is going to stop when we finish DWP's
25 fish witnesses, I will send Mr. Flinn home. If you're

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01 not going to stop, then I can't do that. And I
02 wondered whether I could get an advance ruling on
03 that.
04 MR. BIRMINGHAM: Our situation is this,
05 Mr. del Piero. We had intended to present Dr. Hardy
06 and then Mr. Hanson as individual witnesses as opposed
07 to a panel. We have one more fishery witness,
08 Dr. Emil Morhardt who will testify, presumably,
09 tomorrow. If -- in addition, doctor or Mr. Hanson has
10 a scheduling conflict this evening, and we were
11 informed during the recess that we were going to go
12 with this panel tonight until we finish. That presents
13 some problems inasmuch as Mr. Hanson was not aware of
14 that and does have a scheduling conflict tonight.
15 So what we had hoped was that we could go until
16 approximately five o'clock this evening, break, and
17 then resume with his testimony tomorrow. And then I
18 think the remainder of his testimony tomorrow and
19 Dr. Morhardt's testimony would consume most of
20 tomorrow.
21 Therefore, we had not anticipated calling our next

22 lake witness, Dr. Joseph Jehl, until the next hearing
23 date which would be the first date next week.
24 HEARING OFFICER del PIERO: Can you have him here
25 tomorrow?

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01 MS. GOLDSMITH: Dr. Jehl?
02 HEARING OFFICER del PIERO: Yes.
03 MS. GOLDSMITH: I'll have to call him. I think it
04 would present some problems.
05 HEARING OFFICER del PIERO: Losing a day because
06 of witness scheduling poses a problem, too, and I'm
07 not -- understand. I have full appreciation for the
08 problems in terms of scheduling witnesses on this --
09 MS. GOLDSMITH: In all candor --
10 HEARING OFFICER del PIERO: The reason that these
11 two were asked to be brought on as a panel was for us
12 to us try and improve what is taking an inordinate
13 amount of time in cross-examination. Whatever benefit
14 would have accrued in terms of that will be completely
15 lost, plus some, if the time line that you have laid
16 out, Mr. Birmingham, and I'm not being critical, I'm
17 just telling you, the time line, the way you've laid it
18 out is, in fact -- in fact, results, we will not have
19 gained a minute and, in fact, probably lost more time
20 than even I could have anticipated.
21 MR. BIRMINGHAM: We do have -- we do have some
22 witnesses here. We would be calling them out of order,
23 but we could put them on tomorrow if necessary.
24 HEARING OFFICER del PIERO: Are you going to be
25 prepared to cross-examine?

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01 MR. DODGE: Well, yeah. More to the point, I'll
02 be able to send Mr. Flinn home if he's talking about
03 Mr. Tillemans who I plan to examine.
04 MR. DODGE: We can put Mr. Tillemans on tomorrow,
05 and --
06 HEARING OFFICER del PIERO: Mr. Tillemans, were
07 you intending to leave tomorrow, Sir?
08 MR. TILLEMANS: No, I'll be around. I wasn't
09 intending to testify tomorrow.
10 (Laughter.)
11 HEARING OFFICER del PIERO: That will teach you to
12 show up here.
13 MR. BIRMINGHAM: If you order him to be here, he
14 can't go anywhere. But that would actually create
15 additional need for us not to go late into this evening
16 because we would want to sit down with him on his
17 testimony.
18 HEARING OFFICER del PIERO: I appreciate that.
19 You know -- you aren't ready to do Mr. Hanson today?
20 Right?
21 MR. DODGE: I am ready to do Mr. Hanson.
22 HEARING OFFICER del PIERO: I'm sorry. Mr. Hardy?
23 You are not prepared to do. What do you need Mr. Flinn
24 for?
25 MR. DODGE: I don't.

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01 HEARING OFFICER del PIERO: For any of these
02 witnesses?

03 MR. DODGE: None of the fisheries witnesses and if
04 the next witness tomorrow is going to be Mr. Tillemans,
05 I don't need him for that either.
06 HEARING OFFICER del PIERO: Where's the -- what's
07 his name?
08 MS. GOLDSMITH: Dr. Jehl is in San Diego, and we
09 had anticipated taking Thursday to prepare his
10 testimony.
11 HEARING OFFICER del PIERO: This hearing's not
12 continued on Friday, it's Monday.
13 MS. GOLDSMITH: That's right.
14 HEARING OFFICER del PIERO: You're working on
15 Veteran's Day?
16 MS. GOLDSMITH: I'm not a veteran. I may change
17 that status after this hearing.
18 MR. BIRMINGHAM: I'm taking Veterans Day off in
19 honor of any of those members of the Board who are
20 veterans.
21 (Laughter.)
22 HEARING OFFICER del PIERO: I'm out of quick
23 repartee.
24 MR. DODGE: Mr. Birmingham has sunk to a new low.
25 (Laughter.)

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01 HEARING OFFICER del PIERO: Either that or he's
02 risen to a new high. I'm not sure.
03 MR. DODGE: I would note that the National Audubon
04 Society is comprised of 100 percent of veterans.
05 Millions of them.
06 (Laughter.)
07 MR. BIRMINGHAM: I think we've resolved the
08 question that we needed to resolve with the exception
09 of Mr. Hanson --
10 HEARING OFFICER del OFFICER: That Mr. Dodge is as
11 full of it occasionally as we think he is? Is that the
12 question that needs to be resolved?
13 Okay. Look. Let's do this. Let's go with
14 Mr. Hanson now. Okay? Mr. Hardy, we're going to go
15 with you first thing in the morning. Okay?
16 Mr. Birmingham, you need to be prepared to have
17 your other fisheries specialist and our good friend
18 over here ready to go tomorrow.
19 Mr. Flinn, go home. Okay?
20 MR. FLINN: Thank you.
21 HEARING OFFICER del PIERO: Look at the smile on
22 that man's face.
23 MR. BIRMINGHAM: The ratepayers of the City of Los
24 Angeles thank you.
25 HEARING OFFICER del PIERO: Mr. Hanson?

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01 MR. HANSON: I have not been sworn yet.
02 HEARING OFFICER del PIERO: I'll swear at you in a
03 second here, Sir.
04 Mr. Hardy, if you'd be kind enough to go take a
05 seat in the audience, we'll take you up first thing
06 tomorrow morning, Sir.
07 Now, for the attorneys, we'll be here at nine
08 o'clock tomorrow, and if I have to go through lunch
09 tomorrow, we're going to go through lunch tomorrow to
10 get all the witnesses out of the way. Let me point out

11 the obvious. From now on, I know it may be difficult,
12 but I want you all, all of you, to anticipate that we
13 are going to go without any major breaks. So you need
14 to have your witnesses all lines up. And in the case
15 of witnesses that may be coming from a long distance,
16 you need to be prepared to have them here. So they
17 need to be notified in advance of what's taking place.
18 It's not my intent to cause people to be miserable
19 during this process. We're going to go into night
20 sessions with the express purpose of moving this
21 process along. I don't intend to schedule night
22 sessions if people aren't going to be here to be
23 examined. So -- and since I intend for them to be
24 examined, I expect them to be here. Okay.
25 Mr. Birmingham -- Mr. Hanson, would you please

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01 stand and raise your right hand? And the appropriate
02 response after I get done is "I do" or "yes."
03 Do you promise to tell the truth during the course
04 of this proceeding?
05 MR. HANSON: I do.
06 HEARING OFFICER del PIERO: Please be seated, and
07 Mr. Birmingham, why don't you begin?
08 MR. BIRMINGHAM: Thank you very much,
09 Mr. del Piero.
10 DIRECT EXAMINATION BY MR. BIRMINGHAM
11 Q Mr. Hanson, I'm placing before you a pile of
12 documents that I'll ask you about in a few moments.
13 But first, would you please state and spell your last
14 name for the record?
15 A BY MR. HANSON: Hanson, H-A-N-S-O-N.
16 Q And, Mr. Hanson, where are you employed?
17 A I'm employed as EA Engineering Science and
18 Technology.
19 Q And L.A. DWP Exhibit 13 is a document entitled the
20 Direct Testimony of David F. Hanson. Is that direct
21 testimony which you prepared in connection with this
22 proceeding?
23 A Yes, it is.
24 Q And I've placed in front of you L.A. DWP Exhibit
25 14, which is a document entitled Professional Profile

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01 of David F. Hanson. Is L.A. DWP Exhibit 14 a true and
02 correct copy of the professional profile of David F.
03 Hanson?
04 A Yes, it is.
05 Q And does that document, L.A. DWP Exhibit 14,
06 accurately state your educational --
07 A Yes.
08 Q -- and work experience?
09 A Yes, it does.
10 Q And your professional qualifications?
11 A Yes.
12 Q L.A. DWP 15 is a document entitled EA Engineering
13 Science Technology 1990 Instream Flow Analysis for
14 Lower Rush Creek, Mono County, California, Preliminary
15 Draft. Is L.A. DWP Exhibit 15 a document which you
16 prepared?
17 A Yes, it is.

18 Q And did you use L.A. DWP Exhibit 15 in connection
19 with forming opinions which you would express -- that
20 you have expressed in your written testimony?

21 A Yes.

22 Q L.A. DWP Exhibit 16-A is a document entitled EA
23 Engineering Science Technology, 1990 Draft Report Fish
24 Population in Lower Rush Creek 1985 to 1989. L.A. DWP
25 Exhibit 16-B is a document entitled EA Engineering

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01 Science and Technology Draft Report Fish Population in
02 Lower Rush Creek.

03 Are L.A. DWP Exhibits 16-A and 16-B documents on
04 which you relied in forming opinions which you
05 expressed in your written testimony?

06 A I relied principally on 16-A. I did not rely
07 hardly at all on 16-B.

08 Q Were you involved in the preparation of 16-B?

09 A No, I was not.

10 Q Does L.A. DWP Exhibit 13 accurately state your
11 testimony or -- let me state that differently. Are
12 there any corrections that you'd like to make for L.A.
13 DWP Exhibit 13, the direct testimony of David F.

14 Hanson?

15 A Yes. There are a couple of labeling questions or
16 labeling errors I'd like to correct.

17 Q Would you identify those, please?

18 A Yes. On Page 49, Figure 2, there's a mislabeling
19 of the lines. The legend shows the dashed line
20 representing EA study, the solid line representing CDFG
21 studies. Those should be switched. The dashed line is
22 the CDFG study, the solid like is the EA study.

23 Also, on Page 51, CDFG Figure 18, again, there's
24 mislabeling of the icons; the dot is labeled on that
25 graph as "adult," it should be "fry." And conversely,

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01 the square is labeled "fry" and that should be
02 "adult."

03 The other point that I'd like to make is that the
04 testimony that I prepared here was based on information
05 I had while I was reviewing the Draft EIR. I am aware
06 now that there is a more up-to-date report for Lee
07 Vining Creek than the one that I developed my testimony
08 on.

09 Q Is that a more recent report developed by the
10 Department of Fish and Game?

11 A I believe it is, yes.

12 Q And is it your understanding that that more recent
13 report was issued by the Department of Fish and Game
14 subsequent to the preparation of your written
15 testimony?

16 A Yes.

17 Q Is it possible that the Department of Fish and
18 Game report would change some of the opinions that
19 you've expressed in your written testimony?

20 A Yes, it may.

21 Q But you have not reviewed that report for a
22 presentation of your written testimony; is that
23 correct?

24 A That's correct. Not to the extent that I have my

25 testimony today.

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01 Q Would you briefly summarize L.A. DWP Exhibit 13,
02 the direct testimony of David F. Hanson?

03 A All right. I'll start with a summary of my
04 education and experience. I have a bachelor's degree
05 in zoology from UC Santa Barbara in 1953, a master's
06 degree in wildlife science and fisheries from Utah
07 State University in 1978. At the end of my master's
08 program, I worked one year for a consulting firm
09 W.F. Sigler and Associates, that's S-I-G-L-E-R, in
10 Logan, Utah. The work I did for that firm was a
11 development of a population model for cut throat trout
12 in the Truckee River.

13 In 1978, I joined EA Engineering Science and
14 Technology and since 1980, have worked mostly in
15 instream flow studies using the instream flow
16 incremental methodology or the IFIM. I'll use that
17 term quite a bit throughout my testimony today. Over
18 the course of the last 12 to 13 years in doing instream
19 flow studies, I've worked on 50 or so different streams
20 and rivers mostly in California but also in Oregon,
21 Montana, Pennsylvania, West Virginia, Ohio, Georgia,
22 and New Zealand.

23 The instream flow studies that I've been involved
24 with in the Mono Basin comprise the Lower Rush Creek
25 study. I was involved in the instream flow studies of

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01 Lower Rush Creek. That's what generated the report
02 that I produced. I've also participated in the
03 instream flow studies on Upper Rush Creek working on
04 hydroelectric projects for the Southern California
05 Edison Company. That section of the Upper Rush Creek
06 that I worked on is the reach between Waugh and June
07 Lake.

08 I've also worked on the performance of instream
09 flow studies of Upper Lee Vining Creek between Hilary
10 and Saddlebag Lake and on Mill Creek, one of the other
11 tributaries that flows into Mono Lake. All those
12 studies were done for Southern Cal Edison Company.

13 Also, throughout the eastern Sierra-Nevada, I have
14 done IFIM studies, again, related to hydroelectric
15 projects on Bishop Creek, Birch Creek, McGee Creek, and
16 Green Creek, also on Independence Creek, and Big Pine
17 Creek.

18 In addition to those experiences, I've worked
19 electrofishing surveys on several of these streams;
20 those are Rush Creek, Green Creek, Upper Rush Creek,
21 Upper Lee Vining Creek, and Bishop Creek.

22 Now, the focus of the testimony that I am going to
23 provide today is recommendations for minimum stream
24 flows in Rush Creek and Lee Vining Creek. These
25 recommendations are based on instream flow studies

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01 done by California Department of Fish and Game and EA,
02 in the case of Rush Creek, and the California
03 Department of Fish and Game and EA, in the case of Lee
04 Vining Creek.

05 And I thought that before I got into my

06 recommendations, I would briefly go over what the
07 instream flow incremental methodology is. It's a
08 fairly complicated methodology for developing a
09 functional relationship between stream flow and habitat
10 that is based on a sampling procedure whereby
11 cross-sections are put across a stream, essentially,
12 taking a tape measure and running it across a stream
13 and identifying different stations along that tape
14 measure that define different points on the stream
15 having different depths and velocities and other
16 physical characteristics such as substrate and cover.

17 These transects are the basic sampling protocol
18 for the IFIM. They're placed in different so-called
19 macro-habitat types throughout the stream such as
20 pools, riffles, and runs, and what we sometimes call
21 rock gardens.

22 Each of these different macro-habitat types are
23 assumed to have different hydraulic characteristics,
24 and that's the reason why there are different transects
25 put through them. Generally, the sampling methodology

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01 involves some sort of stratifying random design where
02 the strata, in this case Rush Creek, there were
03 different reaches of the river that were identified as
04 strata, and sampling was conducted in these
05 macro-habitat types. So it's sort of like a two-stage
06 stratified random design; the first level of strata
07 being the reaches of the river. The second level being
08 these macro-habitat types within the reaches, and then
09 the samples, these transects across the river, these
10 cross-sectional transects placed randomly within the
11 different habitat types.

12 In Rush Creek there were a total of 75 different
13 transects over the course of the river from Grant Lake
14 down to the Mono Lake. At each and every one of these
15 sampling locations, these cross-sectional sampling
16 locations, a series of measurements are taken primarily
17 of the bed profile to define what the river looks like
18 from bank to bank.

19 That's very important from the standpoint of
20 looking at depth changes. Water surface elevations are
21 then measured at four -- in this case, four, sometimes
22 three, as many as you want, but in this case, four
23 different stream flows. In this -- in the case of the
24 Rush Creek study, there were 13 -- excuse me. 13 cfs,
25 19 cfs, 60 cfs, 100 cfs were the stream flows at which

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01 water surface elevations were taken.

02 Velocity measurements are also taken in each of
03 the cells at one or two or three of the different
04 stream flows. Two of the stream flows velocity
05 measurements were taken on Rush Creek. Those are used
06 as, certainly, measurements of velocity and for
07 simulation of velocities.

08 Based on all these measured bed profiles and water
09 surface elevations and velocities, hydraulic
10 simulations are performed to simulate what the changing
11 river would look like in terms of elevation rise,
12 spreading of the river at a broader range of stream
13 flows generally than flows that you measure, and also

14 filling in the gaps. For example, wanting to know what
15 the depths of velocities at 75 cfs are, having not
16 measured those, you go to these hydraulic simulation
17 models. They predict the depth and velocities in the
18 cells over a broad range of stream flows.

19 Once you've predicted these depths and velocities,
20 all these cells across the river, you apply what are
21 called habitat suitability criteria, which are the
22 means by which the model translates physical data,
23 physical characteristics of the stream into habitat
24 variables. So the output of this transformation is a
25 term called weighted usable area, which is an index of

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01 the habitat, a measure of the usable space in the
02 river.

03 And to visualize it, imagine yourself up in a
04 helicopter or an airplane overflying the river at a
05 given flow, let's say 50 cfs. You look down on the
06 river, and there's a certain area of the river that's
07 wetted, and this could be measured by plimentary or
08 some other technique.

09 That wetted area, that actual area of the stream
10 that's wetted, is not necessarily always usable, and
11 it's the depths and the velocities and some of the
12 other physical variables that dictate how usable it is
13 and, of course, those change as a function of flow. So
14 this 50 cfs, this total wetted area, is modified to
15 what we call weighted usable area.

16 So the weighting is -- it's weighting of the
17 usability of that wetted area by how good the depths
18 and the velocities are. Some depths are too deep.
19 Some depths are too shallow. Sometimes the water's too
20 deep or too slow for different species and lifestage
21 under consideration in the model.

22 These habitat suitability criteria are these
23 things that tell us whether it's too deep, too shallow,
24 and they are the driving variables that dictate that
25 the weighted usable area is from the wetted area.

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01 The output, then, of the modeling exercise is this
02 functional relationship between stream flow and
03 weighted usable area. Weighted usable area is often
04 shown as its acronym, WUA. You'll see that in lots of
05 reports.

06 So that's my brief description of the
07 methodology. I hope that was understandable because
08 some of those terms you'll be hearing in my testimony
09 and that of Dr. Hardy and I'm sure other witnesses that
10 will come before you.

11 As I said, the focus of my testimony is minimum
12 flow recommendations for both Rush and Lee Vining
13 Creeks. To summarize what I have in my testimony, in
14 my written testimony, I've recommended that you
15 consider flows in the range of 20 to 30 cfs as minimum
16 flows for Rush Creek and 15 to 25 cfs as minimum flows
17 for Lee Vining Creek.

18 Also, I described in my written testimony that in
19 addition to these minimum flows, I recommend that some
20 form of channel maintenance or flushing flows of the

21 kind that Dr. Beschta was speaking of yesterday. I
22 don't provide recommendations for these flows, but I
23 recommend that they be considered and that in that
24 consideration, such factors as maximum flow or the flow
25 necessary to perform the channel maintenance function

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01 is considered along with the duration of that flow and
02 the frequency of that flow. But I will not speak to
03 specific values for that particular function today.

04 So let me turn to the Rush Creek, give you a
05 background regarding how I've come to these flow
06 recommendations that I have for Rush Creek. In 1987,
07 the Department of Water and Power and the Department of
08 Fish and Game agreed to a joint instream flow study to
09 be performed on Rush Creek.

10 It was agreed in this joint study that a single
11 group would collect all these transect data that I was
12 describing to you, these physical variables along these
13 transects. A firm by the name of Beak, B-E-A-K,
14 Consultants was selected for this purpose. It was also
15 agreed as part of this joint study that data generated
16 from the Beak study would be separately analyzed by the
17 two departments, DWP and Department of Fish and Game.

18 My involvement in the field aspect of the study
19 was the following: I met with the Beak Consultants and
20 Cal Fish and Game representatives to discuss the
21 delineation of the different reaches. Remember, this
22 is the first level of stratification I was talking
23 about. And also to review the selection of the
24 transects within these reaches and these different
25 macro-habitat types. I also reviewed some of the

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01 habitat mapping studies that had been done throughout
02 the reach -- throughout each of the different reaches,
03 to determine what the distributions of these
04 macro-habitat types were in the various reaches. I
05 also reviewed and participated briefly in the
06 data-collection techniques. That's the actual
07 collection of the data across these transects. That's
08 physical data, water surface elevation, and velocity
09 data.

10 Once the data then were delivered to me from the
11 analysis, or rather from the field work, I performed my
12 own independent analysis and Beak Consultants performed
13 their own independent analysis, and there are some
14 differences between these analyses. And that's one of
15 the things about IFIM, people go down slightly
16 different pathways in doing these analyses, and there
17 are certain differences that I viewed in comparing the
18 two analyses that I'd like to bring out.

19 The first of these differences is a slightly
20 different approach to -- not slightly different
21 approach, but a different way of dealing with one of
22 the problems related to the hydrologic simulation. As
23 I've mentioned at several of the flows, the plan is to
24 go out and collect water surface elevations across the
25 transects. And the model assumes in most cases, in all

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01 cases, that the water surface elevation is uniform from

02 left to right bank. And this is certainly generally
03 the case in pools, as you all know, from walking on
04 stream banks, walking down streams as fishermen or
05 whatever, that water surface elevations on left and
06 right banks in a pool are generally the same. This is
07 what the model's looking for, and it only allows for
08 one water surface elevation. But in Rush Creek, as in
09 many other streams that I've studied, oftentimes you
10 find transects running across the stream where the
11 water surface elevations are slightly different, where
12 there's a higher water surface elevation on the left
13 bank than the right bank associated with some sort of
14 hydrology pull --

15 MR. BIRMINGHAM: Excuse me, Mr. Hanson. I wonder
16 if you would slow down your speech.

17 HEARING OFFICER del PIERO: Ms. Anglin, are you
18 doing okay down there?

19 THE REPORTER: I'm doing okay.

20 MR. DODGE: I hate to agree with Mr. Birmingham,
21 but I'm having trouble getting it all down, too.

22 HEARING OFFICER del PIERO: We won't hire you as a
23 Court Reporter. Okay?

24 MR. DODGE: I won't ask why.

25 MR. HANSON: So one of the problems that's

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01 sometimes encountered in these studies is the water
02 surface elevations are not necessarily the same. When
03 I say "the same," I'm talking about a tenth of a foot
04 difference. When it gets to be a tenth of a foot or
05 two-tenths difference on either side, then you can
06 start to have problems with the fact that you have to
07 average that value, and you're not going to have as
08 accurate a simulation as you might otherwise have with
09 the uniformity of water surface elevation. And EA
10 specifically developed a version of the hydraulic
11 simulation model that was able to deal with multiple
12 water surface elevations across a stream channel that I
13 don't think was available to the Beak Consultants who
14 were doing the analysis.

15 So I think that's one of the -- one of the
16 differences in hydraulic simulation that I can evaluate
17 by looking at the two studies. You can see in the
18 report I produced some of the cross-sectional profiles
19 that, in some cases, show you these non-uniform water
20 surface elevations across the transects lines.

21 Perhaps the more significant difference in the
22 analyses done by EA and by the Beak Consultants falls
23 on the habitat suitability criteria. The habitat
24 suitability criteria that are generally used in these
25 studies are derived from generally one of two sources.

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01 The first being literature values, data taken from
02 other streams have led to the generation of habitat
03 suitability criteria, can be utilized and are utilized
04 in IFIM studies on a regular basis and were in this
05 case, too.

06 The other option is to collect site-specific data,
07 generally, the preferred option is to collect
08 site-specific data, and that is generally accomplished

09 by snorkeling, actually going into the river and
10 observing fish at different depths and velocities and
11 determining the frequency distribution of that use
12 level, and then using that frequency distribution as
13 the habitat suitability criteria for the analysis.

14 There was some differences in how this was done.
15 There were independent habitat suitability criteria
16 studies performed in Rush Creek. EA did its own
17 independent habitat suitability criteria and developed
18 site-specific criteria for the adult and juvenile life
19 stages of brown trout. We utilized literature values
20 for the fry life stage.

21 The analysis done by Beak Consultants utilized
22 site-specific suitability criteria for juvenile life
23 stage brown trout and literature derived values for
24 adult fry and spawning life stages.

25 You notice that I didn't indicate that spawning
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01 curves or spawning weighted usable area curves were
02 generated in the EA report. I elected not to include
03 spawning curves in the report because of my belief in
04 the fundamental problems associated with simulating
05 accurately relationships between spawning and weighted
06 usable area in these kinds of studies. That's based on
07 my experience in these studies in that spawning habitat
08 in Sierra-Nevada streams is generally sort of a
09 localized small pocket of gravels that are very poorly
10 sampled using cross-sectional transects.

11 Cross-sectional transects work quite well in other
12 streams, coastal streams, anadromous rivers where you
13 have large gravel beds that are known to be used by,
14 say, Chinook Salmon or some other anadromous species.
15 And cross-sectional transects can actually be used to
16 some degree in a mapping process to show the area of
17 usable space over the spawning gravels at different
18 flows.

19 When it comes to sampling, cross-sampling widely
20 distributed pockets of gravel in and amongst the
21 boulders in Sierra-Nevada streams, I think the sampling
22 methodology breaks down. And I generally don't use
23 spawning curves in these studies, and it wasn't used in
24 this particular case.

25 In developing my minimum flow recommendations, I
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01 have evaluated the flow recommendations for Rush Creek
02 that were generated by the Beak report and that came to
03 me as a letter, a copy of a letter dated June 21st,
04 1993, from the director of the California Department of
05 Fish and Game. I believe that these flow
06 recommendations were taken primarily from the results
07 of IFIM study as shown in Beak's report, and I'd like
08 to start showing some of my figures that I have here.
09 So if I could get -- I could get Figure 2 put up,
10 please.

11 HEARING OFFICER del PIERO: Mr. Hanson, I'm going
12 to give you, because we asked to you slow it down, I'm
13 going to give you about three more minutes.

14 MR. HANSON: Three more minutes?

15 MR. BIRMINGHAM: Actually, Mr. del Piero, I'd like
16 to make an application for additional time. I believe

17 on our original notice of intent to appear we listed
18 doctor -- excuse me, Mr. Hanson's testimony as taking
19 approximately 40 minutes given the complexity of IFIM
20 and the central -- central fundamental nature of the
21 issue which he is addressing, and it's actually the
22 ultimate -- one of the ultimate issues that the Board
23 has to decide. I would make an application for an
24 additional 20 minutes.
25 MR. DODGE: We have no objection to that. This is

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01 complicated stuff.
02 HEARING OFFICER del PIERO: All right.
03 MR. HANSON: I may take an additional 10 or 15.
04 HEARING OFFICER del PIERO: So long as --
05 Ms. Cahill?
06 MS. CAHILL: No.
07 HEARING OFFICER del PIERO: Mr. Roos-Collins?
08 MR. ROOS-COLLINS: No objection.
09 HEARING OFFICER del PIERO: Fine. You're granted
10 20 minutes.
11 MR. HANSON: I would also --
12 HEARING OFFICER del PIERO: I forgot to ask.
13 Ms. Goldsmith, if you want to object to
14 Mr. Birmingham's request --
15 MR. BIRMINGHAM: No, she won't.
16 MS. FORSTER: Don't take that.
17 MR. BIRMINGHAM: Don't worry. She won't. We are
18 in a very unique situation in that Mrs. Goldsmith is
19 the chairperson of the department in which I work at
20 Kronick, Moskovitz, Tiedemann and Girard, and so we're
21 approaching the end of the year, and she's going to
22 evaluate me, and so Mrs. Goldsmith doesn't have to take
23 anything.
24 HEARING OFFICER del PIERO: While you're
25 preparing --

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01 MS. STUBCHAER: I was going to say while we're
02 interrupting, could I ask a couple of questions for
03 clarification?
04 HEARING OFFICER del PIERO: Sure.
05 MR. STUBCHAER: Regarding the analysis of the
06 section you were describing, you were describing
07 profiles that you took with a tape measure. Are those
08 longitudinal or transverse?
09 MR. HANSON: They're cross-sectional. Parallel to
10 the -- or rather perpendicular to flow of the stream.
11 MR. STUBCHAER: In engineering parlance, profile
12 normally means parallel?
13 MR. HANSON: These are the exact opposite.
14 MR. STUBCHAER: And are the water surface
15 elevations measured by sticking the stream and getting
16 a depth from the bottom, or are they surveyed in with
17 relation to a bench mark?
18 MR. HANSON: They're surveyed in with relation to
19 a bench mark.
20 MR. STUBCHAER: You survey the section first and
21 then the water surface?
22 MR. HANSON: Yes. You establish a bench mark
23 along the stream's edge. Sometimes it's these things

24 we call head stakes that are sort of like pieces of
25 rebar that are pounded into the side of stream. We

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01 assume they don't change from measurement to
02 measurement, or sometimes it's a convenient rock. And
03 then we simply -- it's just -- we're just using a level
04 and a stadia rod, and we use the level and the stadia
05 rod to measure the cross-sectional profile, the ups and
06 downs of the stream, from left bank to right bank. And
07 then we use the same technique for measuring the water
08 surface elevation and, of course, from the difference
09 between the water surface elevation and the profile, we
10 calculate depth.

11 MR. STUBCHAER: Are the cross-sections tied
12 together by level circuit?

13 MR. HANSON: Sometimes they are. In this case,
14 they are not. There are different hydraulic simulation
15 models that are available for use in this -- I didn't
16 describe the model all that well, but it was developed
17 by the U.S. Fish and Wildlife Service, I think, around
18 1978 is when it was first developed, and there are
19 several different hydraulic simulation programs. Some
20 that -- some in which the transects are hydraulically
21 tied together, so you're surveying up and down the
22 stream. All transects are tied together. Those
23 typically aren't used in stream flow studies where you
24 have higher gradient streams such as we have in
25 California. They're more prevalent in studies in low

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01 gradient streams, say, in the midwest. But all of the
02 studies that I'm aware of, with the exception of just a
03 few that have been done in California, the transects
04 are separated and are unique and independent measures
05 of habitat, not tied together hydraulically.

06 MR. STUBCHAER: And then so the flows of each
07 section are determined --

08 MR. HANSON: The flow at which you visit a stream,
09 that's one of the most difficult things to measure.
10 Sometimes you'll go out and you'll take a depth and a
11 set of velocities at your transects and feel quite
12 comfortable with your flows, but we're not talking
13 about typical cross-sectional profiles that people from
14 U.S.G.S. go out and measure stream flow. We're talking
15 about pretty squirrely conditions where your estimate
16 of flow can be off by several percentage points.

17 MR. STUBCHAER: You mentioned cells; is that
18 correct?

19 MR. HANSON: Cells, yes.

20 MR. STUBCHAER: Do you use a current meter for the
21 velocity in each cell?

22 MR. HANSON: Yes.

23 MR. STUBCHAER: Okay. Thank you.

24 MR. HANSON: Any other questions regarding the
25 methodology?

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01 HEARING OFFICER del PIERO: No. Why don't you go
02 ahead?

03 Q BY MR. BIRMINGHAM: You started to make a reference
04 to Figure 2 and Table A from your testimony.

05 A Actually, what I'd like you to do, if you could,
06 is open my testimony to Pages 30 -- excuse me, 48 and
07 49. Figure 2 is on there, but there's a table in there
08 that I'd also like to talk about simultaneously.

09 In my evaluation of recommendation, I should say
10 of different minimum stream flows for the streams, I
11 look at the recommendations made by the California
12 Department of Fish and Game on Rush Creek and the means
13 by which those recommendations were derived. And I've
14 shown in the testimony here, Table 33, which is one of
15 the tables that was utilized in developing those
16 recommended stream flows.

17 And I want to talk about that because I have
18 concerns about them, the means by which those flow
19 recommendations were derived. The basic methods that
20 are described in the Beak report, and at least shown
21 the results of here, is what you would call a habitat
22 duration analysis very similar to a flow duration
23 analysis, it's simply analogous to that. I think you
24 probably understand a flow duration analysis based on
25 all your experience, but let me describe how a habitat

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01 duration analysis is done.

02 For a given period of time, in this case the
03 analyses are done on a monthly basis, all the available
04 flow records, in this case they were daily flow
05 records, are utilized in developing a sort of a time
06 series of weighted usable area values. So let's say if
07 you're dealing with the month of January, and you only
08 have one year's worth of data, well, you have 31
09 values, 31 daily values of flow starting from January 1
10 running to January 31. And the process is to convert
11 each and every one of the weighted usable -- excuse me,
12 of the flow values, daily flow values, to daily
13 weighted usable area values.

14 So now you have 31 weighted usable area values.
15 Those are ranked, and the median value, or the 50
16 percent exceedance value, is selected, in this
17 particular instance, this application of the method,
18 as the amount of weighted usable area that's the target
19 weighted usable area to support the fishery. And then
20 the flow at which that weighted usable area value
21 corresponds to is the recommended stream flow. And so
22 there -- the process utilizes the weighted usable area
23 curves, that's the mechanism by which you go back and
24 forth between flow and weighted usable area, and flow
25 duration analysis.

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01 In this particular case, for Rush Creek, I
02 believe, there was a fairly long period of record 1937
03 to 1988, so we're talking about quite a few daily flow
04 records for each one of months. That's an awful lot of
05 data. And the problem that I have with the analysis is
06 that I think it ran into one of the problems that
07 plagues analyses of this kind in that the range of
08 flows that were simulated in this case, you can see
09 them on Figure 2, roughly, I'd say 5 cfs up to -- 10
10 cfs up to 100 cfs, is not high enough; that is, on the
11 higher end, to provide a weighted usable area value for

12 some of the higher flows.

13 In other words, if you look at the flow duration
14 curves in the Beak report for the normal wet and dry
15 water years, you'll find that there are several
16 instances in many months where flows in excess of 100
17 cfs occur. And this begs the question of -- has
18 plagued me on other studies that I've done, is how do
19 you -- what weighted usable area value do you give to a
20 flow of 120 cfs, a flow of 150 cfs, if you are limited
21 in your extrapolation to 100 cfs.

22 I think this study was limited to 100 cfs for a
23 reason that I uncovered when I started doing my own
24 independent analysis, and that was that when you go out
25 and measure your weighted use -- excuse me. When you

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01 go out and measure your cross-sectional profile data,
02 where you put the ends of your profile dictates the
03 limits of your hydraulic simulation and that as you
04 start simulating rising water surface elevations and
05 they go above the banks that you've defined by the ends
06 of your transects, you're in an area where you don't
07 know what's happening. You don't know how the water
08 surface elevation is going to change because you don't
09 have information about what the bank profile does
10 outside of your transects.

11 And it's a typical problem that I've dealt with in
12 other studies and run into in other studies when you
13 want to do a time series analysis and want to show
14 weighted usable area through time. You want to convert
15 your flow data to weighted usable data, and you have to
16 make some judgment as to what you're going to do once
17 you start out stripping the extent of your
18 extrapolation values in the weighted usable area
19 curves.

20 And I looked over the flow duration data that were
21 presented in the Beak report and found that in several
22 months, almost nine months in a wet water year and six
23 months in a normal water year, there were flows in
24 excess of 100 cfs. And I think that that problem that
25 was encountered in this instance in running the percent

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01 exceedance analysis is shown to some degree in Table 33
02 that I provided in my testimony.

03 Let me point out that if you look at Figure 2
04 here, you can see that the adult weighted usable area
05 curve rises up to a peak value at 100 cfs and that peak
06 weighted usable area value is a little over 200,000
07 square feet, 208,477, to be exact. If you look, then,
08 at the adult habitat curve, and I'm talking about --
09 not curve, the adult habitat columns in Table 3, I want
10 you to focus on the median weighted usable area values
11 and the flows associated with those, you'll see the
12 value 208,000 -- 208,000 weighted usable area values,
13 for example, in June. This is associated with a flow
14 of 100 cfs, which is the recommended stream flow for
15 that particular month.

16 I think the problem that I've just described is
17 symptomatic of this result in that if 208,000 square
18 feet of habitat is predicted to be the maximum habitat
19 on Figure 2, it's unlikely that it is, in fact, the

20 true median value of habitat duration analysis. In
21 other words, the median value means it's the 50 percent
22 exceedance value where, in fact, if you look at the
23 data, it's really the zero percent exceedance value on
24 Figure 2. There are no curves. There are no weighted
25 usable area values greater than 208,000, and I think

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01 this is symptomatic of the problem that I was talking
02 about, the concerns that I have about the analysis that
03 was performed.

04 My recommendation is that you review this
05 carefully in your consideration of flow recommendations
06 from Cal Fish and Game. I also think that the analysis
07 did not take a step back, so to speak, and look at the
08 biological criteria that were described in Figure 2 for
09 adult brown trout.

10 You'll notice that the figure sort of has this
11 general sort of monotonic relationship where it rises
12 to sort of a plateau and then very, very gradually
13 rises all the way up to 100 cfs at its peak. I looked
14 at the flow recommendations made in certain months,
15 particularly the hundred cfs flow recommendation, and
16 compared the amount of habitat predicted at 100 cfs to
17 habitat that's predicted at lower flows and in my
18 testimony. I point out that, for example, for the
19 adult brown trout, at 50 cfs, the amount of habitat
20 that's predicted by the model is 189,000 square feet.
21 At 100 cfs, it's 208,000 square feet, roughly. That
22 doubling the flow from 50 cfs to 100 cfs corresponds to
23 about a 9.7 percent increase in habitat.

24 So the point I'm making is I think that when you
25 do the percent exceedance analyses whether, in fact,

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01 you actually come up with the correct median value, as
02 I suspect may not have happened here, you still -- also
03 want to step back and make sure whether it's making
04 biological sense and whether the changes in flow
05 provide corresponding changes in habitat. Something to
06 that effect.

07 Also, as I pointed out in my testimony, the fry
08 curves, 100 cfs for -- 100 cfs produces 224,000 square
09 feet of habitat, whereas 20 cfs produces 216,000. So
10 five times as much flow is increasing the fry habitat
11 by about three billion percent.

12 Let me then quickly get to what I did in
13 developing my flow recommendations. I looked at both
14 the results of the EA data or the EA analysis and the
15 Cal Fish and Game analysis. I was looking at the
16 shapes of the curves. The EA analysis, which is shown
17 on Figure 2, the -- you saw the line on Figure 2,
18 showed weighted usable area reaching a peak value
19 around 20 cfs. This is for adult rainbow trout.

20 The Fish and Game curve produced again the sort of
21 monotonic curve that sort of generally rose higher and
22 higher as flows increased, and what I did was looking
23 at the Fish and Game results for adult brown trout, the
24 juvenile, the fry, and the spawning, I developed a
25 percent of maximum weighted usable area table. And

01 that's figure -- rather table -- the next table. Oh,
02 it's on there. Sorry. Table A. And what you're
03 looking at there is percent of maximum weighted usable
04 area at these different flow rates, 20, 30, and 40
05 cfs.

06 And based on that analysis, I was looking for a
07 fairly simple range of value, percent of maximum
08 values, that is used in instream flow studies to
09 provide what is considered sometimes its optimal
10 habitat, sometimes it's self-sustaining habitat. But
11 it is a step down from the maximum habitat rather than
12 going to the top of the curve. The maximum amount of
13 habitat is generally held that 80 percent of the
14 maximum habitat is -- will supply adequate habitat for
15 a self-sustaining fishery.

16 And looking over Table Number A here, I presume
17 that 30 cfs or I believe that 30 cfs, based on the Cal
18 Fish and Game -- Cal Fish and Game results, will
19 provide adequate habitat for the self-sustaining
20 fishery of brown trout in Rush Creek.

21 Based on the result of of the EA analysis and the
22 Fish and Game analysis, I've recommended to you a flow
23 regime, a minimum flow regime between 20 and 30 cfs in
24 Rush Creek. Again, I repeat, that I've also
25 recommended a flushing flow or channel maintenance

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01 release, but I don't have specific figures for that.
02 So this flow that I'm talking about here, the 20- to
03 30-cfs-flow range is the flow that you would fall to
04 following release of higher flows for the purposes I've
05 just described.

06 The additional evidence that I'd like to bring
07 before the Board but won't speak to at length is the
08 electrofishing data, the fish population numbers that
09 have -- that EA has uncovered for Rush Creek over that
10 period of time when the minimum flow was held at 19 cfs
11 in Rush Creek. Initially, Rush Creek was held at 19
12 cfs for some number of years, and we conducted
13 instream -- we conducted electrofishing studies
14 throughout that period. And judging from the testimony
15 of Dr. Morhardt, who will come following me, not
16 directly following me, there seems to be evidence that
17 the brown trout population in Rush Creek at that
18 minimum flow range is comparable to other streams in
19 the eastern Sierra Nevada.

20 The testimony you have today regarding Lee Vining
21 Creek, as I said, was based on an earlier report. I
22 think it's listed in the references to my testimony.
23 That report, what I've said in my testimony, has flow
24 recommendations based on what I would call a flow
25 duration analysis only, and my testimony states that I

01 thought that it was inappropriate that it, in a sense,
02 ignored weighted usable area curves and that weighted
03 usable area curves should not be flow duration analyses
04 used to generate recommended stream flows for Lee
05 Vining Creek.

06 I reviewed the curves in Lee Vining Creek and --
07 this is the table that appeared in the report that I
08 reviewed. And looking at those data -- I didn't have
09 the actual numbers before me -- I looked at these
10 curves, and based on the same 80 percent of maximum
11 weighted usable area criteria, recommended that stream
12 flows somewhere in the range of 15 to 25 percent as a
13 minimum would provide adequate habitat for a
14 self-sustaining fishery of brown trout in Lee Vining
15 Creek.

16 MR. STUBCHAER: Percent or cfs?

17 MR. HANSON: Percent of maximum weighted usable
18 area. Did I misspeak?

19 MR. STUBCHAER: No. No. I misunderstood.

20 MR. HANSON: That concludes the oral
21 presentation.

22 Q BY MR. BIRMINGHAM: I have just one question. An
23 additional question.

24 The flows that you recommended in Rush Creek of 20
25 to 30 cfs and the flows in Lee Vining Creek of 15 to 25

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01 cfs, in your opinion, would those flows keep in good
02 condition fish that existed in those streams?

03 A Yes.

04 HEARING OFFICER del PIERO: Thank you very much.
05 Ms. Cahill?

06 While Ms. Cahill is coming up, I would point out
07 that pursuant to Mr. Dodge's request, that there are
08 two veterans on the Board, Mr. Stubchaer and I. We are
09 designated by the Chairman as the Veterans Affairs and
10 Water Rights Decision-Writing Committee, so if you and
11 Mr. Birmingham would like to join us on Veterans Day
12 for our ceremonies, we would appreciate your coming.

13 Can we count on your attendance?

14 (Laughter.)

15 MR. BIRMINGHAM: I will be there.

16 CROSS-EXAMINATION BY MS. CAHILL

17 Q Good afternoon, Mr. Hanson.

18 A Good afternoon.

19 Q Let me just start by basically going over the
20 corrections you made and one other that I think you
21 might not have discovered.

22 I believe you have already made the correction on
23 this table which indicated in the -- in your testimony
24 that this was the Fish and Game weighted usable area
25 curve and this was EA's. You've already mentioned that

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01 those are mislabeled and corrected that.

02 This table, Figure 18, from the draft report, have
03 you checked to see whether the current Lee Vining Creek
04 report has this table with these numbers?

05 A I've seen a figure that's similar to that, but
06 it's not the exact same numbers, no.

07 Q And your testimony is not based on your new
08 figures; is that right?

09 A That's correct.

10 Q Just let me tell you that this, in fact, is
11 reproduced from your report. It corresponds to this

12 large blowup, and this is now the table. It's actually
13 Figure 16 in DFG's final Rush Creek report. And as you
14 can see, there are -- there are some differences.

15 Mr. Hanson, do you know, or can you tell us when
16 you received a copy of Fish and Game's final report?

17 A I saw it for the first time this morning.

18 Q Do you know when Los Angeles received it?

19 A I do not.

20 Q Would you be surprised if I told you that it was
21 sent out to the parties in August?

22 A Not necessarily. Yes -- no, I would not be
23 surprised. It has a July date on it.

24 Q And you said that you received it after you had
25 completed your written testimony?

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01 A I actually never received it. I saw it, as I
02 said, for the first time today.

03 Q Thank you.

04 There is just one other minor error I think you
05 ought to correct. In fact, you said it correctly in
06 your oral testimony. On Page 45, the second to last
07 sentence on the page you say, "CDFG only uses
08 site-specific data for adult trout." I believe that
09 was juvenile; is that correct?

10 A That's correct. Yes.

11 Q As you've explained already, there were common
12 transects done and some common field work done by Beak
13 and EA on Rush Creek; is that correct?

14 A Yes, it is.

15 Q And they used, then, common hydraulic data?

16 A There was just one set of hydraulic data.

17 Q In your opinion, is the main divergence between
18 the two studies with respect to the habitat suitability
19 criteria?

20 A I think so.

21 Q Do you have a problem with the calibration of the
22 hydraulic modeling that Beak did?

23 A I haven't reviewed it carefully.

24 Q I think despite your careful technical explanation
25 of IFIM, we're going to have to go one level deeper,

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01 and I apologize for having to get so technical so late
02 in the afternoon.

03 Could you explain to the Board Members the
04 difference between a utilization curve and a preference
05 curve?

06 A That's technical.

07 Q And in order to assist you, I will put up those
08 curves from your report.

09 A The difference between a utilization curve and a
10 preference curve is that --

11 HEARING OFFICER del PIERO: Mr. Dodge, are you
12 objecting?

13 MR. DODGE: No. I'm just remembering the spring
14 of 1990 when I tried to master this, and I don't think
15 I ever made it.

16 (Laughter.)

17 MS. CAHILL: Let me tell everyone who'd like to
18 find it. That is a figure from L.A. DWP Exhibit 15,
19 and it's Figure 3 in that report.

20 HEARING OFFICER del PIERO: Which aspect of it do
21 you need assistance on, Mr. Dodge?
22 Mr. Birmingham, can you help him out?
23 MR. ROOS-COLLINS: Mr. del Piero, I'm reminded of
24 the saying about old dogs.
25 (Laughter.)

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01 HEARING OFFICER del PIERO: No. It's too late in
02 the day. We've got to do this in the morning. Not
03 now, please.
04 Q BY MS. CAHILL: Actually, let me lead you through
05 this, Mr. Hanson, and you can correct me if I'm wrong.
06 The utilization curves and preference curves are
07 both subcategories of what we sometimes call habitat
08 suitability curves. Would that be the expression you
09 would use?
10 A Yes, it would.
11 Q And in the IFIM process after you have
12 characterized the hydrology of the stream and you have
13 measured in the cases of many IFIMs, you measure depth,
14 velocity, substrate, and cover. Is that correct?
15 A Um-hum.
16 Q And in your particular case, you relied on depth
17 and velocity?
18 A That's correct.
19 Q Having those measurements and then doing a picture
20 of the stream, you then enter a curve that shows which
21 depths and velocities the fish are predicted to be
22 using, or you can correct that and state it more
23 technically.
24 A Yeah. Well, it's what I was stating earlier when
25 I was going through my little discussion of the

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01 method.
02 Once you -- I don't know if you said painted the
03 picture, once you've simulated all your different
04 depths and velocities in all these cells in all your
05 different flows, the habitat suitability criteria are a
06 definition of how suitable different depths and
07 velocities are to the fish. Hence the suitability in
08 the name.
09 You want me to get into utilization --
10 Q Why don't you just tell us briefly how would you
11 develop the utilization curve.
12 A The utilization curve is developed through this
13 snorkeling that I was describing where you get into the
14 stream and you snorkle about looking for fish. You
15 find fish, and you make observations of what depth and
16 velocity those fish are at. The velocity is mean
17 column velocity. The depth is just a water depth.
18 After collecting a set of data that generally is
19 considered -- has to be above 150 separate
20 observations, you develop a frequency distribution of
21 those observed values. And where you find the fish
22 most often, of course, is then the highest level of
23 frequency. And the suitability curve that you see on
24 this figure over here, the highest frequency is given a
25 value of one. So where you see the fish most often in

01 your observations through snorkeling is assumed to be
02 the most suitable habitat, and that value is given a
03 suitability of one.
04 Q And where you have not observed fish, what number
05 would you assign?
06 A Where you have observed no fish, the suitability
07 is zero.
08 Q And can you tell us when did you -- and you
09 collected this on-site in Rush Creek?
10 A Yes, we did.
11 Q And you did that for two of the life stages?
12 A Yes.
13 Q And at what cfs did you collect those data?
14 A At 19.
15 Q And what year did you do it?
16 A I think it was '87. It could have been '88. I'd
17 to have review.
18 Q Did you, in fact, collect part of your data in one
19 summer, in the summer of 1988, and then collect
20 additional data in 1989?
21 A I can't recall, but that may well be the truth.
22 Q Do you recall that perhaps in 1988 you selected
23 the data macro -- by a macro-habitat length, by a
24 particular run, riffle, or pool, and then in 1989 you
25 collected it for 25-yard stretch of the stream?

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01 Q My recollection is that we collected it by 25 --
02 25-meter stretches of stream.
03 Q Would it be appropriate to collect data by two
04 different methods and then sum it?
05 A It necessarily wouldn't be inappropriate.
06 Q But it might introduce some error because they are
07 not comparably collected. You have different sampling
08 methods.
09 A I have been involved in instream flow studies
10 where different sampling methods have been applied and
11 the data have been logged and sensitivity studies have
12 been employed as to whether, in fact, there was bias
13 using one or more of the data sets, and it turned out
14 in that particular analysis that it was not the case.
15 Q Is it sometimes considered that there is a
16 possible bias in using use criteria?
17 A Yes.
18 Q And can you explain why that would be?
19 A Well, that gets to the issue of utilization versus
20 preference curves. And the debate on this issue has
21 raged for several years now, and it goes to the
22 following: That the use of -- the observations of use
23 may be biased by the availability of data, availability
24 of what's out there.
25 Q Let me put you some questions. In other words, if

01 you see a lot of fish in a certain depth of water,
02 typically, you would assume that the fish liked to be
03 in that depth of water; is that right?

04 A Yes.
05 Q But if -- and it may be that you see that there is
06 very little of a particular kind of water, but when it
07 is present, there are fish in it. So that you would
08 not have many counts because there's not much of that
09 type of water but that, in fact, when the water is
10 available, the fish use it heavily.
11 A I don't know if I would agree that they would
12 necessarily use it heavily. If it's used to some
13 degree at one -- in one condition and it's more
14 prevalent in another condition, I don't know whether
15 that would necessarily imply that it would be used
16 heavily in the second condition.
17 Q Is one of the ways to avoid the possibility of
18 bias out of utilization data to also take into account
19 the availability and then develop a preference curve?
20 A Yes. That's the issue of great debate in instream
21 flow studies.
22 Q And, in fact, in your study, did you do that? Did
23 you develop a preference curve?
24 A I did do it that way. I did it both ways. I
25 developed utilization curves and I developed so-called

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01 preference curves.
02 Q And, in fact, you ran your model with both types
03 of curves; did you not?
04 A That's true.
05 Q Okay. And to get back to Figure 2, isn't this a
06 little bit apples and oranges inasmuch as the
07 California Department of Fish and Game weighted usable
08 area curve was the output with a preference curve run
09 through the system, whereas this EA curve is the output
10 that resulted when you ran use curves through the
11 model?
12 A Well, there's another apple-and-orange factor in
13 there in that one set of data was collected in Rush
14 Creek and the other set of data was collected in
15 streams outside of Rush Creek. The general
16 conventional wisdom of IFIM practitioners is that it's
17 better to collect the data in the stream and it is
18 generally, and I think there's substantial backup for
19 this, that when you collect the data in the stream, the
20 utilization data are the correct data to use, and that
21 a preference function or a modification of the
22 utilization data to create preference data is not as
23 appropriate as using utilization data.
24 Q But, in fact, this one was derived so that to get
25 a comparison using the same types of curves -- I would

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01 refer you all to Figure 8 from L.A. DWP Exhibit 15 --
02 when you finally ran both your utilization data, which
03 has this dip after the peak, and your preference curve,
04 isn't it true that your preference curve has a bit more
05 of the same shape of Fish and Game's than your output
06 using the utilization curve?
07 A Yes, that's true.
08 Q If you decide not to use a preference curve but to
09 use the utilization curve, is it recommended to collect
10 data at a range of flows so as not to bias the results

11 toward the flow at which the data is collected?
12 A That would be recommended.
13 Q And did you do that?
14 A No. We collected data at 19 cfs, but the point of
15 the preference function is that if your concern about
16 the availability of habitat at the flow in which you
17 collect your data, the correction, the availability
18 correction to create the preference function will take
19 care of that. That's the conventional wisdom. And I
20 did that, and I evaluated that, and I generated both
21 sets of curves to evaluate that eventuality.
22 Q Right. But the curve that we see now in Figure 2
23 was not the result of your preference curve?
24 A That's right. I still believe that the
25 utilization curve is the better curve.

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01 Q Right. But it would be better with the
02 utilization curve to take it at representative flows --
03 the danger -- isn't it true that what the danger is of
04 taking it at a low flow would be that certain depths
05 might not be observed at all and consequently, you
06 don't know whether the fish will utilize the water at
07 those depths?

08 A I don't think in Rush Creek that if it had been
09 collected at significantly set -- let me start over
10 again.

11 I believe that in Rush Creek if we had collected
12 data at a lot of other flows -- in fact, to tell you
13 the truth that was -- I don't want to get into it. But
14 the curves wouldn't necessarily --

15 MR. BIRMINGHAM: Mr. Hanson, everything you're
16 telling us is the truth; is it not?

17 HEARING OFFICER del PIERO: Mr. Birmingham, just
18 said so, so it must be.

19 (Laughter.)

20 MR. HANSON: I don't deny that.

21 But if you look at Rush Creek, Rush Creek is a
22 very shallow stream, at least it was in 1987. I know
23 there was some debate that it's changed a little bit
24 over the years. But in 1987, Rush Creek was shallow.
25 You see that in some of the frequency distributions of

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01 available depth that we developed from the data.

02 Q BY MS. CAHILL: Let's go back, then, to the curve
03 that shows your utilization curve, the figure with the
04 three curves. Maybe --

05 A I'm not sure which one --

06 Q Now, in theory, is this curve a compilation of the
07 observations you made in the stream?

08 A Yes.

09 Q And did you observe any fish in water over three
10 feet in-depth?

11 A Few.

12 Q Few.

13 A If any.

14 Q If any. Does this curve include all the
15 observations you made?

16 A It should.

17 The point I'd like to make regarding collecting
18 data at higher flows is, if you look at the

19 cross-sectional profiles with those water surface
20 elevations that we show in our report, you'll see that
21 flows from 19 cfs up to 20 cfs don't add significant
22 depth to Rush Creek. Rush Creek is a shallow stream.
23 There's no question about it -- as shown in this
24 availability plot. You can see that the most dominant
25 depth -- you go out there and walk across Rush Creek in

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01 1987, you're going to walk across a shallow stream.
02 Q Let me just ask, though, is it your testimony that
03 whatever observations you made would, in fact, show up
04 on the utilization curve at the top of that figure?
05 A Yes, they did.
06 Q Okay. And you did not reject any data, any
07 observations?
08 A Not that I'm aware of.
09 Q Okay. I would like to refer you to Page 9 of your
10 report in which you state -- actually, it starts on
11 Page 8. You say, "Problems -- " this is the second
12 sentence in. "Problems were basically caused by the
13 dynamics of low levels of use and availability at the
14 tails of distributions; that is, in swift water and in
15 deep water."
16 Would that suggest that you did make some
17 observations in swift and deep water?
18 A It all depends on what you define as "swift and
19 deep water." What I'm referring to in that sentence is
20 that when you go through the correction technique, it's
21 very volatile, particularly where you have small
22 amounts of observations. We haven't described the
23 correction technique, but just to describe it very
24 briefly --
25 Q Let me just ask the question. The question is

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01 does that indicate that you had, let's say, for
02 example, some observations in water more than three
03 feet deep?
04 A Well, I'm not exactly sure.
05 Q Then on Page 10, the report says, "In order to
06 eliminate the dominance of the incidental use and
07 availability data at the tails of the distributions,
08 the use distributions for both depth and velocity for
09 both adults and juveniles were truncated at appropriate
10 levels prior to application of the preference formula."
11 Does that suggest that some of the data at the
12 tails of the curves was truncated? And what do you
13 mean by "truncated"?
14 A Well, the curves were probably smoothed and maybe
15 brought down to lower levels, the utilization or even
16 the availability in developing the preference
17 function.
18 Again, it's a problem associated with this
19 volatile nature of the technique for making the
20 correction. If you divide the utilization factor by
21 the availability factor, and I know that doesn't make a
22 lot of sense, but that division creates volatile

23 results that create great spikes of preference
24 resulting from dividing a small number by -- excuse me,
25 a large number by a small number relative to the

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01 different curves. And what I'm talking about there is
02 an attempt that's done by all practitioners of IFIM in
03 smoothing their data to some degree, maybe truncating
04 some values in order to create a preference function
05 that is smooth, that doesn't have some of this spiky
06 nature.

07 Q In the end, both your use curve and your
08 preference curve appear to assign a suitability of zero
09 at three feet of depth. As a fisheries biologist, do
10 you believe that brown trout adults will use water of
11 three feet depth if it's available to them?

12 A Yes, generally they will. But again, we have to
13 get back -- and I know you posed this question to the
14 Jones and Stokes fisheries biologist, and their reply
15 and mine's the same is, you have to consider the
16 conditions available in the stream. Brown trout will
17 live in lakes, however deep the lake is. Rush Creek in
18 1987 and probably today, as well, pretty much is very
19 shallow. There is very little deep water, and when you
20 go out into a stream and take random samples of fish
21 observations, as we did when we went out to select
22 these random 25-meter sections, you're going to be
23 looking at shallow water in almost all cases.

24 And the data reflect that. The data reflect the
25 reality of what's out in the stream and the reality of

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01 what the fish have to select from at 19 cfs and even at
02 60 cfs and 100 cfs, the increase in water surface
03 elevation, if you look at these cross-sectional
04 profiles, doesn't substantially change from 19 cfs to
05 100 cfs. It rises about a foot, maybe a foot and a
06 half, and you're not going to be, even at those higher
07 flows, you're not going to be finding much of Rush
08 Creek at depths of 3 to 4 cfs.

09 There are pools in Rush Creek that are three,
10 four, and five feet deep and adult brown trout are in
11 there, but if you go out and randomly evaluate where
12 fish are, as you should in these habitat suitability
13 criteria studies, you will observe most of your fish in
14 shallow water.

15 Q In terms, though, of overall preference for brown
16 trout, if water of 3.2 feet deep were present, you
17 would expect them to use it?

18 A I wouldn't say they wouldn't be in there, that's
19 correct.

20 Q And if water is four feet deep, you would expect
21 them to use it?

22 A That's correct.

23 Q And are there other, either preference or
24 suitability curves, with which you're familiar where
25 the researchers, once they reached the peak, basically

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01 extend this over with an assigned number of one for
02 adult trout, so that if you began to have deep water,

03 your model will show that it was very suitable instead
04 of, in your case, showing that it was entirely
05 unsuitable?

06 A That is done in some cases. It's not done in all
07 cases.

08 I'd like to point out that one of the things to
09 consider in doing IFIM studies like this and developing
10 these suitability criteria and making decisions like
11 that to hold your depth criteria up to a maximum value,
12 is what sort of an impact that will have on the
13 simulation, the simulation of weighted usable area
14 versus discharge, this curve that you're trying to
15 generate at the end. And in the case of Rush Creek,
16 the distribution of deep water is still very
17 infrequent. The -- as can you see, the distribution
18 that's shown on that curve, it's the middle curve, the
19 availability, there is very little deep water in Rush
20 Creek.

21 Q Did you collect -- did you collect these samples
22 at all reaches of the creek -- of the stream?

23 A Yes.

24 Q Did you collect these samples in the return ditch?

25 A No. We were going to areas that were considered

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01 to be more stream-like. There are very few fish in the
02 return ditch.

03 Q Are there fish in the return ditch?

04 A There are some fish in the return ditch.

05 Q And is the return ditch at this point functioning
06 as some portion of the stream between Mono Gate One and
07 Mono Lake?

08 A I don't really have any information to decide
09 whether it's functioning as a -- I know there have been
10 some changes as part of the restoration operation. But
11 whether it's functioning with more fish than it had in
12 1987 -- I'll tell you, in 1987, it had darn few fish.

13 Q But had you collected data and put it into your
14 use curve, you might, in fact, have found -- you would
15 have found use in that stretch of the stream?

16 A I don't think we would have found many fish to
17 observe in that stretch of stream.

18 Q In the end, tell us when the predominant depth of
19 water in Rush Creek is?

20 A I'm not sure exactly what you mean.

21 Q You've said it's a shallow stream. What is the
22 most common depth in Rush Creek?

23 A It depends on what the flow is. It's going to
24 change as a function of flow.

25 Q At 19 cfs?

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01 A 0.4 feet.

02 MS. CAHILL: Mr. del Piero, I would apply for an
03 additional 20 minutes. This is, I think, the heart of
04 Cal Trout --

05 HEARING OFFICER del PIERO: It's granted.

06 MS. CAHILL: If you all are being put to sleep --

07 HEARING OFFICER del PIERO: Oh, no. We find this
08 remarkably interesting. Please proceed.
09 (Laughter.)
10 MS. CAHILL: All right.
11 HEARING OFFICER del PIERO: That was del Piero who
12 said that on the record.
13 Q BY MS. CAHILL: You don't believe that brown trout
14 prefer a depth of 0.4 feet, do you?
15 A You mean as their most highly suitable --
16 Q Right. Is 0.4 feet even suitable for an adult
17 brown trout?
18 A Not much.
19 Q Okay. And yet, you are recommending, as the low
20 end of your flow range, a flow of 20 cfs. Let me quote
21 to you from your report on Page 10, "If the preference
22 curves do, in fact, reflect to preferences of brown
23 trout in Rush Creek, once the bias of habitat
24 availability has been removed, what we discover is that
25 the greater portion of available depths in Rush Creek

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01 at a Mono Gate release of 19 cfs are in a range of
02 values that are not preferred by brown trout."
03 So are you recommending a flow that results in
04 releases that result in habitat that is not preferred
05 by brown trout?
06 A I'm having trouble with the question. Would you
07 repeat the sentence?
08 Q Are you recommending a flow range to the Board,
09 the lower end of which is 20 cfs?
10 A Um-hum.
11 Q And from your own report what can you tell me
12 about the depth of the stream at approximately 20 cfs?
13 A The maximum -- not the maximum depth. The depth
14 that was most prevalent in the stream, based on the
15 transects, is 0.4. That's -- you've got to remember,
16 though, that the weighted usable area curves take into
17 account all the other depths in the stream. The depths
18 in the pools. The depths in the riffles. The depths
19 in the runs. Everywhere. And while it still may be
20 shallow throughout a good portion of it on the edges of
21 the stream, that is all wrapped into the weighted
22 usable area versus discharge curve that's generated as
23 the output of the model.
24 Q And, in fact, didn't you find relatively low
25 levels of weighted usable area?

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01 A Yes.
02 Q Okay. And your report says, "The reason for low
03 levels of usable area in Rush Creek is the
04 preponderance of shallow water as indicated by the
05 availability curve shown in Figure 3," and that's the
06 middle curve on your figure.
07 MR. BIRMINGHAM: Excuse me. Can you tell me from
08 where you're reading?
09 MS. CAHILL: Page 20 of L.A. DWP Exhibit 15. The
10 middle paragraph.
11 Q BY MS. CAHILL: "The predominant depth of Rush Creek
12 at the 19 cfs Mono Gate release is 0.5 feet, which is
13 shown to be utilized very little and predicted to be
14 unpreferred." Is that correct?

15 A Um-hum.
16 Q What happens to the depths in Rush Creek when you
17 go from 20 cfs to approximately 60 cfs?
18 A The depths increase by about one foot throughout
19 most of the stream.
20 Q And so if adult brown trout prefer deeper water,
21 would an increase from 19 cfs to 60 cfs be likely to
22 create more water of the type that the adult brown
23 trout prefer?
24 A Well, you've got to bear in mind that velocity is
25 taking a role in this as well, and the velocities may

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01 be increasing to a point where there's a decline in
02 suitability as a function of velocity. So the two may
03 be offsetting each other.
04 Q Right. But you don't know for a fact that the
05 velocity would, in fact, have made all that increased
06 depth unsuitable?
07 A No. I'm not saying that it would make -- again,
08 you have to remember that this is an analysis where
09 you're taking a tremendous amount of data, 75 different
10 transects, maybe 20 or 30 cells across each reach, or
11 rather each transect, and all that information -- every
12 one of those cells has a different dynamic. It's
13 creating different depths at different flows, different
14 velocities are occurring at different flows, and it all
15 goes in a hopper, in some sense, and out spits this
16 weighted usable area which is the discharge curve.
17 Q Right. But you have admitted that the depth of
18 the stream overall would increase and that typically,
19 assuming a velocity problem, the deep -- assuming no
20 velocity problem, the trout would prefer a deeper
21 water, the adult trout?
22 A Well, not based on the suitability criteria that
23 we developed from the stream.
24 Q Well, but based on your own knowledge as a
25 fisheries biologist, wouldn't adult brown trout prefer

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01 water deeper than is present at 19 cfs?
02 A They would be found in water that is deeper than
03 what is present in 19 cfs.
04 Q And this is -- this is also from your report.
05 It's the first of the series of transects -- transect
06 cross-sections. Can you identify which this is?
07 It's --
08 A I think that's one of the transects that's in the
09 return ditch.
10 Q Yes. I believe it is. And you --
11 A Two of the transects.
12 Q -- all your suitability criteria data at a flow
13 of 19 cfs. That's this lowest line, isn't it?
14 A Yes.
15 Q And so this would be the water surface elevation
16 at 19 cfs?
17 A Actually, that's 13.
18 Q 13. You're right. 13, then 19, then 60, then
19 100.
20 HEARING OFFICER del PIERO: Stop. You need a

21 microphone. Okay?
22 MS. CAHILL: I think I can stay --
23 HEARING OFFICER del PIERO: No. Stop. You need a
24 microphone. Please. Okay?
25 MS. CAHILL: I probably can stay here now.

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01 HEARING OFFICER del PIERO: Can you walk over to
02 the Board. The cord will reach that far. You just
03 need to take it with you. Okay?
04 Q BY MS. CAHILL: For those who want to find this, I
05 know these aren't going very far. Again, these are the
06 first transects in L.A. DWP Exhibit 15, and the four
07 horizontal lines, is this right, Mr. Hanson, are the
08 surface elevations at 13, 19, 60, and 100 cfs?
09 A Yes, that's correct.
10 Q And so on this top one if you went out at 19 cfs,
11 and -- you would find that there was no availability of
12 four-foot-deep water.
13 A Yes.
14 Q However, if you went out -- three feet deep.
15 However, if you went out and measured at 100 cfs, you
16 would, in fact, have some three-foot-deep water?
17 A Yes.
18 Q So had you measured at 100 in the return ditch and
19 found adult trout, you probably wouldn't have had a
20 utilization curve that showed zero preference at water
21 three feet deep?
22 A Well, you have to take into account the
23 distribution of the fish in the stream, and I think if
24 we went into the return ditch, we wouldn't have found
25 many fish to observe. Those in there, yes, would have

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01 been in deeper water. But in terms of the overall
02 study that we would have done, the number of
03 observations probably would have been small because
04 there are few fish there.
05 Q I believe -- I can't remember whether on the Board
06 field trip, we actually saw a fish caught from the
07 return ditch, or we only heard tell of one.
08 MR. BIRMINGHAM: Are you offering testimony,
09 Ms. Cahill? Because I'd love to cross-examine on that
10 issue.
11 Q BY MS. CAHILL: All right.
12 Let me go very briefly back to, if I can, to some
13 of the criticisms you have of the Department of Fish
14 and Game report. You mentioned that in the -- in your
15 testimony on Page 46, you indicate that you didn't use
16 spawning habitat suitability criteria, and you thought
17 it might be inappropriate to do so on Rush Creek. Is
18 that right?
19 Did you look at Table 33, which is also reproduced
20 in your report, had the Department of Fish and Game
21 used only adult weighted usable area curves instead of
22 using the spawning ones for the spawning months, would
23 it have resulted in any lower flow recommendations?
24 A It doesn't look like it.

25 Q You also, on Pages 46 to 47, criticized Beak for
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01 not mimicking what you call natural flows. Is it
02 true that Beak's recommendations were based on the
03 median habitat that would occur in Lower Rush Creek in
04 the absence of Los Angeles' water storage and
05 diversion?

06 A I want to correct you. I don't think I criticized
07 them for not mimicking stream flows or -- what I said
08 in my testimony is that the small changes in stream
09 flow that are recommended in the Beak report, I don't
10 think have that much biological relevance because the
11 curves in that range of flows are very flat from --
12 that is, the Fish and Game curves or the Beak curves.

13 Q And your own recommendations are for 20 cfs for
14 certain months and 30 cfs for certain months. Do those
15 mimic the natural hydrograph?

16 A They're not intended to mimic the natural
17 hydrograph.

18 Q You've stated today that you're not making any
19 channel maintenance flow recommendations; is that
20 correct?

21 A That is correct.

22 Q Were you here for Dr. Beschta's testimony?

23 A Yes, I listened to it.

24 Q Did he make any channel maintenance
25 recommendations?

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01 A I don't think he made any specific
02 recommendations.

03 Q And are you today not making any recommendations
04 for riparian vegetation maintenance?

05 A No, I am not.

06 Q Do you know if anyone from the Department of Water
07 and Power is going to recommend flushing maintenance
08 flows or channel maintenance flows?

09 A In a specific sense or a general sense, as I am?

10 Q In a specific sense will there be numbers provided
11 to the Board?

12 A I'm not certain whether there will be.

13 Q With regard to your early testimony regarding the
14 historical flows that exceeded 100 cfs, if, in fact --
15 assume that Beak did extrapolate out to 260 cfs and
16 found the adult weighted usable area curve to continue
17 to rises throughout that period, is it then likely that
18 the relative order of the medians would not be
19 affected?

20 A If I assumed that they were capable of
21 extrapolating out beyond the 100 cfs and the curve
22 continued to rise?

23 Q Yes.

24 A Would it not be -- what was the --

25 Q Well, would it -- would there be any reordering in
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01 the years in the habitat duration analysis?

02 A I'm not sure what you mean by "reordering in the
03 years."

04 Q Well, you were saying that if there were flows

05 over 100 cfs, it was possible that the median might be
06 different than what Beak saw because many of those were
07 over the range of extrapolation.

08 A I think the median that was reported by Beak was
09 an artifact of the limitation they had in not going
10 over the 100 cfs maximum limit.

11 Q Right. But what -- if their number -- where they
12 have reached the top to their extrapolation at 100,
13 whatever the median is going to be over 100, so long
14 as -- if they've set everything over 100 back to 100
15 and if the curve is still rising and never drops out to
16 250, then, in fact, it's not likely, is it, that
17 anything would affect that 100? The median whatever it
18 is would be over 100. Is that right?

19 A Well, the median weighed usable area could be at a
20 flow higher than 100 cfs. Is that what you're saying?
21 Depending on -- depending on the shape of the curve.
22 anything could happen. If the curve continued to rise
23 and rise and rise, the median could be well above 100
24 cfs.

25 Q Right. What's happening, though, is as you have

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01 the curve rise and you're ordering your habitats in
02 order of the currents, so long as the curve continues
03 to rise, those habitats will have the same order. Only
04 if the curve dropped, would you then start to have to
05 rearrange your habitats in order.

06 MR. BIRMINGHAM: Objection. Compound.

07 MS. CAHILL: This may be a horse not worth
08 beating.

09 HEARING OFFICER del PIERO: I understood it the
10 third time you asked it.

11 Do you understand the question?

12 MR. HANSON: I think what she's saying -- you're
13 talking about the ordering of the --

14 HEARING OFFICER del PIERO: Mr. Hanson, I'm asking
15 you, do you understand the question she asked?

16 MR. HANSON: I'm getting close. I think.

17 HEARING OFFICER del PIERO: I'm going to sustain
18 the objection. You need to break it into parts. I
19 think I know where you're getting to, but --

20 Q BY MS. CAHILL: The way Beak has done its habitat
21 duration analysis is that it has taken the historic
22 period of record, those flows, it has determined what
23 habitat corresponds to each of those flows, it has then
24 ordered the habitat from the least frequent to the most
25 frequent, and it has then found the median level of

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01 habitat and gone back to determine what flow
02 corresponds to that median level of habitat.

03 Now, when the amount of habitat is more than the
04 maximum amount that was extrapolated, something over
05 200,000 square feet of habitat, anything over that Beak
06 set the flow equal to 100, which was the maximum flow.

07 A Right.

08 Q Now, you indicated that if they had extrapolated
09 out further, all those years might be rearranged, and
10 wouldn't that happen only if the curve dropped again?

11 A It would depend on how many flows there are above
12 100 cfs.

13 Q If the median -- if the median habitat was already
14 something over what corresponded to a flow of 100 then,
15 in fact, even if which years the median would change,
16 it would still be over 100. Isn't that right?
17 A I'm sorry. I'm getting a little bit confused
18 again.
19 Q I think --
20 HEARING OFFICER del PIERO: Do you know the
21 answer, Mr. Hanson?
22 MR. HANSON: I don't understand the question well
23 enough --
24 HEARING OFFICER del PIERO: Fine. If you don't
25 understand the question, I think, Ms. Cahill, why don't

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01 you move on.
02 MS. CAHILL: I will do that. Thank you.
03 Q BY MS. CAHILL: You indicated in your report, your
04 IFIM, that the study area extended from Mono Gate One
05 to Mono Lake. In fact, the weighted usable area curve
06 that you presented in your Figure 2 at the beginning,
07 that did not, in fact, include the return ditch trench,
08 did it?
09 A That's correct.
10 Q And Beak did no transects below the county road.
11 How were you able to model the section below the county
12 road down to Mono Lake?
13 A We wouldn't have.
14 Q So in other words, the statement that it
15 represents the stream from Mono Gate One to Mono Lake
16 is not entirely accurate?
17 A You're right.
18 Q Were any additional data taken after preparation
19 of this draft report that's L.A. DWP Exhibit 15?
20 A By EA?
21 Q By EA or anyone?
22 A Relative to --
23 Q Well, this is -- this is labeled as a draft
24 report.
25 A Oh.

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01 Q Preliminary draft. Was there ever a final
02 prepared?
03 A No.
04 Q Were there additional data taken?
05 A We have conducted several studies since this draft
06 report was prepared, but it was -- none of those
07 studies were done with the intention of modifying the
08 draft.
09 Q And none of those have been submitted to the Board
10 or the parties?
11 A No.
12 Q Were there additional analyses made since this
13 draft report came out?
14 A No. There were not.
15 Q With regard to your electrofishing, EA's
16 electrofishing data, were those sites randomly

17 selected?
18 A I don't believe so. Initially, I think they were
19 selected by a team of biologists using professional
20 judgment.
21 Q Were the sites restricted to discrete
22 macro-habitat units?
23 A No.
24 Q Were the site boundaries at the boundaries of
25 macro-habitat units?

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01 A I think generally that was true.
02 Q Does the lack of random selection of sites
03 possibly affect the outcome?
04 A Oh, it always can. I mean, there's always the
05 debate between what a professional judgment imparts
06 some bias that if you selected your stations absolutely
07 randomly would be outside of your data. My guess is
08 that there probably isn't a sufficient enough bias to
09 be concerned about associating and not randomly
10 selecting the sites.
11 Q Let me just recap quickly. On Lee Vining Creek
12 you have not reviewed the final DFG report?
13 A No.
14 Q And your recommendations were based on the draft?
15 A That's correct.
16 Q You gave some changes in weighted usable area, but
17 again, since they're based on what is not the final
18 recommendation, it may not be useful to go through
19 that.
20 A I think I gave those on Rush Creek, not on Lee
21 Vining Creek.
22 Q Your in-house model with regard to the split
23 elevation at different portions of the stream, is that
24 model used by anyone else?
25 A No. It's our own model. Although the U.S. Fish

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01 and Wildlife Service is developing that capability to
02 have more than one water surface elevation across the
03 transects.
04 Q The technique used by Beak is the standard
05 technique used in the field at this time, isn't it?
06 A Yes, it is.
07 Q And where you did use public -- published
08 criteria, where did you take them from?
09 A I took them from the Cal Fish and Game 1987
10 report.
11 Q And is that the same source of published criteria
12 used by Beak?
13 A I believe it is.
14 Q And do you know why Beak did not develop
15 site-specific criteria?
16 A Well, they did develop site-specific criteria for
17 the juvenile life stage.
18 Q Do you know why they didn't for adult?
19 A They didn't see enough.
20 Q Yes. Thank you.
21 I'm getting close.
22 HEARING OFFICER del PIERO: That's good.

23 Q BY MS. CAHILL: One of your criticisms of the Lee
24 Vining report was that it was based on flow duration
25 only. If I were to tell you that the final is not

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01 based on flow duration only, would that alleviate that
02 criticism?

03 A Yes.

04 Q And in the end, your conclusion with regard to Lee
05 Vining, based on the no longer current figure, was that
06 based on 80 percent of the maximum weighted usable
07 area, you came up with 15 to 25 cfs as a minimum flow
08 adequate for a self-sustaining fishery. Do you have
09 any reason to believe that that would be the same as
10 the historic fishery?

11 A No.

12 MS. CAHILL: I think that's all I have. Could I
13 have just a moment to confer with my client?

14 Q BY MS. CAHILL: Could you tell us a little more about
15 the studies you have conducted since this preliminary
16 draft?

17 A The studies that I've conducted?

18 Q That EA has conducted?

19 A Well, there have been electrofishing studies that
20 EA has conducted since then. There have been some
21 transects data collected at some of the sampling --
22 some of the macro-habitat sites that were used in this
23 analysis. There have been some additional studies,
24 very detailed studies of depth and velocity used by
25 fish as part of an epiery study that EA has done. We

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01 used Rush Creek as a sample stream for that.

02 I'm really not familiar with all of the details of
03 those studies, but that's some of the work that's been
04 done by EA since then.

05 MS. CAHILL: Okay. Thank you. I think that's --
06 wait. One last question.

07 Q BY MS. CAHILL: Was Rush Creek prior to 1941 a
08 shallow stream?

09 A I don't have an opinion on that.

10 Q Have you heard anything about the existence of
11 pools or deep water in Rush Creek prior to diversion?

12 A I've heard some debate on the subject, yes.

13 MS. CAHILL: Thank you.

14 HEARING OFFICER del PIERO: Thank you very much.

15 I assume Mr. Dodge is next, but Mr. Brown's got a
16 couple of questions, so if you'd be kind enough to hold
17 on for a moment, Mr. Dodge.

18 Mr. Brown?

19 CROSS-EXAMINATION BY THE BOARD

20 Q BY MR. BROWN: Mr. Hanson, at 19 cfs, what's the
21 normal velocity in that stream?

22 A BY MR. HANSON: I'm not sure I can answer that
23 without reviewing data, and I don't know if I have any
24 data in the report to answer that question.

25 HEARING OFFICER del PIERO: Can you check and see?

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01 MR. HANSON: I don't think -- I'll look, but I
02 don't think it's in here. I'm pretty certain it's
03 not. I could look at some of the velocity
04 distributions. There are velocity distributions shown
05 in this report that can give you an idea --
06 Q By MR. BROWN: Just an estimate of what it is?
07 A BY MR. HANSON: At 19 cfs?
08 Q 19, 20. Three, four feet per second?
09 A I'd say it's more in the range of one to two.
10 Q One to two. My experience with brown trout, their
11 habitat is generally in the banks as opposed to the
12 rainbows and brooks being out in the middle of the
13 stream for their habitat. Is that true in this stream?
14 A I actually didn't collect any of the snorkeling
15 data in this stream, and I can't tell you exactly where
16 all the brown trout were observed.
17 Q Are there many holes in that stream at 19 or 20
18 cfs?
19 A There are few holes in the stream at 19, 20 cfs or
20 at 60 or 100 cfs in 1987. I know that there have been
21 some pools created as a result of the restoration
22 program, but the point I was making in the discussions
23 a minute ago was that a good portion of Rush Creek is
24 dominated by riffle habitat, which is a shallow
25 habitat, and run habitat, and what we call rock garden

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01 habitat. Very little of Rush Creek, when we were out
02 there, was pool habitat or deep habitat.
03 Q Isn't that a preferred habitat for brown trout?
04 A The adults. When we electrofished, we found more
05 adults in the deeper water than in the shallow.
06 MR. BROWN: Thank you, Mr. Chairman.
07 HEARING OFFICER del PIERO: Mr. Dodge.
08 Mr. Dodge?
09 CROSS-EXAMINATION BY MR. DODGE
10 Q Good afternoon. This feels like deja vu all over
11 again.
12 A Yes, it does.
13 Q Didn't you and I discuss Exhibit 15 in the spring
14 of 1990?
15 A I think we've done this before, Mr. Dodge.
16 Q It's dated --
17 HEARING OFFICER del PIERO: Mr. Hanson, you don't
18 look anywhere near as old as Mr. Dodge.
19 (Laughter.)
20 Q BY MR. DODGE: It's dated April of 1990, and as I
21 recall, you hurried to finish it for that interim
22 stream proceeding, correct?
23 A You're right.
24 Q And I notice it's still a draft, a preliminary
25 draft. Has it not been completed in the three and a

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01 half years since you and I went over this?
02 A Well, that's true.
03 Q Are you still working on some of the points on
04 this for cross-examination?
05 A I'm still thinking about them.
06 (Laughter.)
07 MR. BIRMINGHAM: Objection. Assumes facts not in
08 evidence.

09 (Laughter.)
10 HEARING OFFICER del PIERO: Sustained.
11 Q BY MR. DODGE: Why would you do an IFIM study?
12 Again, what is -- I think you've told us this, but what
13 is the purpose of doing this study?
14 A The purpose is to develop this relationship
15 between stream flow and fish habitat upon which flow
16 recommendations are generally based.
17 Q And you have at least a preliminary draft for Rush
18 Creek. Do you have one for Lee Vining Creek?
19 A I did no analysis on Lee Vining Creek.
20 Q The only IFIM analysis we have for Lee Vining
21 Creek is the Department of Fish and Game analysis?
22 A Yes.
23 Q Now, you say -- and you said it twice, as a
24 minimum, 20 to 30 cfs for Rush Creek. Now, if my math
25 is right, 30 is about 50 percent more than 20, which

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01 seems to me to be a fairly wide gap. Is there a reason
02 for that?
03 A Well, the gap is based on consideration of the
04 results of the EA analysis and the Fish and Game
05 analysis or the range, I should say.
06 Q But a 50 percent difference seems like a large
07 difference for a scientific study. Are these IFIM
08 studies somewhat of an inexact science?
09 A Well, there is -- yeah. There's a certain amount
10 of uncertainty as to the exact relationship that we're
11 shooting for, this relationship between weighted usable
12 area and discharge.
13 With regards to whether a 50 percent change in the
14 range of flow is significant or not, we often deal with
15 smaller streams where flow recommendations are made at
16 a lower flow range over a much broader percent
17 change -- percent difference in flows.
18 Q Isn't it true that even if -- even if the
19 scientists agreed as to what the relationship was
20 between weighted usable area and flow, there's still
21 substantial room for disagreement as to what the
22 recommended flow would be?
23 A Are you saying if they agree that the curve is
24 correct, what the flow ought to be, and that's a very
25 good point. There are several avenues that different

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01 people who do IFIM go down in coming up with a
02 recommended stream flow.
03 Q And one -- one scientist might look at weighted
04 usable area curve and recommend one flow, and one of
05 his or her colleagues might recommend a totally
06 different flow. Isn't that right?
07 A Yes.
08 Q So there's -- even after you have the results, you
09 have to use professional judgment in applying them?
10 A Yeah. There are different techniques to apply,
11 too, it's not simply always just looking at the curve.
12 Obviously, in the case of the Beak report, there was a
13 habitat duration analysis. Sometimes population
14 modeling is performed. We, on other streams, have used
15 a population response model to evaluate what the best

16 recommended flow is.
17 Q And you, as I said, twice referred to 20 to 30 cfs
18 as a, quote, minimum, end quote, flow. Would you agree
19 that higher flows might be suitable for Rush Creek?
20 A Might be suitable. In what sense do you mean
21 "suitable"?
22 Q I mean suitable in the sense of suitable fit
23 habitat for brown trout?
24 A I think flows higher than that minimum are not
25 going to be degrading to brown trout habitat.

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01 Q Not going to be degrading?
02 A That's right. Well, it depends on how high you
03 go. If you look at the curves that were generated by
04 the EA study and the Cal Fish and Game study, you do
05 notice a sort of general plateau over a broad range of
06 flows. It seems to indicate that there's not potential
07 for habitat degradation in that range as you go higher.
08 Q You're not here telling us that the DFG
09 recommended flows are, quote, degrading.
10 A My testimony will be, right, that they will not
11 lead to degradation of habitat, significant degradation
12 of habitat.
13 Q What do you understand the goal of this proceeding
14 to be as it relates to stream flow?
15 A Well, I believe the goal of this proceeding is to
16 evaluate potential management regimes for the Basin
17 including flow regimes in the stream as one component,
18 overall management -- how to best manage water in the
19 Mono Basin.
20 Q You say "best management." Against what standard,
21 Sir?
22 A Well, I don't really know that much about all the
23 standards, I suppose, that are being utilized in this
24 exercise. There are certainly all the resources that
25 are being considered such as the aquatic resources,

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01 terrestrial resources, the lake --

02 Q I'm solely concerned with stream flows.

03 A Okay.

04 Q And what do you understand the goal to be?

05 A The goal to be with regard to this exercise or
06 these hearings?

07 Q Yes.

08 A I would say the goal is to develop a flow regime
09 that provides adequate protection for fish and other
10 aquatic organisms in Rush and Lee Vining Creek.

11 Q Does the DFG recommendation do that?

12 A Yes. As does mine.

13 Q The reason I ask is that I went through your
14 testimony fairly carefully, and at Page 45 you talked
15 about a self-reproducing population. And then today
16 you told us about a self-sustaining fishery, which I
17 read as pretty similar to that. At Page 49, you talked
18 about a fishery, quote, equivalent to other population
19 in the streams of the Owens Basin, end quote. At Page
20 50, you talked about, quote, maintaining the brown
21 trout population in Rush Creek, end quote. And then at
22 Page 50, again, you said at 30 cfs we reach, quote, 80
23 percent of the maximum predicted habitat for all life
24 stages, end quote.

25 Now, those all read to me as goals, arguably

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01 different goals.

02 A I don't know if I would agree that they're
03 different goals. I view them more or less as the same
04 goal. Maybe I just stated it differently in different
05 places in the testimony.

06 Q Okay. But let me ask you in terms of the 20 to 30
07 cfs recommendation, does that relate to these different
08 goals, or if they are the same goal?

09 A Yes, it does relate to the same goal.

10 Q And that goal again is?

11 A Is -- well, I don't know which way I'm going to
12 put it. To maintain a self-reproducing population of
13 brown trout in Rush and Lee Vining Creek.

14 Q Now, would you agree with me that if someone had a
15 different goal, they might come up with a different
16 flow recommendation?

17 A Absolutely.

18 Q Now, you told us that looking at Figure 2 that the
19 habitat peaked at approximately --

20 HEARING OFFICER del PIERO: Mr. Dodge, I'm going
21 to admonish you the same way I admonished Ms. Cahill.

22 MR. DODGE: I thought were you admonishing
23 Ms. Cahill because of volume.

24 HEARING OFFICER del PIERO: No. Volume has no
25 bearing on the tape recorder that's here. It's

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01 proximity as opposed to volume.

02 MR. DODGE: Because no one's ever said that I was
03 too quiet.

04 (Laughter.)

05 HEARING OFFICER del PIERO: No. In fact,

06 Mr. Birmingham won't object to that assertion, either.
07 Q BY MR. DODGE: In Figure 2 you said, in response, I
08 believe, to a question by Ms. Cahill, that habitat
09 peaked at 200 cfs. Do you see that?
10 A For the Fish and Game curve, yes.
11 Q For the Fish and Game curve.
12 But isn't it true that you submitted a declaration
13 before Judge Finney in '89 which said, in effect, that
14 an adult and juvenile habitat at Rush Creek increased
15 up to flows between 150 cfs and 180 cfs?
16 A That was from an earlier deposition, and I --
17 Q It was a declaration that you submitted to
18 Judge Finney in September of 1989.
19 MR. BIRMINGHAM: Maybe Mr. Hanson could be given a
20 copy of the declaration if he's going to be asked
21 questions about it?
22 HEARING OFFICER del PIERO: Do you have a copy
23 available?
24 MR. DODGE: I do, but I'd like to see what his
25 recollection is first.

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01 HEARING OFFICER del PIERO: Okay. That's
02 appropriate to ask him in regards to his recollection
03 of a document like that.
04 MR. HANSON: I don't recall exactly what I said in
05 the declaration, and I think what I said was based on
06 preliminary data that I received from the Beak study,
07 the Beak data that had been generated in the field.
08 Q BY MR. DODGE: Let me ask you to look at a
09 declaration that I -- and ask you whether you signed it
10 on September 8, 1989, and then if you did, I'll ask you
11 to take a look at Paragraph 4 and see whether I've
12 correctly summarized what you've said about habitat
13 peaking in Rush Creek at 150 to 180 cfs.
14 HEARING OFFICER del PIERO: Take your time,
15 Mr. Hanson.
16 MR. HANSON: I've reviewed it.
17 Q BY MR. DODGE: Is that a declaration that you signed?
18 A Yes, it is.
19 Q And did I accurately summarize in it terms of
20 Paragraph 4?
21 A Yes. What it says is that flows sharply increase
22 from 5 cfs -- excuse me, habitat sharply increases from
23 5 cfs up to 20 or 30 cfs followed by a gradual increase
24 up to 150, 180 cfs. What I -- I frankly don't recall
25 exactly what this is from. I mean, what data I was

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01 looking at, but I would tell you that I think what it
02 is is preliminary analyses of the data that we were
03 doing back in '89 when it was written.
04 Q Well, is it your testimony that it peaks at 100
05 cfs?
06 A No. My testimony is based on the more up-to-date
07 analysis that I did in April of 1990 that it peaked at
08 20 cfs. I can't tell you the differences and the
09 analysis that was done that led to that conclusion
10 versus the analysis that was done that led to this --
11 not conclusion, but results. There may have -- you

12 notice that I took it up to 150 or 180 cfs? Well, if
13 you've read this, you'd notice that I also indicated
14 that we started overtopping our banks at 100 cfs in 8
15 of the 75 transects in the analysis, so that probably
16 was one of the things that I changed or we changed
17 going from that -- the materials in that declaration to
18 what's in here, cutting back on the simulation up to
19 higher flows because of the problem with the
20 overtopping of transects.

21 So what I'm saying is that was based on a
22 preliminary assessment of the analysis, and this was
23 based, my present testimony, was based on the analysis
24 that was done in 1990, which is more up to date and
25 complete and more correct.

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01 Q Let me change subjects with you, Sir. You said in
02 your written testimony that as Rush Creek increased
03 from 50 to 100 cfs, that you got a 10 percent increase
04 in adult habitat. Do you recall that testimony?

05 A Yes.

06 Q Let me ask you -- aside from an adult habitat, are
07 there other benefits of increasing from 50 to 100 cfs?
08 Fisheries benefits?

09 A You mean from a weighted usable area perspective?

10 Q No. General fisheries benefits?

11 A Well, I don't have anything that I can think of
12 off the top of my head that would improve fishery
13 benefits other than maybe some of the studies related
14 to geomorphological changes or the riparian changes of
15 those flows, and I haven't reviewed that data well
16 enough to answer the question specifically.

17 Q Will my change from 50 to 100 cfs move sediment?

18 A In the Cal Fish and Game report, there was an
19 indication of flows above 60 cfs would move spawning
20 gravels, but I don't feel that I have a good handle on
21 all the studies that have been done relative to
22 sediment transport in the system to know what flows are
23 going to move sediments.

24 Q But there's a potential benefit for fisheries
25 there in an increase from 50 cfs to 100 cfs, correct?

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01 A I think my testimony states that there would be a
02 potential benefit to fisheries associated with normal
03 channel maintenance or regular channel maintenance
04 flows -- flushing flows which do move sediment, but I
05 don't know what those values would be, whether it would
06 be 100 cfs or whether it would be 200 cfs. I just
07 don't have a clue.

08 Q Would an increase from 50 to 100 cfs have the
09 beneficial effect of moving young fish, distributing
10 them throughout the stream?

11 A I don't have an opinion on it. I haven't
12 evaluated what the dynamics of the fry I presume you're
13 talking about are in the river.

14 Q Would an increase from 50 to 100 have potential
15 benefits for riparian vegetation?

16 A I would have to defer to Dr. Beschta to answer
17 that question.

18 Q Now, the IFIMs look at the existing wetted
19 channels, correct?

20 A Yes. In 1987, the IFIM looked at all the channels
21 that were wetted, presuming that the transects went
22 through areas where there were multiple channels and
23 that sort of thing, but yes, in 1987, it would have
24 included that consideration.

25 Q Now, if you went from 50 cfs to 100 cfs in Rush

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01 Creek but used some or all of the extra 50 cfs to
02 rewater historic channels that are now dry, would that
03 potentially have an increase in habitat over 10
04 percent?

05 A Say, going from 50 to 100 cfs, but you're leaving
06 the 50 cfs in the main channel --

07 Q We're --

08 A Is that what you're saying.

09 Q Hypothetically, we're rewatering historic channels
10 below the narrows of Rush Creek that are now dry and
11 putting water year-round into those dry channels. My
12 question to you is whether an increase from 50 to 100
13 cfs would potentially have greater than the 10 percent
14 increase in weighted usable area that you testified to.

15 A There's a possibility that if you're opening up
16 new areas, side channels with a higher flow and that
17 higher flow isn't degrading the habitat in the main
18 channel; that is, where the velocities are getting too
19 swift, that the expanded areas off to the side would
20 improve habitat. You would have an increase certainly
21 if you're going to add adequate depths. It depends
22 what the configuration of the side channels are in
23 terms of the depths of the velocities that additional
24 50 cfs provided but, yes, there is the potential that
25 there would be improved habitat greater than 10 percent

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01 that I showed.

02 Q Now, you developed site specific utilization
03 information on adults, correct?

04 A Yes.

05 Q And that's a difference from what DFG did,
06 correct?

07 A That's correct.
08 Q And you testified to certain water surface
09 elevation measurements and those, you said, were done
10 from 19 to 100 cfs. I believe there were four
11 different flow, correct?
12 A Actually, it's 13 to 100.
13 Q Four different flows. But in terms of the
14 utilization, that was just done at 19 cfs.
15 A That's correct.
16 Q Now, is there a problem with that?
17 A I don't have a problem with it.
18 Q If you look at -- look at Figure 3, which
19 Ms. Cahill talked to you about and it shows the
20 utilization basically going down to zero as the depths
21 get to a little over two feet, correct?
22 A Yes.
23 Q And you wouldn't expect that as a biologist for
24 adult brown trout, would you?
25 A Yes. The point is that fish -- adult brown trout

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01 can be found in a multitude of depths, depending on
02 what is available in the stream. The distribution of
03 depths that you observe in a given stream is a function
04 of what is available to them, and as I was pointing out
05 to Ms. Cahill earlier, Rush Creek does not provide many
06 deep -- does not provide a lot of deep water even at
07 the higher flows.
08 Q But you would find more deep water at 60 cfs than
09 you would at 19 cfs, correct?
10 A You would find water -- the distribution that you
11 would see would be similar to that distribution that
12 you see in the middle curve there, add one foot.
13 Q So if were you looking at 60 cfs, you would have a
14 lot more observations of two foot and above water
15 wouldn't you?
16 A Yes. And to some degree, the correction factor
17 that I applied going from the utilization to the
18 preference function takes that into account.
19 Now, the point -- I'd also like to make one point
20 here is that the depth criteria that were used here,
21 first of all, reflect what was observed in the stream,
22 and there may be a shift in depth if you collected data
23 at 60 cfs for deeper water. And you could even go to
24 the extent where you kept the depth criteria up to a
25 high level, say, anything up to 100 feet is suitable.

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01 But I would tell you that the results of the
02 analysis using that different -- those different curves
03 showing preferences or suitabilities, or wherever you
04 want to put it for deeper water would have, I think, a
05 fairly small impact on the results of the analysis.
06 There's two things to consider here in doing these
07 analyses -- it's not being counted against my time,
08 Mr. Chairman, is it?
09 HEARING OFFICER del PIERO: It is.
10 MR. DODGE: I would request an additional 20
11 minutes.
12 HEARING OFFICER del PIERO: You're granted an

13 additional 20 minutes.

14 MR. HANSON: Let me point out something that I've
15 observed here. There's two levels of sensitivity to
16 the model. Remember, there are different avenues to
17 take in running an instream flow study. The
18 sensitivity of the model is one thing to consider.
19 Sensitivity of the decisions made, or what I call
20 policy sensitivity, is another thing to consider. If
21 these suitability criteria were extended to deeper
22 depths, my sense is there would be some change in the
23 suitability criteria -- excuse me. Some change in the
24 output of the model, some sensitivity to that weighted
25 usable area, but the sensitivity of the policy

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01 decisions made from that new curve, I don't think would
02 be that significantly different than what I've made
03 here.

04 Q BY MR. DODGE: When I was a biologist --

05 HEARING OFFICER del PIERO: Mr. Dodge, just for
06 the record, so it's clear, you need to make a showing
07 of why you need the additional 20 minutes seeing as
08 everyone else has.

09 MR. DODGE: I need the additional 20 minutes
10 because this is very complicated and the witness is
11 going on and on, sometimes unrelated to the questions.

12 HEARING OFFICER del PIERO: Proceed.

13 Q BY MR. DODGE: As a biologist, wouldn't you expect
14 that curve on Figure 3, the top curve, to show a
15 greater preference of brown trout for deep water?

16 A Again, I would not expect it to show that based on
17 what is out there in Marsh Creek.

18 Q Let's -- you had very few observations of
19 three-foot water at 19 cfs, correct?

20 A Probably true, yes.

21 Q In fact, you had very few observations of water
22 greater than two feet; isn't that true?

23 HEARING OFFICER del PIERO: Excuse me, Mr. Dodge.
24 I think it's already in the record that he -- you did
25 not do the measurements yourself, did you?

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01 MR. HANSON: Oh, yeah, I'm not personally -- I
02 thought he was referring --

03 HEARING OFFICER del PIERO: Are you referring
04 to --

05 MR. DODGE: I'm referring to EA, yes.

06 HEARING OFFICER del PIERO: The last question was
07 you did not or EA did not see very many examples of
08 two-foot water?

09 MR. HANSON: That's correct.

10 Q BY MR. DODGE: So you had a very small sample in
11 developing your utilization curve, a very small sample
12 of observations of deep water; isn't that correct?

13 A It's because there's little deep water out there
14 to -- if you go out in a random fashion, which is what
15 we did, you're not going to see that much deep water.

16 Q Couldn't that small sample of deep water have
17 affected that utilization curve?

18 A I'm not sure exactly how you mean. It's in
19 there.

20 Q Aren't there inherent dangers in generalizing from
21 a small sample?

22 A When we do a study like this, you did not collect
23 the same number of data from different depths. You
24 don't go out, for example, to collect 50 observations
25 at one depth and 50 observations at another depth.

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01 Standard procedure is to go out in a different fashion
02 and you will run into the depths in proportion to their
03 distribution throughout the stream. And that's what we
04 did.

05 Q Let's go back to Exhibit 15, Sir. Page 21. Do
06 you have the IFIM on Rush Creek in front of you? Now,
07 Page 21 you talk about habitat improvement, correct?

08 A Yes, I think so.

09 Q And you -- again, you say, as you've told us
10 today, that Rush Creek is simply too shallow; is that
11 correct?

12 A Yes.

13 Q And you talk about the possible habitat
14 improvement by increasing the number of pools within
15 the stream, correct?

16 A Yes.

17 Q And you told us today that -- today or at least in
18 1987 that there were a very small amount of pools in
19 Rush Creek, correct?

20 A Yes.

21 Q So you're here recommending the creation of deep
22 water habitat; isn't that right?

23 A I did so in that report.

24 Q And are you aware that the consultant under
25 direction of Judge Finney has been doing just that?

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01 A I'm aware of that.

02 Q Now, you also, in this Exhibit 15 at Page 22, talk
03 about planting riparian vegetation and putting in cover
04 sources such as boulders, correct?

05 A Yes. I make that in reference to the return ditch
06 only.

07 Q But wouldn't that make sense in all of Rush Creek?
08 A Well, no. The return ditch is essentially a ditch
09 that, while it had very good depths and velocities to
10 it, lack cover generally. My recommendation was that
11 there's excellent depth and velocities, if you went in
12 and put some boulders and created some -- instream
13 boulders to create some overhead cover for fish, that
14 would improve the value of that ditch considerably.
15 And if it was more shaded with riparian vegetation,
16 that would also improve the quality of the habitat. As
17 I saw it in 1987 prior to the restoration program, it
18 didn't have good fish habitat, and that was the reason
19 why I stated earlier that we saw few fish in it.
20 Q Now, this -- this recommendation that pools be put
21 in Rush Creek, that was made before Dr. Beschta and
22 Dr. Chapman entered the scene, correct?
23 A That's correct. The notion behind that was if you
24 want to get the depths up in Rush Creek, what I was
25 saying was that by increasing flows, the depths are not

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01 increasing fast enough to achieve the depths that you
02 want because the velocities are going to start to take
03 over and degrade the habitat.
04 If you want to improve depth, I was suggesting
05 that the river could be deeper in places, and that
06 would do far better than trying to throw more water
07 down the stream because the more water you put down the
08 stream, the depth just wasn't increasing quickly
09 enough.
10 Q And isn't it true, Sir, that the creation of pools
11 would be a good thing from a fish habitat standpoint
12 either at your recommended 20 to 30 cfs or at the DFG
13 recommendations?
14 A More pools in Rush Creek I think would be
15 beneficial, whether they can be created artificially or
16 whether they'll occur naturally as a natural process.
17 Either way, that, I think, would be beneficial to the
18 trout population of Rush Creek.
19 Q Regardless of the flows?
20 A Yeah. I think there's a broad range of flows that
21 really won't matter. As long as you've got some of
22 those deep pools, you're going to improve habitat.
23 Q And when you wrote this report in -- on or about
24 April of 1990, you felt that pools could be created in
25 Rush Creek without an unacceptable injury to the

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01 riparian vegetation associated with Rush Creek?
02 A Yeah. Well, frankly, I wasn't thinking about
03 that, whether the materials that were dug out from the
04 stream would be put on the stream bank where the
05 riparian vegetation was or not. I was simply
06 theorizing if there was deeper water, pool habitat, it
07 would improve conditions, and if that could be done
08 artificially, then that would be beneficial for the
09 stream.
10 Q And you didn't, in this report, call out any
11 problems in doing that, did you?
12 A No, I didn't.

13 Q Now, flushing flows, you told us that you didn't
14 have any recommendations today. Can you give us any
15 standard by which you would recommend a flushing flow?

16 A Well, I know of some of the methods that are used
17 for flushing flows. I been involved in some studies
18 that have evaluated flushing flows and have some level
19 of familiarity of the techniques. There are certain
20 models that are sometimes applied, so-called incipient
21 motion models, that will predict at what flows
22 different particle sizes will be moved through the
23 system.

24 There are other techniques that will evaluate what
25 so-called a bank full discharge is, what that flow is,

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01 the periodicity of that flow. This is the kind of
02 thing that so-called effluvial geomorphologists deal
03 with, and I have an understanding of it but not enough
04 understanding to make my own specific recommendation.

05 Q If I were to give you the mean daily flow or the
06 mean daily peak flow on any of these creeks, would that
07 help you make a recommendation?

08 A Not really.

09 Q Now, just a couple more things and then I'll let
10 you go. At Page 47, you talk about Rush Creek and a
11 gravel replenishment or replacement program, and you
12 said or you referred to, quote, some level of
13 replenishment, end quote. And I take it that you meant
14 by that that on some periodic basis there would be
15 gravel replenishment?

16 A That's, yes, what I was assuming.

17 Q And is that, in your experience, common on
18 regulated streams?

19 A I know where it has occurred, but I don't know if
20 I would claim it to be common on regulated streams.

21 Q Would an approximate replenishment program of once
22 every five years seem reasonable to you?

23 A I really don't know.

24 Q Is there any industry standard, to your knowledge?

25 A Not to my knowledge.

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01 Q Finally, just a couple of questions on the return
02 ditch. I think you and Ms. Cahill established that DFG
03 analyzed the return ditch and EA did not, correct?

04 A Well, we analyzed it. I mean, it's in our
05 analysis, but it is not in the weighted usable area
06 curve that you see there on Figure 2. It's not part of
07 that calculation. In fact, we predicted a lot more
08 habitat in the return ditch than rest of the stream.
09 Based on the depth and velocity characteristics of that
10 return ditch.

11 Q Now, if I were to tell you that the return ditch
12 contains a lot of deeper water today, would that affect
13 the comparison between your curve and the Department of
14 Fish and Game curve?

15 MR. BIRMINGHAM: Objection. Ambiguous.

16 HEARING OFFICER del PIERO: Wait a second. Wait a
17 second. You need to expand on what your objection is.
18 I didn't think it was ambiguous.

19 MR. BIRMINGHAM: Deeper than what?

20 MR. DODGE: Substantially deeper than the rest of
21 Rush Creek, is what I meant.

22 MR. BIRMINGHAM: With that clarification --

23 HEARING OFFICER del PIERO: I assumed he was
24 talking about the baseline in '89, but go ahead.

25 MR. HANSON: I'm sorry. Would you repeat the

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01 whole question one more time?

02 HEARING OFFICER del PIERO: Sustained.

03 (Laughter.)

04 Q By MR. DODGE: If, in fact, the return ditch contains
05 substantially deeper water than the rest of Rush Creek
06 and you've talked about the difference between your
07 curve and the DFG curve, I'm wondering whether that
08 fact could bring the two curves closer together?

09 A Well, I'm not certain that the DFG curve did
10 include the return ditch.

11 Q Assume it did, Sir.

12 A That might have some impact. I think the
13 differences between the EA curve and the Fish and Game
14 curve are based on habitat suitability criteria more
15 than anything else.

16 Q The habitat suitability criteria?

17 A Yes.

18 Q And again, if I'm right, you used utilization and
19 DFG used preference; is that right?

20 A I used utilization data from the stream. I also
21 used preference data from the stream. Both those
22 analyses are present in my report. Cal Fish and Game
23 used preference data from streams off-site.

24 Q But Figure 2, your curve, uses utilization?

25 A That particular curve shown in that figure was

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01 based on the utilization data.

02 Q As I understand an IFIM in principle, you find
03 utilization and then you look at the availability of
04 the habitat -- you get the utilization and assign
05 various values. You look in a given stream at the
06 availability of that habitat and somehow you create a

07 preference from that; is that correct?
08 A Well, again, there is a debate on this subject.
09 Q That's one approach?
10 A That's right.
11 Q And, in fact, that is the approach that you
12 started out to take in Exhibit 15, isn't it?
13 A I'm not sure I'd quite put it that that was the
14 approach that I started out to take. It's the approach
15 that I was generally using throughout the document.
16 Are you talking about the correction approach or the
17 utilization approach?
18 Q I'm talking about the fact that when you started
19 the analysis in Exhibit 15, you were going to look at
20 utilization and then availability and come up with a
21 preference curve, correct?
22 A The general approach as we started out was to use
23 the utilization data. As I've stated earlier, the --
24 again, general conventional wisdom is that if
25 utilization data are collected in the stream upon which

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01 the IFIM study has been conducted, then this there
02 isn't a need to correct for availability.
03 Q But if you look at Figure 2, and -- your curve, as
04 you said, I think, peaks at about 20 cfs based on the
05 utilization curve. What would your curve look like
06 under the preference curve approach?
07 A Well, using the data from Rush Creek, it's shown
08 in my report.
09 Q That curve would be more similar to the DFG curve,
10 wouldn't it?
11 A A little bit. It would start to be a little bit
12 more similar.
13 MR. DODGE: Just give me a second, Mr. Chairman,
14 if you would.
15 Thank you, Mr. Hanson. No further questions.
16 HEARING OFFICER del PIERO: Thank you very much,
17 Mr. Dodge.
18 Mr. Roos-Collins, do you have questions, Sir?
19 MR. ROOS-COLLINS: I do.
20 HEARING OFFICER del PIERO: Fine. We're going
21 take a break for ten minutes and start again promptly
22 at five o'clock.
23 (Whereupon a recess was taken.)
24 HEARING OFFICER del PIERO: We're back on the
25 record again.

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01 Mr. Dodge, are you here somewhere? There you
02 are. Mr. Birmingham, I understand we have a problem
03 with the availability of the witness after two minutes
04 from now; is that true?
05 MR. BIRMINGHAM: Yes. Mr. Hanson has a commitment
06 in Walnut Creek this evening, and he promised his
07 spouse that he would be back by seven o'clock and that
08 he would leave here by five.
09 HEARING OFFICER del PIERO: Mr. Hanson, you're
10 going to be here tomorrow morning?
11 MR. HANSON: Absolutely.
12 HEARING OFFICER del PIERO: Mr. Roos-Collins, I

13 understand your cross-examination is going to take at
14 least 30 minutes; is that true?

15 MR. ROOS-COLLINS: That's correct.

16 HEARING OFFICER del PIERO: Given the nature of
17 the hour, Ladies and Gentlemen --

18 MR. THOMAS: We have one procedural question with
19 relation to Mr. Tillemans tomorrow. I'd like to
20 have some explanation about the relevancy of his
21 Crowley Lake testimony so we can file an objection now
22 so that you could rule, and we could know of his
23 availability or not tomorrow.

24 HEARING OFFICER del PIERO: He's going to be
25 available tomorrow.

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01 MR. THOMAS: There is some question whether the
02 discussion about Crowley Lake is at all relevant to the
03 water rights licenses in the Mono Basin, so we would
04 object to the testimony on Crowley Lake insofar as it's
05 not relevant to the --

06 HEARING OFFICER del PIERO: Let me suggest that if
07 you want to raise that objection, you can raise it
08 tomorrow.

09 MR. THOMAS: We can do it tomorrow as well.

10 HEARING OFFICER del PIERO: Tomorrow's more
11 appropriate than right now. I'll be happy to rule on
12 it at that time.

13 MR. THOMAS: If you ruled in our favor, you
14 wouldn't need to hear Mr. Tillemans tomorrow.

15 HEARING OFFICER del PIERO: Well -- we'll see
16 everybody tomorrow morning and then if he gets to go
17 home early, he can go home early, so he gets to spend
18 one more delightful evening in the great metropolitan
19 area of Sacramento. Okay?

20 Mr. Roos-Collins, you're on tap first thing in the
21 morning.

22 Mr. Hanson, you'll be here bright and early ready
23 to go promptly at nine o'clock.

24 MR. HANSON: I'll be here at eight, if you want.

25 HEARING OFFICER del PIERO: Actually, see --

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01 see -- I would prefer starting at eight o'clock, but in
02 the interests of everyone else, I'm inclined to think
03 I'd probably hear howls of objection. Is that true?
04 It wasn't noticed at nine o'clock, I don't think. Was
05 it? It was just noticed for day. Would people mind
06 beginning earlier?

07 MR. DODGE: Our preference would be to begin
08 earlier and end earlier.

09 HEARING OFFICER del PIERO: I understand that,
10 but -- my preference is to finish sometime within the
11 calendar year of 1993, so -- the second portion of your
12 preference isn't necessarily going to be receiving a
13 tremendous amount of consideration.

14 MR. BIRMINGHAM: Would 8:30 be an appropriate hour
15 to start tomorrow?

16 HEARING OFFICER del PIERO: Ms. Anglin, can you be

17 here at 8:30?

18 THE REPORTER: Absolutely.

19 HEARING OFFICER del PIERO: Any objections to
20 beginning at 8:30 in the morning?

21 We're going to adjourn for the evening and start
22 again at 8:30, and then we'll continue with the
23 cross-examination. I'll take up your issue after the
24 cross-examination -- after both cross-examination and
25 redirect and recross of this is completed.

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01 I would point out for the record Mrs. Anglin has
02 some of the transcripts. I know she distributed some
03 of them, but there are some that are available. I'd
04 strongly recommend counsel for the various parties get
05 together with her after this in order to make sure that
06 they get all that she has available.

07 Any other questions before I close this out for
08 the day?

09 MR. CANADAY: Mr. del Piero?

10 HEARING OFFICER del PIERO: Yes, Sir,
11 Mr. Canaday?

12 MR. CANADAY: Of course, my standard admonition
13 about the garbage, but I've been informed by Maureen
14 Marche that we can calendar December 1st.

15 HEARING OFFICER del PIERO: December 1st?

16 MR. CANADAY: Yes. In December we were going to
17 start on Thursday the 2nd.

18 HEARING OFFICER del PIERO: Yes.

19 MR. CANADAY: But we now have Wednesday the 1st as
20 a day of opportunity.

21 HEARING OFFICER del PIERO: What happened to the
22 other hearing that was scheduled for the 1st?

23 MR. CANADAY: I'm not sure. All I know is --

24 HEARING OFFICER del PIERO: There was another
25 hearing scheduled for the 1st and, in fact, I was

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01 supposed to have a meeting with Mr. Pettit about it
02 this afternoon at five o'clock, so --

03 MR. CANADAY: We can firm that up tomorrow
04 morning.

05 HEARING OFFICER del PIERO: Would you call
06 Mr. Pettit's office and make sure he's still here, so I
07 can see him before we start calendaring the 1st of
08 December?

09 Ladies and Gentlemen, I'll see you tomorrow
10 morning at 8:30.

11 (Whereupon the proceedings adjourned
12 at 5:01 p.m.)

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01 REPORTER'S CERTIFICATE

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03 STATE OF CALIFORNIA)
03) ss.
04 COUNTY OF SACRAMENTO)
04

05 I, KELSEY DAVENPORT ANGLIN, certify that I was the
06 official court reporter for the proceedings named
07 herein; and that as such reporter, I reported, in
08 verbatim shorthand writing, those proceedings, that I
09 thereafter caused my shorthand writing to be reduced to
10 typewriting, and the pages numbered 1 through 255
11 herein constitute a complete, true and correct record
12 of the proceedings:
13

14 PRESIDING OFFICER: Marc del Piero
15 JURISDICTION: State Water Resources Control Board
16 CAUSE: Mono Lake Diversions
17 DATE OF PROCEEDINGS: November 9, 1993
18

19 IN WITNESS WHEREOF, I have subscribed this
20 certificate at Sacramento, California, on this 16th day
21 of November, 1993.
22

23
24
24 _____
25 Kelsey Davenport Anglin, RPR,
25 CM, CSR No. 8553