

SUPREME COURT OF THE UNITED STATES  
No. 142, Original

STATE OF FLORIDA, )  
Plaintiff, )  
V. ) VOLUME VII  
STATE OF GEORGIA )  
Defendants. )

TRANSCRIPT OF PROCEEDINGS

The above-entitled matter came on for HEARING before SPECIAL MASTER RALPH I. LANCASTER, held in the U. S. Bankruptcy Court, at 537 Congress Street, Portland, Maine, on November 9, 2016, commencing at 8:57 a.m., before Claudette G. Mason, RMR, CRR, a Notary Public in and for the State of Maine.

APPEARANCES:

For the State of Florida: PHILIP J. PERRY, ESQ.  
JAMIE L. WINE, ESQ.  
MATTHEW Z. LEOPOLD, ESQ.  
NATALIE HARDWICK RAO, ESQ.  
STIJN VAN OSCH, ESQ.

For the State of Georgia: CRAIG S. PRIMIS, ESQ.  
BARACK S. ECHOLS, ESQ.  
KAREN McCARTAN DeSANTIS, ESQ.  
JOSH MAHONEY, ESQ.  
EMILY K. MERKI, ESQ.

Also Present: JOSHUA D. DUNLAP, ESQ.

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1 PROCEEDINGS  
2 SPECIAL MASTER LANCASTER: Welcome back,  
3 Mr. Perry.  
4 MR. PERRY: Thank you, your Honor.  
5 SPECIAL MASTER LANCASTER: I understand  
6 congratulations are in order?  
7 MR. PERRY: Thank you, your Honor. I'm  
8 very proud of my wife.  
9 I would like to introduce our -- a new  
10 counsel who will be working with us today,  
11 particularly with Dr. White, who is our first  
12 witness; and that's Matt Leopold.  
13 SPECIAL MASTER LANCASTER: Welcome.  
14 MR. PERRY: He's from Carlton Fields in  
15 Tallahassee, Florida.  
16 SPECIAL MASTER LANCASTER: Thank you.  
17 MR. PERRY: Thank you, your Honor.  
18 SPECIAL MASTER LANCASTER: Before we  
19 begin, if I read the statistics correctly,  
20 both Florida and Georgia -- the people of  
21 Florida and the people of Georgia agreed on  
22 the presidential race. Might I suggest that  
23 their counsel confer and see if they can agree?  
24 That's just a suggestion.  
25 MR. PERRY: Thank you.  
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1 MR. LEOPOLD: Good morning, your Honor.  
2 SPECIAL MASTER LANCASTER: Good morning.  
3 MR. LEOPOLD: We would like to call  
4 Dr. Wilson White to the stand.  
5 SPECIAL MASTER LANCASTER: Please.  
6 THE CLERK: Please raise your right  
7 hand.  
8 Do you solemnly swear that the testimony  
9 you shall give in the cause now in hearing  
10 shall be the truth, the whole truth, and  
11 nothing but the truth, so help you God?  
12 THE WITNESS: I do.  
13 THE CLERK: Please be seated.  
14 Pull yourself right up to the microphone  
15 and please state your name and spell your  
16 last name.  
17 THE WITNESS: My name is James Wilson  
18 White, III. That's J A M E S, W I L S O N,  
19 W H I T E, III.  
20 MR. LEOPOLD: Your Honor, if I may  
21 approach the witness?  
22 SPECIAL MASTER LANCASTER: Please.  
23 DIRECT EXAMINATION  
24 BY MR. LEOPOLD:  
25 Q. Dr. White, I have handed you your prefiled direct  
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1 testimony in the case. Do you see that?

2 **A. Yes.**

3 **Q.** And do you adopt in full this as your sworn

4 testimony here today?

5 **A. Yes, I do.**

6 **Q.** Thank you.

7 MR. LEOPOLD: I hand him over.

8 MR. ECHOLS: Good morning, your Honor.

9 SPECIAL MASTER LANCASTER: Good morning.

10 MR. ECHOLS: Your Honor, before I begin

11 with Dr. White, in light of your comments at

12 the end of court day yesterday and just this

13 morning, I thought that I would respond to a

14 point that you made.

15 I have had neither the gravitas nor the

16 experience that you do, so I have a simple

17 demonstrative; but I will not put anything on

18 the record.

19 SPECIAL MASTER LANCASTER: Thank you.

20 CROSS-EXAMINATION

21 BY MR. ECHOLS:

22 **Q.** Good morning, Dr. White.

23 **A. Good morning.**

24 **Q.** Now, Dr. White, you are an ecologist who

25 researches and has experience with mathematical

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1 models; is that correct?

2 **A. That's right.**

3 **Q.** But you are not an oyster biologist?

4 **A. That's right. I'm more of a broad population**

5 **biologist. I study population dynamics.**

6 **Q.** And, similarly, you're not an expert in fishery

7 science. Would that be accurate?

8 **A. I disagree with that. I --**

9 (Discussion off the record.)

10 BY MR. ECHOLS:

11 **Q.** Great. So you do consider yourself an expert in

12 fisheries?

13 **A. Yes, sir.**

14 **Q.** And fisheries management?

15 **A. Yes, sir.**

16 **Q.** Including oyster fisheries?

17 **A. The -- I would consider myself an expert in the**

18 **theory and mathematics of fisheries management.**

19 **So that can apply to oysters or any species.**

20 **Q.** Just one thing, Dr. White, sort of like when we

21 did your deposition, we have madam court reporter

22 taking everything down. If you could speak a

23 little more slowly for her.

24 **A. I'm very sorry.**

25 **Q.** No problem. She told me I had to do that, too.

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1 Now, you, sir, were retained here by the

2 State of Florida to develop a computer model

3 which would examine the changes in the oyster

4 population of Apalachicola Bay. Correct?

5 **A. That's right. The purpose was to identify**

6 **potential contributing causes to the fishery**

7 **collapse in 2012.**

8 **Q.** And what you determined from your model is that

9 high salinity conditions associated with

10 freshwater flows or reductions, rather, in

11 freshwater flows into the bay contributed to the

12 oyster population crash. That's your opinion?

13 **A. That and that there was no evidence that**

14 **harvesting contributed. Yes.**

15 **Q.** Correct. And the secondary conclusion is just as

16 you said, that harvesting pressure throughout the

17 2009 to 2012 time period was not different from

18 prior years when the fishery was healthy. Is

19 that correct?

20 **A. That's correct.**

21 **Q.** And in order to reach this conclusion, you

22 developed what's called an integral projection

23 model?

24 **A. That's correct.**

25 **Q.** And that's the basis for the conclusions that

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1 there was not overharvesting and that higher

2 salinity caused by Georgia consumption and lower

3 flows contributed to the collapse of the fishery?

4 **A. That's correct.**

5 **Q.** Now, when you put together one of these models,

6 sir, you have to define certain parameters; isn't

7 that right?

8 **A. Yes.**

9 **Q.** And those parameters are supposed to be based on

10 the best available science; are they not?

11 **A. Yes.**

12 **Q.** And if we -- if you could look, please, to your

13 written direct, paragraph 28, which is on page 6.

14 **A. Yes.**

15 **Q.** And as you explained in your written direct,

16 there are certain parameters that you input that

17 relate to the particular species that you're

18 examining that do not change over time; is that

19 right?

20 **A. That's right.**

21 **Q.** And among the types of parameters that do not

22 change over time for a model like this are things

23 like the growth rate?

24 **A. That's right.**

25 **Q.** And similarly, that would also apply to the

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1 parameter of what's called maximum asymptotic  
 2 size?  
 3 **A. That's right.**  
 4 **Q.** That's something that does not change over time?  
 5 **A. That's right.**  
 6 **I want to clarify by does not change over**  
 7 **time, that's in contrast to things that depend on**  
 8 **salinity, for example. And because the salinity**  
 9 **changes over time, there are parts of the model**  
 10 **that also change over time in response to**  
 11 **salinity.**  
 12 **Q.** And we -- just, again, I'm sorry, sir. If you  
 13 could go a little, little bit slower.  
 14 Now, asymptotic maximum size, at least for me  
 15 since I was never good at math, especially higher  
 16 math, it's kind of hard to explain and understand  
 17 it. So I tried to get a demonstrative that would  
 18 show how this works mathematically and just made  
 19 a chart.  
 20 And I apologize to you; since I pulled it out  
 21 this morning, I don't have a printout. But this  
 22 is just something I pulled out of an ecological  
 23 journal to try to understand this mathematically.  
 24 Now, would it be the case that this curve  
 25 reflects the general theory or concept behind

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1 asymptotic maximum size; that is, as a particular  
 2 species gets older, it gets larger in size, but  
 3 then it sort of tops out and continues at that  
 4 largest size or larger size?  
 5 **A. That's not quite correct, no.**  
 6 **Q.** Please explain.  
 7 **A. Absolutely. So what's important to understand**  
 8 **that what's not on this chart is data, for**  
 9 **example. So the way you -- the way you described**  
 10 **this relationship is you collect a bunch of data.**  
 11 **You have fish or oysters or whatever of different**  
 12 **ages. And you have their sizes, and you plot**  
 13 **that. It would be sort of a cloud of points.**  
 14 **And then the line, a line like what's shown on**  
 15 **this graph, would be drawn to sort of go through**  
 16 **the middle of that cloud of points.**  
 17 **And so this -- this parameter we're talking**  
 18 **about, the asymptotic maximum size, it's one of**  
 19 **these cases where the technical terminology**  
 20 **differs a little bit from what we might -- sort**  
 21 **of the everyday lay person usage of the word.**  
 22 **It's not the actual maximum size that any**  
 23 **individual oyster could reach; it's the average**  
 24 **maximum size of a large oyster.**  
 25 **So if you actually plotted data around that**

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1 **curve, for the very old -- presumably that's**  
 2 **supposed to be age that's on the horizontal axis**  
 3 **of that figure. For the very old individuals you**  
 4 **would have some individuals that are smaller than**  
 5 **that curve at a very old age and some that are**  
 6 **larger. So you can have individuals that are**  
 7 **larger than that asymptotic size.**  
 8 **That's just describing the shape of that**  
 9 **cloud of points.**  
 10 **Q.** But as you just explained in your written direct,  
 11 the maximum asymptotic size is supposed to  
 12 reflect the average of the largest size or the  
 13 larger size that these species grow to?  
 14 **A. That's right.**  
 15 **Q.** Now, when you submitted to us the expert report  
 16 in February of this year, you included a  
 17 parameter for maximum asymptotic size for your  
 18 model; did you not?  
 19 **A. Yes.**  
 20 **Q.** And if I could ask you, please, to turn to --  
 21 MR. ECHOLS: What tab is it?  
 22 BY MR. ECHOLS:  
 23 **Q.** -- tab 2 in your binder, please.  
 24 **A. Yes.**  
 25 **Q.** And tab 2 in your binder is your -- if you would,

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1 please identify -- it's FX-798 -- your expert  
 2 report?  
 3 **A. Yes.**  
 4 **Q.** And you -- because it doesn't have page numbers,  
 5 I believe we flagged the relevant page for  
 6 everyone.  
 7 **A. Is that the sticky note here?**  
 8 **Q.** Yes, please.  
 9 **A. Great.**  
 10 **Q.** Are you there, sir?  
 11 **A. Yes.**  
 12 **Q.** Now, on that page, that table of FX-798, where  
 13 you have the asymptotic maximum size for oyster  
 14 parameters, you have listed there 61.5  
 15 millimeters. Do you see that?  
 16 **A. Yes.**  
 17 **Q.** And the source listed for that is Kimbro expert  
 18 report?  
 19 **A. That's right. This was derived from data that**  
 20 **Dr. Kimbro had collected in the bay.**  
 21 **Q.** And so the way we should understand you have  
 22 chosen 61.5 millimeters here is that when you  
 23 first structured your model, you were using 61.5  
 24 millimeters as the average maximum size for the  
 25 eastern oyster in Apalachicola Bay. Right?

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1 **A. That's right. Based on Dr. Kimbro's data from**  
 2 **the bay, yes.**  
 3 **Q.** It wasn't quite clear yesterday with Dr. Kimbro  
 4 whether he gave you the number or whether you  
 5 calculated this yourself.  
 6 **A. Yes. So there's a standard mathematical**  
 7 **procedure for calculating the shape of that curve**  
 8 **given the type of data I described. If you have**  
 9 **the age of the animal and the size of the animal,**  
 10 **you can fit the shape of that curve. Dr. Kimbro**  
 11 **gave me the data, and so I used a few lines of**  
 12 **computer code to calculate the shape of that**  
 13 **curve.**

14 SPECIAL MASTER LANCASTER: Dr. White,  
 15 excuse me. Would you just -- I know this is  
 16 difficult. But would you just slow down a  
 17 little bit because the reporter, as talented  
 18 as she is, can't read minds.

19 THE WITNESS: Yes, your Honor. I'll do  
 20 my best.

21 SPECIAL MASTER LANCASTER: Thank you.

22 BY MR. ECHOLS:

23 **Q.** And, actually, if you wouldn't mind, could you  
 24 move the mike a little bit closer? I'm having a  
 25 little trouble hearing you.

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1 meaning of this particular parameter -- the  
 2 average maximum size of an old Apalachicola  
 3 eastern oyster is bigger than 61.5 millimeters?  
 4 **A. I agree that the -- the updated data we obtained**  
 5 **from Dr. Kimbro is a better reflection of what's**  
 6 **happening.**  
 7 **Q.** And, I'm sorry, sir, I'm not -- I'm not referring  
 8 to the particular data. I'm just speaking  
 9 generally, because this kind of parameter is  
 10 supposed to reflect the biology of the species;  
 11 is it not?  
 12 **A. Yes.**  
 13 **Q.** And the biology of the species of the eastern  
 14 oyster is that it grows to much bigger than 61.5  
 15 millimeters. In fact, they're not even legally  
 16 harvestable until they get to 76 millimeters.  
 17 Right?  
 18 **A. Again, they grew larger than 61 millimeters with**  
 19 **the original relationship, which was based on**  
 20 **data we had collected in the bay at the time. So**  
 21 **that was our best available estimate of the**  
 22 **growth rate.**

23 **Q.** To determine what the size that a species grows  
 24 to may be, like the eastern oyster, there are  
 25 other sources you can look at. You don't have to

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1 **A. All right. Is this better?**  
 2 **Q.** I think so, yes.  
 3 And so what you determined from the data that  
 4 Dr. Kimbro gave you was that the appropriate  
 5 value for your model for asymptotic maximum size  
 6 was 61.5 millimeters. Correct?  
 7 **A. Yes. That's right.**  
 8 **Q.** You have since determined that that is not a good  
 9 value to use; have you not?  
 10 **A. That was the value that was supported by the data**  
 11 **at the time, and with new data we updated the**  
 12 **value.**  
 13 **Q.** Right. But with respect to the eastern oyster in  
 14 Apalachicola Bay, they grow to -- at a very old  
 15 age or on the way to being a very old age to more  
 16 than 61.5 millimeters; do they not?  
 17 **A. They do. And that was reflected in the model and**  
 18 **in the original relationship we developed because**  
 19 **you can have oysters that are larger than 61.5**  
 20 **millimeters in the model. As I described,**  
 21 **they're spread around that. So, yes, there were**  
 22 **oysters larger than that in the original**  
 23 **formulation.**  
 24 **Q.** But it's accurate, is it not, sir, that the  
 25 average maximum size, as you described the

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1 conduct an experiment. Do you?  
 2 **A. I'm not sure what you mean by other sources. I**  
 3 **mean, there were literature estimates of growth**  
 4 **from other places, but not from Apalachicola Bay.**  
 5 **Q.** In some of the other parameters that you defined  
 6 in your model, you cite articles -- academic  
 7 articles and such to come up with the proper  
 8 figure, because this has been written about --  
 9 this species has been written about in academic  
 10 articles; and there's information there about  
 11 that. Right?  
 12 **A. That's right. Whenever possible, we use data**  
 13 **from Apalachicola Bay to best represent what was**  
 14 **happening in the bay. But in the case of some**  
 15 **values that there was no information from**  
 16 **Apalachicola, we looked to published literature**  
 17 **sources; that's right.**  
 18 **Q.** I'm sorry. Your testimony, sir, is there was no  
 19 information for Apalachicola with respect to how  
 20 big eastern oysters grow?  
 21 **A. No. There was. There was the information that**  
 22 **Dr. Kimbro collected.**  
 23 **Q.** No. Separate and apart from Dr. Kimbro. Before  
 24 2013, 2012 when Dr. Kimbro went out into the bay,  
 25 was there no information available anywhere in

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1 Florida about how big Apalachicola eastern  
 2 oysters grow?  
 3 **A. There may have been. I did not check because I**  
 4 **had Dr. Kimbro's data in hand, and that was data**  
 5 **that was just collected. I knew the source of**  
 6 **the data, and that was the best data to use.**  
 7 **Q.** I'm sorry. We just have to keep going a little  
 8 slower for madam court reporter.  
 9 I take it you didn't talk to Mr. Berrigan,  
 10 for instance, to ask him what is the average  
 11 maximum size eastern oysters grow to?  
 12 **A. No.**  
 13 **Q.** And I take it you didn't talk to any oystermen in  
 14 Apalachicola Bay to ask them what is the average  
 15 maximum size oysters grow to?  
 16 **A. No.**  
 17 **Q.** And I take it you didn't go to Wikipedia or  
 18 anything like that to see what the average  
 19 maximum size oysters grow to in Apalachicola Bay  
 20 is?  
 21 **A. No.**  
 22 **Q.** Let me ask you to look at, please, an exhibit  
 23 which is pretty large; but I have only got  
 24 flagged a couple of pages that are relevant.  
 25 And for the record, I have handed you, sir,  
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1 **A. Yes.**  
 2 **Q.** That in the Gulf, the oysters can reach harvest  
 3 size, 76 millimeters or 3 inches, in about a  
 4 year-and-a-half or so. Is that right?  
 5 **A. That's what it says, yes.**  
 6 **Q.** This was information available to you when you  
 7 constructed your model?  
 8 **A. Yes.**  
 9 **Q.** And similarly, it goes on to say that at five to  
 10 six years they can get up to 150 millimeters?  
 11 **A. It does say that.**  
 12 **Q.** And you see it even goes up to 300 millimeters.  
 13 But what you used for your parameter in your  
 14 model was 61.5 millimeters. Right?  
 15 **A. That's correct.**  
 16 **This is good example of a difference in the**  
 17 **meaning of the word maximum as it's used sort of**  
 18 **colloquially here or in the usual layperson way**  
 19 **versus the very technical meaning of the**  
 20 **asymptotic maximum growth. Certainly, you could**  
 21 **have oysters growing to very large sizes in the**  
 22 **way I constructed the model because we allow for**  
 23 **spread around that average maximum size. And, in**  
 24 **fact, if you look at the model results, the model**  
 25 **did a very good job of predicting how many**  
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1 what is a joint exhibit, meaning submitted both  
 2 by Florida and by Georgia here, which is JX-62.  
 3 Have you seen this document before, sir?  
 4 **A. I think that I have, although I have not read it**  
 5 **fully recently.**  
 6 **Q.** Okay. Hopefully not, given how long it is.  
 7 Now, this document is called the Oyster  
 8 Fishery of the Gulf of Mexico Regional Management  
 9 Plan. If you wouldn't mind, sir, turning back to  
 10 the flagged page, which is 3-13, the first  
 11 flagged page.  
 12 **A. Yes.**  
 13 **Q.** And if you wouldn't mind taking a look there at  
 14 the -- it's 3-13 at the -- partway down the  
 15 section entitled Growth, the last two paragraphs  
 16 there in that section.  
 17 Actually, just the last paragraph in that  
 18 section.  
 19 **A. Yes.**  
 20 **Q.** It starts with oysters expend.  
 21 **A. Yes. I see that.**  
 22 **Q.** And do you see, sir, that in this regional  
 23 management plan for the Gulf coast oysters, it  
 24 notes that in the Gulf -- which would include  
 25 Apalachicola Bay; would it not?  
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1 **oysters were of, you know, 80, 90, 100, 110**  
 2 **millimeters. And that prediction corresponded**  
 3 **with the observed abundance of oysters of that**  
 4 **size.**  
 5 **So the model was predicting that there were**  
 6 **very large oysters in the bay. In fact, it was**  
 7 **predicting the right number of very large oysters**  
 8 **in the bay.**  
 9 **Q.** Let me ask you, sir, to turn back to your written  
 10 direct testimony. And I would direct you to  
 11 page -- the table is reflected on page 23.  
 12 **A. Yes.**  
 13 **Q.** And now, this is the written direct testimony  
 14 that you submitted for purposes of this case.  
 15 And it has a revised parameter table 1 on it.  
 16 Right?  
 17 **A. That's right.**  
 18 **Q.** And let's go back to the oyster parameters  
 19 section in the middle there. And you have an  
 20 asymptotic maximum size reflected there. Do you  
 21 see that?  
 22 **A. Yes.**  
 23 **Q.** And, again, that's a source from Kimbro expert  
 24 report. That's Dr. Kimbro?  
 25 **A. That's right.**  
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1 Q. And here it appears that you fixed the mistake in  
 2 the first report and have doubled the size more  
 3 or less to 120.35 millimeters. Right?  
 4 **A. I don't characterize it as fixing a mistake. We**  
 5 **received new information and used the best**  
 6 **available information in our updated values.**  
 7 Q. Would you say that this is better information  
 8 than you originally used in the report you  
 9 submitted in February?  
 10 **A. Yes. That's why we -- that's why I used it. If**  
 11 **I did not think it was better information, I**  
 12 **would have not used it.**  
 13 MR. ECHOLS: Okay. We can take that  
 14 down.  
 15 BY MR. ECHOLS:  
 16 Q. Let me change topics, if I could, with you  
 17 please, sir.  
 18 Now, in your original report you submitted,  
 19 sir, you did not look at shelling or reshelling  
 20 at all; is that right?  
 21 **A. That's right. That was not appropriate given the**  
 22 **scope of the modeled analysis.**  
 23 Q. And I think -- tell me if this is correct -- you  
 24 explained you are not an expert in restoration  
 25 ecology?

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1 Q. Were you here in court yesterday, sir?  
 2 **A. Yes.**  
 3 Q. So now, having been here yesterday, you know that  
 4 that statement is incorrect; do you not?  
 5 **A. No.**  
 6 Q. You do not know that it's the case that Florida's  
 7 reshelling activity prior to the 2012 oyster  
 8 collapse was lower than in prior years?  
 9 **A. No. That's not my conclusion.**  
 10 Q. As a matter of the oyster biology, sir, isn't it  
 11 the case it's important to have the shell there  
 12 at least a year or year-and-a-half or so before  
 13 the spat arrives so that the spat has someplace  
 14 to settle?  
 15 **A. In general you have to have some sort of**  
 16 **substrate there for the spat to settle on, yes.**  
 17 Q. And given that it's the case that these baby  
 18 oyster spat grow in about a year,  
 19 year-and-a-half, wouldn't it be more relevant,  
 20 sir, to look at the years prior to the collapse  
 21 to see whether there was shell laid for spat to  
 22 land on?  
 23 **A. Yes.**  
 24 Q. And now, what you do in your chart, however, to  
 25 make the curve look like there's more shelling

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1 **A. That's correct.**  
 2 Q. However, in your written direct here, you make  
 3 some comments about Dr. Lipcius's analysis of the  
 4 reshelling that Florida has done over the past  
 5 couple of decades; do you not?  
 6 **A. Yes.**  
 7 Q. And if you turn -- in your written direct,  
 8 please, if I could refer you back to that,  
 9 page 16, please. Here is the -- are you with  
 10 me, sir?  
 11 **A. Yes.**  
 12 Q. And this is a chart that you included in your  
 13 expert report reflecting that in Dr. Lipcius's  
 14 report, he did this LOESS sort of average curve  
 15 that in red showed that based on his analysis,  
 16 there had been less reshelling over time done by  
 17 Florida in the years prior to 2012. Right?  
 18 **A. Excuse me. Yes.**  
 19 Q. And if you look at what you say down below in  
 20 paragraph 71, the last sentence in that  
 21 paragraph 71 you say is that you disagree with  
 22 Dr. Lipcius's conclusion that shelling was  
 23 declining before the 2012 oyster collapse.  
 24 Right?

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1 taking place is you have included the year 2014.  
 2 Isn't that correct?  
 3 **A. I used the data to create that chart. I simply**  
 4 **took the dataset that Dr. Lipcius had produced as**  
 5 **part of his analysis. I didn't modify the**  
 6 **dataset. I just used the same one.**  
 7 Q. Right. And Dr. Lipcius put this data through  
 8 2013 because the question was how much shelling  
 9 had Florida done prior to and during the  
 10 collapse. Do you recall that?  
 11 **A. I recall seeing that in Dr. Lipcius's -- I think**  
 12 **it was in his prefiled direct testimony, although**  
 13 **my understanding would be that since the collapse**  
 14 **really began in 2012, you would want to only look**  
 15 **at data up to 2012.**  
 16 **And as a matter of fact, just yesterday, to**  
 17 **check my assumptions about that, if you conduct**  
 18 **that same analysis that I did and exclude data --**  
 19 **only include data, excuse me, up until 2012, you**  
 20 **see exactly the same pattern.**  
 21 **Although I also want to clarify, the point of**  
 22 **my creating that blue curve was really just to**  
 23 **illustrate that drawing that kind of line is not**  
 24 **a really valid statistical test. Dr. Lipcius**  
 25 **created the red line. Creating that line in a**

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1 **certain way averaging over a certain time period,**  
 2 **it happens to show decline. If you choose a**  
 3 **different time window, you can show an incline or**  
 4 **decline. It's a very arbitrary approach to**  
 5 **drawing a trend line and not really a valid way**  
 6 **of describing a statistically meaningful pattern.**  
 7 **The approach that Dr. Kimbro took is really**  
 8 **better because in that way, you can include**  
 9 **confidence intervals and actually say with**  
 10 **statistical certainty what was happening.**  
 11 **Q.** Just for madam court reporter, if you would.  
 12 But the question being whether Florida's  
 13 reshelling activity prior to the collapse was  
 14 increasing or decreasing, you would want to look  
 15 to that reshelling activity prior to the  
 16 collapse. Would you agree with me, sir?  
 17 **A. Yes. And as Dr. Kimbro's analysis showed, it was**  
 18 **not different from historical norms.**  
 19 **Q.** Yes. We took care of that yesterday. And you  
 20 were here, and you saw that that was entirely  
 21 inaccurate.  
 22 Now, with this particular chart the way you  
 23 have done it, by including 2014, the blue line  
 24 makes it look like Florida's shelling efforts  
 25 have increased or were on the uptake before the

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1 collapse. Correct?  
 2 **A. If you take out the data from 2014, the line**  
 3 **changes, yes.**  
 4 **Q.** It's -- are you trying to communicate to the  
 5 Court that Florida's efforts on reshelling prior  
 6 to 2012 were increasing?  
 7 **A. Well, if you redo that analysis, only including**  
 8 **data up to 2012, yes; it still shows that the --**  
 9 **the blue line shows that it's increasing,**  
 10 **although as I said before, I don't rely on that**  
 11 **type of curve to make a statistical judgment**  
 12 **about what was happening or not. That's not an**  
 13 **appropriate way to charge a trend or not.**  
 14 **Q.** Can we look at our shelling exhibit that we used  
 15 before, please.  
 16 Now, the Court has seen this a number of  
 17 times before. I'm not sure if you saw it  
 18 yesterday. But this is based on the official  
 19 Florida state records about the amount of  
 20 shelling that was taking place. And I just want  
 21 to ask you to confirm that in your expert  
 22 analysis, what this shows is that Florida's  
 23 shelling was increasing prior to 2012, the  
 24 collapse?  
 25 **A. Without doing a statistical analysis of my own on**

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1 **this particular data, I'm relying on the analysis**  
 2 **of Dr. Kimbro which does show that, at the very**  
 3 **least, the shelling in that time period was --**  
 4 **was comparable to the long-term average.**  
 5 **Q.** Can we go back to Dr. White's chart with the  
 6 lines here. One of the other things that you  
 7 state in your direct testimony is that  
 8 Dr. Lipcius, you say, skewed the results because  
 9 he -- because he included the very aggressive  
 10 high shelling that Florida did after Hurricane  
 11 Elena. Do you recall that?  
 12 **A. Yes. I wouldn't say he skewed it because he**  
 13 **included that, but merely the way he calculated**  
 14 **that line gave very high weight to -- to that**  
 15 **particular datapoint, and that if you calculate**  
 16 **the line in that way, it inevitably leads to**  
 17 **showing a decline from that unusually high point**  
 18 **in the mid-1980's down towards the 2010's.**  
 19 **Q.** And if I can direct you in your written  
 20 testimony, please, to paragraph 70 which is on  
 21 page 15, and if you would read that to yourself,  
 22 sir. This is where you describe how you think  
 23 Dr. Lipcius made the curve look like there was a  
 24 decrease in shelling by including the  
 25 extraordinary reshelling efforts in 1986 and

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1 1987. Correct?  
 2 **A. Yes.**  
 3 **Q.** And it is the case, is it not, that when that  
 4 fishery collapse took place after the hurricanes,  
 5 Florida did engage in some extraordinary  
 6 reshelling efforts. Right?  
 7 **A. It's my understanding that that is why there were**  
 8 **really high reshelling numbers for those years.**  
 9 **Right.**  
 10 **Q.** That's what you testified to. Right?  
 11 **A. Yes.**  
 12 **Q.** And part of the reason Florida engaged in that  
 13 extraordinary reshelling effort during that  
 14 period is because they wanted the oyster fishery  
 15 to come back. This was an important restoration  
 16 effort. Right?  
 17 **A. It is my understanding that because there was**  
 18 **considerable habitat destruction, they had to add**  
 19 **shell to create a new habitat, yes.**  
 20 **Q.** And the habitat wasn't very good during this  
 21 current collapse either, was it, in 2012-2013?  
 22 You have seen documents attesting to that?  
 23 **A. I'm aware that there were some places where there**  
 24 **was poor habitat and some places where there was**  
 25 **good habitat, although I want to clarify that**

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1 **habitat is a very broad term.**  
 2 **And there are multiple aspects of oyster**  
 3 **habitat. There is the shell that has to be**  
 4 **present. Another aspect of oyster habitat is the**  
 5 **water column, the water conditions. And it's**  
 6 **possible to have shell present, but have poor**  
 7 **water conditions. And if you have poor water**  
 8 **conditions, the oysters won't be able to survive**  
 9 **even if there is shell present.**  
 10 **Q.** If I could refer you back, please, sir, we have  
 11 had through a number of witnesses the discussion  
 12 with the Court and the witnesses about the amount  
 13 of shelling that Florida did after Hurricane  
 14 Elena. But each time, unfortunately, I haven't  
 15 had the exact numbers in front of me. But I have  
 16 now in JX-62, that giant document, the second  
 17 page that we have flagged. You know, this is  
 18 what we in Georgia were referring to to be able  
 19 to identify how much shelling was actually done.  
 20 And so back on the page which is 16-36, do  
 21 you see that?  
 22 **A. Yes.**  
 23 **Q.** Okay. And the hurricane was around the time  
 24 period of 1985-ish, I believe. Does that sound  
 25 about right?  

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1 **A. Without checking.**  
 2 **Q.** Yes.  
 3 **A. Somewhere in there.**  
 4 **Q.** Somewhere in there.  
 5 If we go to the very bottom of this table,  
 6 this is table 16-two in -- on page 16-36. We  
 7 have here some of the shelling activity that  
 8 Florida engaged in back after the hurricane in  
 9 order to help the oyster fishery to restore. Do  
 10 you see that?  
 11 **A. Yes.**  
 12 **Q.** And this is one of the sources you -- that  
 13 Dr. Lipcius used and that you used in that prior  
 14 chart with the curve. Right?  
 15 **A. That's right. I saw Dr. Lipcius's data. I**  
 16 **didn't check the source or anything.**  
 17 **Q.** And what we have here that Florida did then when  
 18 there was an oyster collapse is it engaged in, as  
 19 you described it, extraordinary reshelling  
 20 effort. So we have -- for instance, in  
 21 Apalachicola Bay in 1986, we have got 120 acres  
 22 that were shelled with processed oyster shell,  
 23 and in that very same year another 225 acres that  
 24 were shelled with oyster shell as part of the  
 25 effort to restore the fishery. Right?  

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1 **A. Yes.**  
 2 **There was habitat destruction. There was an**  
 3 **effort to restore the cultch habitat.**  
 4 **Q.** And Florida continued this extraordinary shelling  
 5 effort in 1987. If we can go and flip over to  
 6 the next page.  
 7 Actually, it looks like I -- that's east bay.  
 8 So there was shelling taking place in more  
 9 locations.  
 10 But in 1987, as you can see, we had some  
 11 additional major shelling taking place in  
 12 Apalachicola Bay. We had one batch of 160 acres  
 13 and another batch of 60 acres that were  
 14 reshelled. Correct?  
 15 **A. That's right.**  
 16 **Q.** And this was a good management activity that  
 17 Florida was engaging in at this point in time to  
 18 restore the fishery after the collapse. Would  
 19 you agree?  
 20 **A. It's my understanding, not being an expert on**  
 21 **oyster reshelling per se, but that if you have**  
 22 **habitat destruction that has removed or silted**  
 23 **over oyster shells, then you would need to add in**  
 24 **new oyster shell to provide habitat. And that**  
 25 **will work only if the water column conditions,**  

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1 **if the salinity and temperature of the water is**  
 2 **suitable for oyster growth. If that -- if**  
 3 **those -- and I presume that following the**  
 4 **hurricane, that would be typical of the type of**  
 5 **disturbance that might silt over a lot of shell.**  
 6 **So you would need to add shell back in. But the**  
 7 **salinity and temperature in the water would be**  
 8 **just fine, and so you would have good oyster**  
 9 **growth. If you don't have proper salinity**  
 10 **conditions, then adding shell doesn't do anything**  
 11 **because the oysters can't grow anyway.**  
 12 **Q.** You do know, sir, do you not, that the salinity  
 13 and conditions in the bay in 2013, '14, and '15  
 14 were pretty good?  
 15 **A. Without looking at specific data, I'm aware that**  
 16 **there was more rain in 2013, for example, and the**  
 17 **salinity -- there were periods of lower salinity,**  
 18 **yes.**  
 19 **Q.** And the drought had ended, and so the  
 20 environmental conditions in the bay were in  
 21 circumstances that it would have been helpful for  
 22 there to be some shell for the spat to land on so  
 23 that they could grow up and repopulate the  
 24 fishery. Right?  
 25 **A. Without specifically examining the salinity. You**  

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1 **know, my analysis ended in the end of 2012; so I**  
 2 **haven't looked specifically at what those**  
 3 **salinities were to make that judgment.**  
 4 **Q.** Sir, are you familiar with the -- we have looked  
 5 at it quite a bit yesterday; so you probably saw  
 6 the University of Florida Sea Grant report, the  
 7 oyster task force -- Dr. Kimbro was a part of it,  
 8 Dr. Pine, Dr. Havens -- when they were  
 9 investigating the cause of the collapse. Do you  
 10 recall that?  
 11 **A. Yes.**  
 12 **Q.** And do you know, sir, that that report also has  
 13 some suggestions about the level of reshelling  
 14 that Florida should engage in in order to assist  
 15 the recovery of the bay?  
 16 **A. You know, I have not read that recently. I would**  
 17 **like to look at the exact comments before --**  
 18 **before commenting on that.**  
 19 **Q.** Yes. I want to do exactly that.  
 20 And for the record, I have handed you, sir,  
 21 the oyster situation report which is GX-568 --  
 22 which we looked at for quite awhile yesterday.  
 23 And I would direct you, if I could, to page 5.  
 24 And do you see on the left-hand side there's a  
 25 column titled Management and Restoration. Are

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1 you with me, sir?  
 2 **A. Yes.**  
 3 **Q.** And if you go down, if we could --  
 4 MR. ECHOLS: What is it, the second to  
 5 last bullet, if we could show the whole  
 6 thing, please.  
 7 BY MR. ECHOLS:  
 8 **Q.** On that left-hand side that begins management  
 9 actions such as shell planting, are you with me,  
 10 sir?  
 11 **A. Yes.**  
 12 **Q.** And this is again, you're aware, the report put  
 13 together by a number of scientists who were  
 14 tasked with looking at what should Florida be  
 15 doing to assist the oyster fishery to recover.  
 16 Right?  
 17 **A. Yes.**  
 18 **Q.** And in this report from April 2013 -- so shortly  
 19 after the collapse -- these scientists together  
 20 put in this management and restoration section  
 21 that management actions like shell planting would  
 22 help expedite recovery; isn't that true?  
 23 **A. That's what it says, yes.**  
 24 **Q.** And do you see in the middle of that paragraph  
 25 how much shelling they suggest should be done?

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1 **A. Yes.**  
 2 **Q.** And how much is that, sir?  
 3 **A. They suggest, based on this modeling tool**  
 4 **ECOSPACE, that approximately 200 acres per year**  
 5 **for five years is what they recommend.**  
 6 MR. ECHOLS: Can we put my shelling  
 7 chart back up, please.  
 8 BY MR. ECHOLS:  
 9 **Q.** So we can all agree, I think, can we not, sir,  
 10 based on the official state records that Florida  
 11 has not been engaging in 200 acres of reshelling  
 12 per year since the collapse. Correct?  
 13 **A. I agree.**  
 14 **Q.** And, in fact, in the prior 10 years before the  
 15 collapse, Florida did not reshell even a total of  
 16 200 acres. It's only 180?  
 17 **A. That's right.**  
 18 **Q.** And do you know how much Florida spent in 2013  
 19 when it shelled 16 acres?  
 20 **A. No, I'm not familiar with the dollar values.**  
 21 **Q.** It's in the -- that same official state record.  
 22 It's slightly less than \$110,000. Were you aware  
 23 of that?  
 24 **A. No.**  
 25 **Q.** I would like to change topics again. Well,

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1 actually, this is slightly related.  
 2 If you go to your written direct, the table,  
 3 again, of the parameters which was page 23,  
 4 please.  
 5 **A. Thank you.**  
 6 **Q.** And do you see that's where the table starts,  
 7 this revised parameter table. But then it  
 8 continues onto the next page, if you would take a  
 9 look on page 24. And right above there, sir, the  
 10 bolded grille parameters, you have a parameter  
 11 identified as dead shell erosion rate. Do you  
 12 see that?  
 13 **A. Yes.**  
 14 **Q.** Could you please explain to the Court what dead  
 15 shell erosion rate is.  
 16 **A. Excuse me. Yes. So the way the model operates**  
 17 **in order to represent all the different important**  
 18 **factors, the biology of the oyster, you have**  
 19 **adult oysters growing and producing larger and**  
 20 **larger shell. And when they die, for example,**  
 21 **due to predation, their shell gets left behind.**  
 22 **And the model keeps track of how much dead shell**  
 23 **there is sitting there on the bar, which is**  
 24 **important because that's the habitat that the**  
 25 **juvenile oysters have to settle to.**

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1 **Dead shell doesn't just stay there forever.**  
 2 **It gradually dissolves in the water essentially.**  
 3 **And so this dead shell and erosion rate is the**  
 4 **rate at which that shell will break up and**  
 5 **dissolve and disappear over time.**

6 **Q.** But it is a gradual process, is it not, from when  
 7 the shell breaks up and erodes over time?

8 **A. That's right. It is a -- it's a -- it takes**  
 9 **several years is my understanding.**

10 **Q.** And if you, hopefully, will take my word for it,  
 11 I asked Dr. Lipcius to, again, create a graph so  
 12 we could see just how long this lasts.

13 MR. ECHOLS: And if we could have that  
 14 demonstrative, please, of that shell erosion  
 15 rate.

16 MR. LEOPOLD: Your Honor, I just want to  
 17 note for the record that this exhibit was not  
 18 shared in advance with counsel.

19 MR. ECHOLS: This is graphing the  
 20 parameter, your Honor, in Dr. Kimbro's report  
 21 so we can all understand it a little bit  
 22 better.

23 BY MR. ECHOLS:

24 **Q.** And if it's totally off, please let the Court  
 25 know. But what I tried to do is in the best,

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1 **an estimate of the oysters in Apalachicola Bay in**  
 2 **Dr. Powell's study.**

3 **Q.** And, once again, if you say 50 percent or so,  
 4 there would be 50 percent of shell remaining, if  
 5 you draw the line across, that hits around six  
 6 years or so. Does that seem about accurate?

7 **A. Roughly, yes.**

8 MR. ECHOLS: And we can take that down.

9 BY MR. ECHOLS:

10 **Q.** Now, part of the work that you and Dr. Kimbro did  
 11 reaches conclusions about the extent of predation  
 12 by the rock snail; is that true?

13 **A. That's right.**

14 **Q.** And the basic way predation by the rock snail  
 15 works is it lands on a live oyster and kills it,  
 16 either by boring a hole in the top or going  
 17 through the lip part and then eating the meat  
 18 out. Is that about right?

19 **A. That's right.**

20 **Q.** And when it does this, the shell is left behind,  
 21 which we have talked about before is typically  
 22 called a gaper or a box. Does that sound right?

23 **A. That's right. And that's also how it was**  
 24 **represented in the model, yes.**

25 **Q.** And so what happens when you have large-scale

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1 most accurate way make it easier for us to  
 2 understand what this dead shell erosion rate  
 3 meant. And at least based on our running the  
 4 graphing calculator, we came up with a curve that  
 5 shows we have got percent of shell remaining on  
 6 the left-hand side; and then we have got years  
 7 across the bottom.

8 And so if this is accurate and if we're  
 9 reading it correctly, would that suggest, for  
 10 instance, that after two years you should have  
 11 about 80-some percent shell remaining based on  
 12 the erosion rate?

13 **A. Yes.**

14 **Q.** And that's -- I mean, that's not inconsistent  
 15 with your understanding; is it?

16 **A. That's right. You know, this -- this particular**  
 17 **parameter is one I obtained from a published**  
 18 **study by Dr. Eric Powell. So it seems to be**  
 19 **correct.**

20 **Q.** This is one that you didn't have to do an  
 21 experiment to figure out because you could just  
 22 go to the academic literature, and it's already  
 23 been published about what the dead shell erosion  
 24 rate is. Right?

25 **A. That's correct. And it's my understanding it was**

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1 predation by rock snails, you should have a lot  
 2 of shell left on the floor of the bay; should you  
 3 not?

4 **A. Certainly right after the predation you would**  
 5 **certainly see a lot of shell, yes.**

6 **Q.** Is it your understanding, sir, that this shell  
 7 would typically disappear, be washed away by  
 8 tides or something like that; or would you expect  
 9 that it would remain?

10 **A. That's a little bit beyond my expertise as an**  
 11 **oyster field biologist. I know in discussing**  
 12 **things with Dr. Kimbro in developing the model,**  
 13 **that it's certainly possible for tidal currents**  
 14 **to move things around. Certainly, there's --**  
 15 **things can be silted over and things like that.**

16 **Q.** You wouldn't expect that if you have a  
 17 substantial amount of dead shell at the bottom of  
 18 the bay, that it's just going to wash away in any  
 19 short amount of time; would you?

20 **A. Again, that is really beyond my expertise, not**  
 21 **being somebody who spends time in the field in**  
 22 **Apalachicola Bay.**

23 **Q.** Well, this dead shell, at least you -- is a good  
 24 substrate, you know, if conditions are good for  
 25 spat to land on and then grow up to be adult

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1 oysters; is that right?

2 **A. Yes. I agree that, as you say, given good**

3 **conditions, it's good habitat.**

4 **Q.** Were you here when we were looking at pictures

5 with Dr. Kimbro of the experiments that were

6 being conducted in January 2013?

7 **A. Yes.**

8 **Q.** And did you see there that at least in this one

9 area where his research assistants had laid down

10 the quadrats, they came up with no shell

11 whatsoever. Do you recall that?

12 **A. I remember that photograph, yes.**

13 **Q.** And so that would be a situation where we don't

14 have a lot of dead shells present, you know, from

15 a claimed predation event. Right?

16 **A. In that particular quadrat, that's right.**

17 **Q.** So those shells are gone. So they either washed

18 away or the shell had been picked up out of the

19 water, maybe through harvesting or some other

20 method. Correct?

21 **A. That is a possibility. Another possibility would**

22 **be, for example, that that -- the random sampling**

23 **procedure that they did happened to put a quadrat**

24 **down in a place where there hadn't been a lot of**

25 **oysters beforehand and hadn't been a lot of**

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1 **predation. It's hard -- it's impossible to say**

2 **without knowing more information.**

3 **Q.** So it's possible then it was a mistake for them

4 to test that section with their quadrat sampling?

5 **A. No. That would be part of the point of doing**

6 **random sampling is to get an unbiased estimate of**

7 **what's present in the bay.**

8 **Q.** But you would agree, as we just went through, the

9 shell didn't erode and disappear, you know,

10 between mid-2012 and January 2013?

11 **A. Based on, you know, the rates of erosion alone, a**

12 **shell can't dissolve in -- totally in that amount**

13 **of time, no.**

14 **Q.** Given that harvesting is one particular method of

15 the shells being removed from the bay, let's

16 change topics and talk a little bit about

17 harvesting, if we could, please, sir.

18 **A. Yes.**

19 **Q.** And if I could refer you back to your written

20 direct to paragraph 165, which is on the very

21 back of the written direct. It's on the total

22 back side, last page.

23 **A. Yes.**

24 **Q.** And here you are saying that based on your model,

25 which you created to assess whether Georgia water

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1 consumption was related to the oyster collapse,

2 your model generates a harvest rate. Is that

3 accurate?

4 **A. That's right. It estimates what proportion of**

5 **oysters would have to be withdrawn from the bay**

6 **or withdrawn from Cat Point Bar in order to**

7 **accurately predict how many oysters are -- were**

8 **observed in the fishery with the dataset; that's**

9 **right.**

10 **Q.** And that's right that in connection with your

11 initial model that you did, you only analyzed Cat

12 Point, a single oyster bar, not any others.

13 Right?

14 **A. That's right. The model requires salinity data,**

15 **and it also requires very high resolution**

16 **observations. And so Cat Point was the one bar**

17 **in the bay that both had a long-term salinity**

18 **record collected by the national Estuarine**

19 **Research Preserve, and it was also very intensely**

20 **sampled by DACS. So it was the best dataset to**

21 **analyze.**

22 **Q.** And if we still can just slow down a little bit,

23 please, sir.

24 And after we pointed out or Dr. Lipcius

25 pointed out you had only sampled one oyster bar,

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1 you, prior to submitting your written direct, did

2 another one. You added Dry Bar. Right?

3 **A. That's right. Just to confirm that there was no**

4 **need to -- to confirm that if you did analyze a**

5 **different dataset, you would obtain a similar**

6 **result. The Dry Bar dataset was not as -- not**

7 **sampled as frequently by DACS; so it wasn't an**

8 **ideal one to use. But we did analyze it and**

9 **found a similar outcome.**

10 **Q.** Do you think it was appropriate to -- strike

11 that.

12 You weren't here when Mr. Berrigan testified;

13 were you?

14 **A. No, I was not.**

15 **Q.** But you know generally that Mr. Berrigan is --

16 had been in charge of DACS and the resource

17 sampling for about 30 years in Apalachicola Bay.

18 Right?

19 **A. Yes.**

20 **Q.** And are you aware, sir -- let me ask you this.

21 Is it your position that different oyster reefs

22 are essentially their own individual ecosystems?

23 **A. That's not the way I would -- I would describe it**

24 **because different oyster reefs are connected.**

25 **For example, larvae produced in one reef can**

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1 **travel throughout the bay and settle on a**  
 2 **different reef. So they're connected. I**  
 3 **wouldn't call them independent or something like**  
 4 **that. But I would certainly agree that reefs at**  
 5 **different parts in the bay exposed to different**  
 6 **salinity conditions would be expected to have**  
 7 **different patterns of change over time.**  
 8 **Q.** So you wouldn't agree that -- that different  
 9 oyster reefs are different as far as the level of  
 10 growth and amount of oysters depending on where  
 11 they are in the bay and the salinity conditions  
 12 that they're exposed to?  
 13 **A. I'm sorry. Could you restate that question? I'm**  
 14 **not sure I -- I'm unsure what you're asking.**  
 15 **Q.** Sure. No. You used, at least originally, Cat  
 16 Point Bar only as the reference for your model.  
 17 Correct?  
 18 **A. That was the dataset that the model was**  
 19 **describing. Yes.**  
 20 **Q.** And despite that others may have testified that  
 21 it's impossible to draw conclusions from one reef  
 22 to the entire bay, you disagree with that?  
 23 **A. I -- I'm not sure I have seen any testimony that**  
 24 **says that specifically. I know, for example,**  
 25 **Dr. Kimbro testified yesterday --**  

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1 **Q.** Slower.  
 2 **A. Dr. Kimbro testified yesterday that different**  
 3 **reefs are different in salinity and other**  
 4 **factors. And as long as you account for those**  
 5 **factors when drawing conclusions, you can**  
 6 **certainly extrapolate patterns from one bar to a**  
 7 **different bar.**  
 8 **Q.** And with apologies, I don't have this in hard  
 9 copy; but just to make sure that I'm not doing  
 10 this on my own, I'm putting in front of you what  
 11 is -- has been said --  
 12 MR. ECHOLS: Do you have that --  
 13 Berrigan?  
 14 BY MR. ECHOLS:  
 15 **Q.** And, again, apologies; I don't have the hard  
 16 copy, but we'll blow it up.  
 17 If you look at the very bottom of page 148 --  
 18 we'll make it big here so you can see it -- there  
 19 is an answer that he says, I probably identified  
 20 it quite often.  
 21 And this is in the deposition testimony. And  
 22 we used this when Mr. Berrigan was here on  
 23 Friday, so it's also in the trial testimony.  
 24 And Mr. Berrigan there was explaining that  
 25 what happens on one reef, in his view having been  

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1 there for 30 years, is not a good representation  
 2 of what to expect for the rest of the bay;  
 3 they're individual ecosystems. He goes on and  
 4 says, it's difficult to make a statement of one  
 5 size fits all.  
 6 And if we look over, as we continue to the  
 7 next page, he says, specifically, as a matter of  
 8 fact, it's impossible. It shouldn't be done.  
 9 I take it you are not in agreement with  
 10 Mr. Berrigan?  
 11 **A. I'm sorry. I just want to be clear about what**  
 12 **we're looking at here. Is this Dr. Berrigan's --**  
 13 **Mr. Berrigan's deposition?**  
 14 **Q.** Yes. This is Mr. Berrigan's sworn testimony in  
 15 deposition back when I deposed him. And he also  
 16 testified to this on the stand on Friday.  
 17 **A. Right. And it's not possible to have a hard copy**  
 18 **of this?**  
 19 **I know, having looked at the deposition**  
 20 **before, there is a broader context of these**  
 21 **statements. I would like to review that, if**  
 22 **that's possible.**  
 23 **Q.** Is it too small for you to read on the screen?  
 24 **A. No. I'm sorry. For example, I can't see the**  
 25 **question that was asked or -- I know there's**  

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1 **other information around this time in the**  
 2 **deposition.**  
 3 **Q.** I'll let you --  
 4 MR. LEOPOLD: Your Honor --  
 5 BY MR. ECHOLS:  
 6 **Q.** The way this process works, your counsel will  
 7 have a chance to ask you questions after. So I'm  
 8 sure, to the extent there is something else that  
 9 I'm missing, he will refer you to it.  
 10 MR. LEOPOLD: Your Honor, we would  
 11 request that counsel give the witness the  
 12 entire transcript so he can have it during  
 13 this section of questioning.  
 14 MR. ECHOLS: I'm actually done, judge.  
 15 BY MR. ECHOLS:  
 16 **Q.** Let's go back to harvesting and paragraph 165 of  
 17 your direct testimony.  
 18 **A. Yes.**  
 19 **Q.** And your testimony to this Court is that based on  
 20 your model, the harvest rates preceding and  
 21 during the collapse were consistent with or lower  
 22 than historical harvest rates. Is that accurate?  
 23 **A. Yes.**  
 24 **Q.** And if we look at our chart that we have used a  
 25 couple of times on landings --  

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1 **A. Thanks.**

2 **Q.** And so now, sir, what we have here is the

3 official Florida state landings data from FWC.

4 And it's correct, is it not, as a general matter,

5 that harvested oysters are supposed to show up in

6 landings data?

7 **A. Yes. That's my understanding, yes.**

8 **Q.** And I take it you have seen landings data before,

9 whether here or in other of your work. Right?

10 **A. Yes.**

11 **Q.** And now, is your testimony to this Court that

12 despite the fact that the official state data

13 from the State of Florida shows that in 2011,

14 2.81 million pounds of oysters were harvested and

15 in 2012, 3.03 million pounds of oysters were

16 harvested, that these are inaccurate and, in

17 fact, that the harvest rates preceding and during

18 the collapse were consistent with or lower than

19 historical harvest rates?

20 **A. No. That's not correct. These two things are**

21 **not in any sort of conflict. The landings data**

22 **that we're looking at, these are fishery -- what**

23 **we call fishery-dependent data. So this is**

24 **what's reported by the harvesters as they're**

25 **coming off the water. That's the amount of**

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1 **oysters in pounds or tons that they're taking off**

2 **the reef. That's different than the harvest**

3 **rate that I have estimated from the**

4 **fishery-independent dataset, which is talking**

5 **about the proportion of the resource that's on**

6 **the reef that was harvested.**

7 **For example, if you had, say, a bar with a**

8 **thousand oysters on it, if you were taking 10**

9 **percent of the oysters every year, for example,**

10 **if the bar stays the same size, you will always**

11 **get 100 oysters. If the bar gets bigger in a**

12 **particular year and you're still taking 10**

13 **percent, you would get -- let's say if the bar**

14 **doubles in size, you would then get double the**

15 **amount of oysters that you took, even though**

16 **you're harvesting at the same rate.**

17 **So the landings data -- the fishery-dependent**

18 **data don't give the whole picture because you**

19 **don't know how many oysters are actually on the**

20 **bar. That's what the fishery-independent data**

21 **from DACS is telling us. And that's why I based**

22 **my analysis on that, not simply on the landings**

23 **data.**

24 **Q.** So as you just explained then, in order for

25 this -- these harvest amounts, the 2.81 million

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1 and the 3.03 million pounds of oysters to be

2 harvested in those years, in order for the rate

3 of harvest in those years to be the same as even

4 this year where there is .82, there must be a ton

5 of oysters out there to get to that rate. Right?

6 I mean, you probably have to have 10 million

7 pounds of oysters out on the bar for this rate to

8 be the same as here?

9 **A. I wouldn't want to speculate on exactly what the**

10 **number is; but it suggests because the -- because**

11 **the fishery-independent dataset estimates that**

12 **the harvest rate was consistent, that means that,**

13 **yes, the likely explanation for that is that**

14 **there were more -- that there was a good crop of**

15 **the oysters in the '11, early '12 period.**

16 **Q.** So what your model shows is that there was an

17 excellent, historically great, higher than ever

18 crop of oysters out there in Apalachicola Bay in

19 2011 and 2012?

20 **A. That's right. And that's also consistent with**

21 **the data I have examined from -- the**

22 **fishery-independent data that I examined from Cat**

23 **Point Bar that the model was fit to.**

24 **Q.** All right. Let me change topics.

25 Well, as a general matter, sir, you have had

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1 access during the course of working on your

2 expert report to state documents like the DACS

3 resource assessment reports; have you not?

4 **A. Yes.**

5 **Q.** And do you recall at least in a general sense

6 that there were references in the 2011 and 2012

7 time period to overharvesting and sub-legal

8 harvesting?

9 **A. I would want to look at an actual document before**

10 **characterizing it. It has been a little while**

11 **since I read some of those.**

12 **Q.** All right. Well, I think the Court has seen them

13 enough. I'm not going to bother to pull up what

14 we have looked at before.

15 It's your opinion, however, sir, that there

16 was not overharvesting and sub-legal harvesting

17 taking place to any significant level. Right?

18 **A. Well, it's important to recognize that although**

19 **the -- the DACS reports and other things were**

20 **based on this fishery-independent dataset, they**

21 **weren't actually making the same type of fishery**

22 **calculations that I was in my model. They**

23 **weren't actually calculating a harvest rate in**

24 **the way that a -- say, a fishery stock assessment**

25 **would.**

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1 **And that's the analysis that I performed. So**  
 2 **my analysis of the data is able to provide the**  
 3 **actual estimate of what was happening with the**  
 4 **harvest. And, yes, it shows that there was no**  
 5 **increase.**  
 6 **Q.** And I think, as you previously at least described  
 7 it to me, that you, because you're using the  
 8 scientific method, don't look to anecdotes and  
 9 speculation about overharvest that might be out  
 10 there that people would say?  
 11 **A. That's right. The model has to use actual**  
 12 **scientific data. It has to have a mathematical**  
 13 **relationship. There's not a good way to plug in**  
 14 **sort of anecdotal reports and things of that**  
 15 **nature.**  
 16 **Q.** And anecdotal reports, you don't take those into  
 17 account or plug them in even if they're in  
 18 official Florida state documents year after year.  
 19 Right?  
 20 **A. If there's no data or mathematical results, it's**  
 21 **not possible to translate that into something**  
 22 **that can actually describe what's happening with**  
 23 **the oyster population.**  
 24 **Q.** I want to change topics again, please, sir. If I  
 25 could refer you back to your written direct,

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1 paragraph 114, page 30. Now, here, sir, in your  
 2 written direct you are, again, criticizing or  
 3 critiquing something that Dr. Lipcius had in his  
 4 report; is that accurate?  
 5 **A. That's right.**  
 6 **Q.** And what you say is that you looked at his  
 7 analysis of how oysters increased or declined in  
 8 abundance on reefs that were harvested and reefs  
 9 that were not harvested. Right?  
 10 **A. That's right. I -- it's my understanding from**  
 11 **looking at the numbers that the reefs that**  
 12 **Dr. Lipcius was looking at, the ones that he**  
 13 **calls the sort of unharvested bars, those are**  
 14 **bars that actually do have harvest; but**  
 15 **they're -- some of them were summer bars or**  
 16 **things like that. They were not perhaps the most**  
 17 **heavily-targeted bars.**  
 18 **Q.** So that we're not speaking in the abstract, let  
 19 me give the Court and you the specific analysis  
 20 that I'm referring to.  
 21 MR. ECHOLS: And for the record, this is the  
 22 submitted direct testimony of Dr. Lipcius,  
 23 Georgia's oyster expert.  
 24 BY MR. ECHOLS:  
 25 **Q.** And you have read this; have you not?

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1 **A. Yes.**  
 2 **Q.** And if I could direct you, please, to page 12.  
 3 MR. ECHOLS: And if we could, please,  
 4 blow up the chart, the Lipcius dem 3.  
 5 BY MR. ECHOLS:  
 6 **Q.** And this is part of the analysis that you are  
 7 responding to; is that right?  
 8 **A. That's right.**  
 9 **Q.** And so the Court understands what you're  
 10 responding to in your written direct, what  
 11 Dr. Lipcius did is look at eight -- one, two --  
 12 nine different bars in Apalachicola Bay, four of  
 13 which we have heard a lot of discussion about  
 14 because they're the generally-harvested,  
 15 productive bars, North Spur, Dry Bar, Cat Point,  
 16 and East Hole. And he also looked at some bars  
 17 that are less harvested and some, as we talked  
 18 about with Mr. Sutton, and others had been  
 19 reshelled. And those we have as the nonmajor  
 20 fish bars. And you understand the analysis that  
 21 Dr. Lipcius did here; do you not?  
 22 **A. Generally speaking, yes. I didn't look at the**  
 23 **exact code he used to produce this analysis, but**  
 24 **generally speaking, yes.**  
 25 **Q.** Well, you critiqued it and said he was mistaken.

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1 You didn't look at his analysis?  
 2 **A. I critiqued it based on the possibility of a**  
 3 **compounding factor in the analysis that he hadn't**  
 4 **accounted for.**  
 5 **Q.** And you say that the compounding factor is he  
 6 failed to take into account salinity. Right?  
 7 **A. That's right. As we were discussing earlier,**  
 8 **bars at different places in the bay have**  
 9 **different environmental conditions. And it**  
 10 **happens that the way the bars for this analysis**  
 11 **were selected, the so-called major harvested bars**  
 12 **are further away from the mouth of the river; so**  
 13 **they all tend to be -- they all tend to have**  
 14 **higher salinities in general and be less**  
 15 **influenced by the river. And most of the bars**  
 16 **colored in blue, the nonmajor harvested bars, as**  
 17 **he calls them, are more influenced by the river.**  
 18 **So that environmental factor alone would be**  
 19 **expected to lead to differences among the bars**  
 20 **independent of any other factor that could be**  
 21 **happening.**  
 22 **Q.** And I'm going to go back to your direct  
 23 testimony as soon as we make sure that it's  
 24 clear what this shows. What this analysis  
 25 shows is that for the harvested bars, the more

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1 heavily commercially-harvested bars, before the  
 2 collapse -- and this is for legal oysters; the  
 3 next page has sub-legal. This is for legal  
 4 oysters. Before the collapse, for instance, on  
 5 North Spur, there was some abundance of  
 6 legal-size oysters; but that post the collapse,  
 7 there were very few legal-size oysters. Right?

8 **A. That's right. Calculated over these fairly broad**  
 9 **time intervals from 2008 to 2012 for the pre and**  
 10 **'12 to '14 for the post, yes.**

11 **Q.** And you can see a similar pattern for Cat Point,  
 12 for East Hole, for Dry Bar. But what is  
 13 interesting is that even if you take a bar like  
 14 Hotel Bar, which is close to East Hole, so  
 15 generally you would expect similar salinity  
 16 conditions?

17 **A. Broadly speaking, I would say so.**

18 **Q.** Broadly speaking.  
 19 But if you had a bar that was not harvested,  
 20 that before the collapse you had a particular  
 21 abundance of oysters, but even after the collapse  
 22 there were more, that's the way you understand  
 23 this analysis. Right?

24 **A. Well, without having a more detailed**  
 25 **understanding of this and without checking, I**

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1 **averaged over such broad windows.**

2 **Q.** Let's go back to your written direct so the Court  
 3 understands what your analysis of this was. On  
 4 page 31, please.

5 **A. Yes.**

6 **Q.** And is this the right page, sir, where at least  
 7 in part you critique and criticize and explain  
 8 how in your opinion Dr. Lipcius was mistaken?

9 **A. That's right. Again, I did not redo his analysis**  
 10 **or examine the way he calculated oyster densities**  
 11 **or anything like that. But I did want to**  
 12 **illustrate the potential compounding factor of**  
 13 **salinity that could be clouding his analysis.**

14 **Q.** But you don't list here, do you, sir, the  
 15 salinities at these various bars. You have  
 16 something that you call a salinity anomaly.  
 17 Right?

18 **A. That's right. The point of my analysis was to**  
 19 **show that looking at the collection of bars where**  
 20 **we're considering that some bars tended to have**  
 21 **higher salinities than the other bars and that**  
 22 **the salinity -- the bars colored in blue that**  
 23 **we're calling the nonmajor bars tended to have in**  
 24 **general lower salinities because they're closer**  
 25 **to the mouth than the bars colored in red, the**

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1 **don't think it's correct to say that Hotel is not**  
 2 **harvested. There are oysters harvested at bars**  
 3 **throughout the bay.**

4 **Q.** Well, it's lightly -- it's not harvested as much  
 5 as Cat Point and East Hole. Would you agree with  
 6 that?

7 **A. It's my understanding that Cat Point is one of**  
 8 **the more heavily harvested bars, but I think that**  
 9 **the reason that DACS does assessments of those**  
 10 **bars and the reason there's reshelling and things**  
 11 **like that is because there are oysters taken from**  
 12 **those other bars.**

13 **Q.** But you do understand, sir, that what this  
 14 analysis shows that Dr. Lipcius conducted is that  
 15 for the nonmajor fished bars, they were not as  
 16 harmed or not as fished out, lower in abundance  
 17 from before to after the collapse if you go from  
 18 the official DACS department abundance data?

19 **A. Without conducting a more thorough analysis of**  
 20 **this on my own, I'm hesitant to characterize**  
 21 **things in that way. And that's because of the**  
 22 **way these data are calculated in this broad**  
 23 **window, it's difficult to say exactly what**  
 24 **happened right before the collapse in 2012 and**  
 25 **early 2013 when we're looking at numbers that are**

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1 **major bars. And so that anomaly is simply saying**  
 2 **if you look at the salinities of all those bars**  
 3 **together, are they above that collective average,**  
 4 **or are they below that collective average?**

5 **So are they higher salinities in general or**  
 6 **lower salinities in general?**

7 **Q.** So when we looked at the map a moment ago at  
 8 Hotel Bar and it shows that from before to after  
 9 the collapse, Hotel was actually doing better.  
 10 Do you recall that?

11 **A. Yes.**

12 **Q.** Here you have Hotel Bar on your salinity anomaly  
 13 chart. And if you look at the anomaly, you have  
 14 got a 2.87 at the 50th percentile, which on --  
 15 this is on the blue, lightly harvested or  
 16 nonharvested bar. And then if you compare that  
 17 to the heavily harvested bars, it's 1.17 up to  
 18 2.14 on the harvested bars. Is that accurate?

19 **A. That's right. If you look at the map of the blue**  
 20 **ones, Hotel is the one that is furthest from the**  
 21 **river mouth. So that is to be expected.**

22 **Q.** But what -- this is a positive anomaly, meaning  
 23 that the salinity at Hotel was higher than at the  
 24 harvested bars?

25 **A. For that particular bar, that's correct.**

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1 **Q.** Right. And the salinity was higher at this  
 2 lightly-harvested bar that was doing better than  
 3 at Cat Point, Dry Bar, East Hole, and North Spur.  
 4 Correct?  
 5 **A. Well, again, I don't know what the harvest rate**  
 6 **of Hotel Bar is. I made the calculation at Cat**  
 7 **Point Bar and Dry Bar, but I haven't made an**  
 8 **actual calculation of the harvest rate at Hotel**  
 9 **Bar. So, you know, I wouldn't want to**  
 10 **characterize that one way or the other.**  
 11 **Q.** Is it your understanding, sir, that part of the  
 12 reason that we look at salinity, Dr. Kimbro  
 13 looked at salinity is because there's the issue  
 14 of predators, like the rock snail, being  
 15 attracted to higher salinity locations. Right?  
 16 **A. That's correct.**  
 17 **Q.** And is it your understanding, sir, based on your  
 18 knowledge of oyster -- I'm sorry, of rock snail  
 19 biology, that the rock snails are attracted to  
 20 salinity anomalies as opposed to absolute  
 21 salinity?  
 22 **A. I'm sorry. Could you -- could you say that**  
 23 **again, please?**  
 24 **Q.** Sure. What you didn't show the Court in this  
 25 analysis is the salinity at these different

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1 **A. That's my understanding, yes.**  
 2 **Q.** And you yourself are tenured, too, I take it?  
 3 **A. Yes, that's right.**  
 4 **Q.** And it is the case that Dr. Lipcius has reviewed  
 5 and signed off on some articles that you and your  
 6 graduate students have written. Right?  
 7 **A. That's right. He was the -- what we call the**  
 8 **handling editor at the journal; so he sent out**  
 9 **the papers to different peer reviewers and then**  
 10 **reviewed their positive assessments of the paper**  
 11 **and judged that was acceptable to accept the**  
 12 **paper for publication. That's right.**  
 13 **Q.** And I take it you, as well, just like  
 14 Dr. Lipcius, were involved in the most successful  
 15 oyster restoration ever conducted worldwide that  
 16 was done in Chesapeake Bay?  
 17 **A. No, I was not.**  
 18 **Q.** Let's go to our last topic, please. Let's go  
 19 back to your written direct testimony.  
 20 If I could direct you, please, to page 47.  
 21 And now, your general conclusion, sir, is that  
 22 Georgia water consumption contributes to the  
 23 decrease of biomass of oysters. Right?  
 24 **A. That's right. The low flow conditions in 2012**  
 25 **led to a rapid decrease in oyster biomass.**

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1 locations. You have the salinity anomaly, which  
 2 is some difference apparently from the average.  
 3 Is it your understanding that the way rock snails  
 4 migrate is that they may be in one location  
 5 that's relatively high salinity, but they find  
 6 another location that's higher; and so they want  
 7 to go to the better, higher saline bar? Is that  
 8 your understanding of the way rock snails  
 9 operate?  
 10 **A. My understanding is that they have particular**  
 11 **salinities where they're most, you know,**  
 12 **physiologically suited.**  
 13 **Q.** And you studied the rock snail and the oyster, I  
 14 take it, and the interactions between them as  
 15 long as Dr. Lipcius has, for 35 years. Right?  
 16 **A. I have been working on them with Dr. Kimbro and**  
 17 **his research team for the past few years.**  
 18 **Q.** How many is that? How many years?  
 19 **A. Since 2014. It's about two years.**  
 20 **Q.** And you do understand, although you have numerous  
 21 places in your direct testimony where you're  
 22 criticizing and calling Dr. Lipcius's work as  
 23 being mistaken or misleading, that he's a tenured  
 24 professor at the Virginia Institute of Marine  
 25 Sciences?

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1 **Q.** You don't say in your expert report that your  
 2 analysis shows that Georgia water consumption  
 3 caused the collapse. Do you?  
 4 **A. I don't specifically use that word.**  
 5 **Q.** And your model doesn't show that?  
 6 **A. The model shows that low flows led to a decline,**  
 7 **and that had there been higher flow, the decline**  
 8 **would have been mitigated; and there would have**  
 9 **been considerably more oyster biomass on the**  
 10 **reef.**  
 11 **Q.** And the reason that the oyster biomass would be  
 12 lower is because there were three different  
 13 things that you said could be happening, the  
 14 predation, the lowered recruitment, and is it the  
 15 dermo disease? Are those the three aspects of  
 16 it?  
 17 **A. Those were the three aspects of oyster biology in**  
 18 **the model that depended on salinity. That's**  
 19 **right.**  
 20 **Q.** And you, sir, did not calculate or determine any  
 21 relative impact of either of these three aspects,  
 22 whether it was predation or disease or  
 23 recruitment failure. Right?  
 24 **A. I didn't specifically make that calculation.**  
 25 **Q.** So --

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1 **A. I --**  
 2 **Q.** Right. Now, this page -- this particular page  
 3 here that we're showing the Court says, change in  
 4 biomass at Cat Point on an unimpacted scenario.  
 5 Do you see that?  
 6 **A. Yes.**  
 7 **Q.** And this unimpacted scenario is something that  
 8 you yourself didn't calculate. The unimpacted  
 9 you got from -- is it Dr. Greenblatt?  
 10 **A. That's correct.**  
 11 **Q.** And the premise behind this unimpacted scenario  
 12 is that the State of Georgia is not consuming any  
 13 water at all. Is that right?  
 14 **A. My understanding is that it's something along**  
 15 **those lines, yes.**  
 16 **Q.** And so what your model shows is if we wipe out  
 17 all water consumption by the State of Georgia,  
 18 there would be at Cat Point at the very most  
 19 about a 10, 10.3 percent increase in biomass at  
 20 Cat Point. Right?  
 21 **A. That's right. That as the collapse is occurring,**  
 22 **you would have had substantially more oysters on**  
 23 **the reef if you had had higher flow conditions.**  
 24 **Q.** Let's turn to page -- or to paragraph 152,  
 25 please. Now, when you submitted your expert

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1 report in February, sir, you had only run this  
 2 unimpacted scenario. Isn't that true?  
 3 **A. That's correct.**  
 4 **Q.** And, in fact, in the second sentence of paragraph  
 5 152, you explain, since Dr. Lipcius pointed out  
 6 that that was so unrealistic, that you reran the  
 7 model with a very conservative remedy scenario  
 8 similar to the relief Florida is seeking in this  
 9 Original Action. Right?  
 10 **A. That's right.**  
 11 **Q.** And you did that?  
 12 **A. Yes.**  
 13 **Q.** And are you aware, sir, that this very  
 14 conservative remedy scenario contemplates a  
 15 reduction by 50 percent of all agricultural  
 16 watering in the ACF Basin in Georgia?  
 17 **A. I'm not aware of the actual particulars leading**  
 18 **to the remedy. That's the action of other**  
 19 **experts.**  
 20 **Q.** So you're not aware then, I take it, sir, that  
 21 this very conservative remedy scenario involves  
 22 removing water from 50 percent of a 4.7 billion  
 23 dollar agricultural economy in Georgia?  
 24 **A. Again, I was not part of that part of this**  
 25 **calculation; so I wasn't familiar with that.**

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1 **Q.** Let's see what it looked like when you ran this  
 2 very conservative remedy scenario and how much it  
 3 helped the oysters in Apalachicola Bay. If we  
 4 could go to your tables, on page 51 at the top is  
 5 one of those tables. Is this, sir, the results  
 6 of your model, your mathematical model, showing  
 7 what the change in oyster biomass would be at Dry  
 8 Bar under your -- the remedy scenario that  
 9 Florida is seeking?  
 10 **A. That's right.**  
 11 **Q.** And what your model shows -- regardless of  
 12 whether we accept any of the parameters, what  
 13 your model shows is that at the very most, if you  
 14 cut off 2 billion plus of Georgia's agriculture,  
 15 you would get about a 1.3 percent increase in  
 16 biomass of oysters at Dry Bar. Is that right?  
 17 **A. At Dry Bar, that's correct.**  
 18 **Q.** And you looked at Cat Point as well on the prior  
 19 page. And at Cat Point, another one of the major  
 20 commercial oyster bars in Apalachicola Bay, you  
 21 ran the same analysis with your model; did you  
 22 not?  
 23 **A. That's right.**  
 24 **Q.** And what your model shows is that at Cat Point  
 25 under the remedy scenario that Florida is

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1 seeking, that it would result in no more than a  
 2 1.2 percent increase in oyster biomass at that  
 3 reef?  
 4 **A. That's right. And, again, this is a conservative**  
 5 **estimate. I think I'm aware that there's been a**  
 6 **revised remedy scenario proposed that would**  
 7 **actually have increased flows. So this would be**  
 8 **conservative.**  
 9 **And then, again, as we discussed, this is an**  
 10 **estimate for Cat Point, which is further from the**  
 11 **mouth of the river. So it's also conservative in**  
 12 **the sense that you would expect larger increases**  
 13 **at bars that are closer to the river and would be**  
 14 **more influenced by changes in flow.**  
 15 **Q.** And you're aware that, I take it, since you spoke  
 16 to the revised remedy scenario that not only  
 17 would that revised remedy scenario wipe out all  
 18 of Georgia's agricultural water consumption, but  
 19 would also decrease the municipal water  
 20 consumption. You're aware of that, I take it?  
 21 **MR. LEOPOLD:** Objection, your Honor.  
 22 **Mischaracterization.**  
 23 **MR. ECHOLS:** I asked if he was aware of  
 24 it, Judge.  
 25 **SPECIAL MASTER LANCASTER:** You may

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1 answer.

2 **A. Again, I'm not part of the analysis that**

3 **calculates those things. I have no knowledge of**

4 **what factors lead through any scenario. I**

5 **focused on what happens to the flow and the**

6 **salinity.**

7 MR. ECHOLS: I have no further

8 questions, your Honor.

9 MR. LEOPOLD: Your Honor, I can proceed

10 with my direct examination or take our

11 morning break. Whatever you prefer.

12 SPECIAL MASTER LANCASTER: Why don't we

13 take a break.

14 (Time Noted: 10:23 a.m.)

15 (Recess Called)

16 (Time Noted: 10:36 a.m.)

17 SPECIAL MASTER LANCASTER: Counsel.

18 MR. LEOPOLD: Thank you, your Honor.

19 REDIRECT EXAMINATION

20 BY MR. LEOPOLD:

21 **Q.** Dr. White, thank you for your testimony today. I

22 just have a few questions for you.

23 You testified earlier as to your state-space

24 integral projection model; is that right?

25 **A. That's correct.**

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1 could have been a factor leading up to the

2 collapse.

3 And so what the model does is it predicts --

4 at each week in time over this 20-year time span

5 from 1992 to 2012, it predicts how many oysters

6 are on the bar of each size. So from small

7 oysters all the way up to legal-size oysters and

8 beyond. And it makes that prediction based on

9 all these known factors, the growth and mortality

10 that I described. And then it has to estimate

11 how much harvest would have been taking place in

12 order for that model prediction to match the

13 observed data.

14 So essentially let's say in the year 2000, it

15 would predict how many oysters there were of a --

16 of, say, you know, 3 inches, 4 inches. And it

17 would calculate the harvest rate that would be

18 necessary to get the observed number of oysters

19 of those sizes. It then sort of spits out that

20 number, and so we can see how the harvest rate

21 would have changed over time.

22 **Q.** Thank you, Dr. White.

23 And why was it important for you to rely on

24 fishery-independent data to calculate that rate?

25 **A. Right. The -- in the fisheries world, there are**

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1 **Q.** Would you please explain to the Court how that

2 model was developed and operates?

3 **A. That's right. So the overall goal of the**

4 **analysis was to understand what factors in oyster**

5 **biology or in harvesting led up to the collapse**

6 **of the oysters in 2012. And so we developed a --**

7 **or I developed a biological model that included**

8 **all of the major biological factors that we knew**

9 **about for oysters. So the model described the**

10 **change over time from year to year, from week to**

11 **week in the oysters on oyster bars. So it**

12 **includes factors like predation, oyster growth**

13 **and oyster reproduction, a lot of known factors,**

14 **most of which we were able to get parameter**

15 **values and mathematical relationships for from**

16 **Dr. Kimbro's expert report, from the work he was**

17 **doing in the bay, and from other published**

18 **sources.**

19 There are other factors that we didn't

20 have an independent scientific estimate of that

21 would be expected to affect oyster biology. The

22 No. 1 of one of those is the harvest rate. As I

23 think I had said earlier, there is not an

24 independent fishery -- independent estimate of

25 the harvest rate in the bay. I mean, the harvest

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1 two types of data we consider. There is

2 fishery-dependent data that are collected by the

3 fishermen themselves. So these are things like

4 landings data or the number of boats that go out

5 and things like that. Fishery-dependent data are

6 not always as reliable because they're not

7 collected in a scientific manner. So the number

8 of trips that are made or the number of oysters

9 that are landed, they depend on how many oysters

10 are in the bay; but they also depend on things

11 like the market price for oysters, which can go

12 up and down. They depend on -- the price of

13 gasoline can affect how many boats trips you want

14 to take.

15 So fishery-dependent data aren't collected in

16 a scientifically consistent method. So there are

17 problems -- potential problems in inferring

18 patterns of actual oyster abundance from those

19 type of data.

20 Fishery-independent data are collected in a

21 scientific way. You have exactly the same kind

22 of sampling effort at every single instance. So

23 from the data that that has collected, there's

24 actually a remarkably good time series of oyster

25 abundance from that time leading up to 2012.

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1 **Because it's scientifically and independently**  
 2 **collected, you know that that was the actual**  
 3 **abundance of oysters on the bar; and we can use**  
 4 **our model to then estimate, based on those**  
 5 **observations, how much harvest was taking place,**  
 6 **how many of those large oysters were being taken**  
 7 **away.**  
 8 **Q.** And do you know whether the landings data that  
 9 you were shown earlier is fishery-independent or  
 10 dependent?  
 11 **A.** **The landings data are always fishery-dependent**  
 12 **data because it's the amount of stuff that the**  
 13 **harvesters took.**  
 14 **Q.** And if you would, Dr. White, could you explain,  
 15 again, your conclusion as to the effect of  
 16 harvesting in the run up to the oyster collapse  
 17 of 2012.  
 18 **A.** **Absolutely.**  
 19 **So the hypothesis that we had going in, one**  
 20 **of several competing hypotheses was that there**  
 21 **may have been an increase in harvest leading up**  
 22 **to that collapse. So the model estimated a**  
 23 **harvest rate in that 2009-2012 time period right**  
 24 **before the collapse, and it was not statistically**  
 25 **distinguishable from the harvest rate at previous**

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1 **time periods in the earlier 2000's. It actually**  
 2 **was lower than the one for the period of time in**  
 3 **the 1990's. So that suggests that the harvest**  
 4 **was consistent over time for many years leading**  
 5 **up to the collapse and did not increase in the**  
 6 **years prior to the collapse.**  
 7 **Q.** And did you cause -- did you draw a conclusion as  
 8 to whether overfishing was a cause of the fishery  
 9 collapse?  
 10 **A.** **So if overfishing had -- had been a cause of the**  
 11 **fishery collapse, we would have seen an increase**  
 12 **in the harvest rate prior to the collapse. We**  
 13 **saw a consistent harvest rate, a harvest rate**  
 14 **that had been taking place from the oyster**  
 15 **resource when it was very healthy when there were**  
 16 **lots of oysters on the bar. So we know from the**  
 17 **model that that harvest rate is a totally**  
 18 **sustainable harvest rate.**  
 19 **As a matter of fact, if you look at the**  
 20 **biology of the oyster, because you're harvesting**  
 21 **oysters that are larger than 3 inches, it's very**  
 22 **difficult to find a harvest rate that would lead**  
 23 **to a fishery collapse because oysters reproduce**  
 24 **at a much smaller size. And as long as you**  
 25 **harvest -- generally speaking as long as you**

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1 **harvest your resource after it's reproduced, it's**  
 2 **almost impossible to overharvest it.**  
 3 **So the harvest rate we estimated was**  
 4 **consistent with the harvest rates that we had in**  
 5 **the past when the oyster reefs were very healthy,**  
 6 **and it didn't change leading up to the 2012**  
 7 **period.**  
 8 **Q.** Thank you. Dr. White, I have no further  
 9 questions.  
 10 SPECIAL MASTER LANCASTER: Counsel?  
 11 MR. ECHOLS: I have no questions, your  
 12 Honor.  
 13 SPECIAL MASTER LANCASTER: Dr. White, as  
 14 your counsel has probably already explained  
 15 to you, I'm the least informed of anybody in  
 16 this room. So if my question doesn't make  
 17 sense, please feel free to correct me.  
 18 But am I correct in summarizing your  
 19 testimony to say that high salinity caused  
 20 increased predation and that it had nothing  
 21 to do with overharvesting which caused the  
 22 collapse in the bay in 2012?  
 23 THE WITNESS: That's correct, your  
 24 Honor. Not only increases in predation, but  
 25 the high salinity led to higher incidence of

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1 disease in the model; and it also led to a  
 2 decrease in the -- what we call the  
 3 recruitment, essentially the number of baby  
 4 oysters that are settling on the reefs.  
 5 Those three factors are all affected by  
 6 salinity. The high salinity led to poor  
 7 consequences for the oysters in all three  
 8 cases. And, yes, that and not harvest led to  
 9 the decline and the collapse.  
 10 SPECIAL MASTER LANCASTER: And we were  
 11 handed Joint Exhibit 62, the 2012 Revision of  
 12 the Gulf State Marine Fisheries Commission on  
 13 the Oyster Fishery in the Gulf of Mexico.  
 14 Are you familiar with this document?  
 15 THE WITNESS: I have reviewed it. I  
 16 have not read it, you know, this past week;  
 17 but I'm familiar with it, yes.  
 18 SPECIAL MASTER LANCASTER: And did you  
 19 use any of the information in it in coming to  
 20 your conclusion?  
 21 THE WITNESS: No, your Honor. I -- the  
 22 conclusion I drew about the levels of  
 23 overharvest and the effect of salinity was  
 24 not drawn from reading other contemporaneous  
 25 sources. It was drawn from the analysis I

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1 conducted of those fishery-independent data,  
 2 the DACS data. So the analysis and my  
 3 conclusions are based entirely on my -- on my  
 4 analysis of the data.  
 5 SPECIAL MASTER LANCASTER: On your  
 6 model?  
 7 THE WITNESS: That's correct.  
 8 SPECIAL MASTER LANCASTER: And similarly  
 9 with GX-568, which we were handed today --  
 10 THE WITNESS: Yes.  
 11 SPECIAL MASTER LANCASTER: -- did you  
 12 use that in coming to your conclusions?  
 13 THE WITNESS: Again, I looked at it; and  
 14 I considered all of the various reports that  
 15 were generated around the time. And as, I  
 16 think, Dr. Kimbro explained, when he and I  
 17 were planning our research program, we were  
 18 using reports like that to generate our  
 19 hypotheses. We thought maybe it was  
 20 overharvest; maybe it was an effect of flow,  
 21 based on these other suggestions in the  
 22 reports.  
 23 But the actual test we did was to use  
 24 the model to analyze the data. So that was  
 25 the basis for the conclusion.

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1 SPECIAL MASTER LANCASTER: Counsel?  
 2 MR. ECHOLS: No, your Honor. No  
 3 questions.  
 4 MR. LEOPOLD: No questions, your Honor.  
 5 SPECIAL MASTER LANCASTER: You're off  
 6 the hook.  
 7 THE WITNESS: Thank you very much.  
 8 MR. PRIMIS: Your Honor, on the Georgia  
 9 side, we are switching teams and documents.  
 10 So can we just have a minute for the new  
 11 witness?  
 12 SPECIAL MASTER LANCASTER: Take your  
 13 time.  
 14 MR. PRIMIS: Thank you.  
 15 Your Honor, if I may, I just wanted to  
 16 introduce the two new members of our team who  
 17 have not been at counsel table for  
 18 cross-examinations yet. The first is Karen  
 19 DeSantis will be conducting the examination.  
 20 MS. DeSANTIS: Good morning, your Honor.  
 21 MR. PRIMIS: And she's assisted by our  
 22 colleague, Emily Merki.  
 23 MS. MERKI: Good morning, your Honor.  
 24 MR. QURESHI: Your Honor, the State of  
 25 Florida will call Dr. Marcia Greenblatt.

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1 She's a water resources engineer with  
 2 Integral Consulting.  
 3 She will be in here momentarily. She  
 4 went to the -- she's not in the courtroom  
 5 right now.  
 6 But in the meantime, may I just pass out  
 7 the prefiled direct?  
 8 SPECIAL MASTER LANCASTER: Please do.  
 9 MS. DeSANTIS: And, your Honor, is it  
 10 appropriate for us to go ahead and --  
 11 SPECIAL MASTER LANCASTER: I'm sorry.  
 12 Would you speak into the microphone.  
 13 MS. DeSANTIS: Is it appropriate for us  
 14 to go ahead and distribute the binders that  
 15 we'll be using, to conserve time?  
 16 SPECIAL MASTER LANCASTER: Certainly.  
 17 THE CLERK: Please raise your right  
 18 hand.  
 19 Do you solemnly swear that the testimony  
 20 you shall give in the cause now in hearing  
 21 shall be the truth, the whole truth, and  
 22 nothing but the truth, so help you God?  
 23 THE WITNESS: I do.  
 24 THE CLERK: Please be seated.  
 25 Pull yourself right up to the microphone

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1 and please state your name and spell your  
 2 last name.  
 3 THE WITNESS: My name is Marcia  
 4 Greenblatt, M A R C I A, G R E E N B L A T T.  
 5 DIRECT EXAMINATION  
 6 BY MR. QURESHI:  
 7 Q. Dr. Greenblatt, do you recognize the document  
 8 that's been placed in front of you?  
 9 A. I do.  
 10 Q. What is it?  
 11 A. It's my prefiled direct testimony.  
 12 Q. And, Dr. Greenblatt, do you adopt this in sum and  
 13 substance as the testimony that you prepared in  
 14 this --  
 15 A. I --  
 16 Q. -- the testimony you prepared in this matter?  
 17 A. I do.  
 18 Q. Thank you.  
 19 MR. QURESHI: Your Honor, I would like  
 20 to provide Dr. Greenblatt with her reading  
 21 glasses.  
 22 THE WITNESS: Thank you.  
 23 MS. DeSANTIS: Good morning again, your  
 24 Honor.  
 25 SPECIAL MASTER LANCASTER: Good morning,

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1 counsel.

2 MS. DeSANTIS: Your Honor, I do have a

3 microphone on in the event that I should move

4 away from the podium to assist the Court in

5 hearing what I'm saying.

6 CROSS-EXAMINATION

7 BY MS. DeSANTIS:

8 **Q.** Good morning, Dr. Greenblatt.

9 **A. Good morning.**

10 **Q.** Dr. Greenblatt, I want to start by outlining for

11 the Court what you did in this case. You were

12 asked to provide opinions regarding salinity

13 patterns in the Apalachicola Bay. Correct?

14 **A. That's correct.**

15 **Q.** Okay. You evaluated flow patterns in salinity in

16 the bay for various streamflow scenarios.

17 Correct?

18 **A. That's correct.**

19 **Q.** And the scenarios that you used were developed by

20 Dr. Hornberger, another one of Florida's experts

21 in the case. Correct?

22 **A. That's correct.**

23 **Q.** You did hydrodynamic modeling to assess what

24 salinity in the bay would look like under these

25 different scenarios. Correct?

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1 **A. That is correct.**

2 **Q.** And you found that reduced freshwater inflows

3 into the bay increased salinity levels in the

4 bay. Correct?

5 **A. That is correct.**

6 **Q.** All right. You were also asked to assess the

7 impact of upstream withdrawals on salinity levels

8 in the bay. Correct?

9 **A. I indirectly assessed the impact of upstream**

10 **withdrawals.**

11 **Q.** All right.

12 MS. DeSANTIS: Let's put up slide 1 and

13 slide 2, please.

14 Slide 2.

15 BY MS. DeSANTIS:

16 **Q.** So, doctor, you were indirectly asked to assess

17 the impact of upstream withdrawals. Correct?

18 **A. I was asked to assess the scenario provided by**

19 **Dr. Hornberger, and he assessed the impact of**

20 **upstream withdrawals.**

21 **Q.** All right. And you maintained that Georgia's

22 consumptive use of water caused reduced inflows

23 resulting in increased salinity in the bay.

24 Correct?

25 **A. Based on the work of Dr. Hornberger.**

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1 **Q.** And also Dr. Flewelling, correct?

2 **A. And Dr. Flewelling.**

3 **Q.** Because Dr. Flewelling is the expert who analyzed

4 upstream consumption. Correct?

5 **A. That is correct.**

6 **Q.** And finally, doctor, you were asked to

7 investigate the relationship between sea level

8 and salinity. Correct?

9 **A. Correct.**

10 **Q.** All right. And you developed some opinions as to

11 whether or not projected sea level rise will

12 affect salinity in the bay. Right?

13 **A. I developed those opinions based on their**

14 **data-based opinions. I didn't do any modeling**

15 **projections.**

16 **Q.** All right. And I don't want to spend a lot of

17 time on your sea level rise opinion; but with

18 respect to sea level rise, you didn't do any

19 hydrodynamic modeling with respect to sea level

20 rise. Correct?

21 **A. Correct.**

22 **Q.** And you have not actually done any testifying

23 work as an expert on sea level rise. Correct?

24 **A. That's correct.**

25 **Q.** And you're not testifying today as an expert on

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1 sea level rise?

2 **A. That's correct.**

3 **Q.** And you're not an expert on sea level rise; is

4 that correct?

5 **A. That's correct.**

6 **Q.** All right. Let's move on to your work regarding

7 the salinity patterns in the bay and really look

8 at the first two projects on the slide that we're

9 showing, the opinions regarding salinity patterns

10 in the bay and the assessment of upstream

11 consumptive use that you did indirectly because

12 you were relying on the work of other experts.

13 Correct?

14 **A. That's correct.**

15 **Q.** All right. Dr. Hornberger provided you with

16 three different water consumption scenarios that

17 you used in your hydrodynamic model. Correct?

18 **A. Correct.**

19 **Q.** And you ran these scenarios for the years 2007 to

20 2012. Right?

21 **A. Correct.**

22 **Q.** And you ran a no withdrawal scenario. Correct?

23 **A. Yes.**

24 **Q.** You ran this scenario to understand how salinity

25 in the bay would change if there was no

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1 consumptive use of any water at all in Georgia.  
 2 Correct?  
 3 **A. That's correct. It provides a bounding estimate**  
 4 **of what salinity would look like in the absence**  
 5 **of withdrawals.**  
 6 **Q.** All right. You also ran a future scenario.  
 7 Right?  
 8 **A. Yes.**  
 9 **Q.** And this scenario took into account what other  
 10 Florida experts projected Georgia's water use to  
 11 be in the year 2050 -- 2,000-five-zero --  
 12 correct?  
 13 **A. That's correct.**  
 14 **Q.** And you ran a remedy scenario that was provided  
 15 to you by Dr. Hornberger as well; did you not?  
 16 **A. I did.**  
 17 **Q.** And in that scenario, you evaluated how certain  
 18 reductions in Georgia's consumptive use would  
 19 affect salinity levels in the bay. Right?  
 20 **A. Correct.**  
 21 **Q.** All right. And for your work on all of these  
 22 water consumption scenarios you relied on the  
 23 work of other Florida experts regarding the  
 24 quantification of upstream withdrawals. Correct?  
 25 **A. That's correct.**

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1 **Q.** And you relied on other Florida experts regarding  
 2 the effect of these upstream withdrawals on  
 3 streamflow. Right?  
 4 **A. Correct.**  
 5 **Q.** Dr. Flewelling, who is one of Florida's experts,  
 6 provided information to Dr. Hornberger. Correct?  
 7 **A. Yes.**  
 8 **Q.** He provided information to Dr. Hornberger about  
 9 Georgia's consumptive use. Correct?  
 10 **A. That's correct.**  
 11 **Q.** And Dr. Hornberger provided information to you to  
 12 use in modeling in your scenarios. Correct?  
 13 **A. Correct.**  
 14 **Q.** All right. And so you relied on Dr. Flewelling's  
 15 consumptive use data indirectly because  
 16 Dr. Hornberger relied on it. Right?  
 17 **A. That's correct.**  
 18 **Q.** And you have no basis other than Dr. Flewelling's  
 19 analysis and conclusions to support your claim  
 20 that upstream water use by Georgia has  
 21 substantially increased since 1970. Right?  
 22 **A. I didn't do an independent evaluation, but**  
 23 **I did review the work that was performed by**  
 24 **Dr. Flewelling.**  
 25 **Q.** But you didn't independently evaluate any of

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1 Dr. Flewelling's work. Correct?  
 2 **A. No.**  
 3 **Q.** You didn't evaluate any of Dr. Flewelling's  
 4 analysis. Correct?  
 5 **A. I reviewed his work.**  
 6 **Q.** Did you review his models?  
 7 **A. I didn't review the details of the models. I**  
 8 **reviewed his report.**  
 9 **Q.** And you have not actually calculated the impact  
 10 that any changes to Georgia's consumptive use  
 11 might have on streamflow in the ACF Basin.  
 12 Right?  
 13 **A. No, I didn't do that evaluation.**  
 14 **Q.** Let's turn to your scenarios, doctor. And I  
 15 would like to look at your no withdrawal scenario  
 16 first. And under this no withdrawal scenario,  
 17 your model compared bay salinity levels under  
 18 Dr. Hornberger's no withdrawal scenario to  
 19 salinity levels under Georgia's simulated water  
 20 use in the years 2007 to 2012. Right?  
 21 **A. I'm sorry. Can you repeat the question?**  
 22 **Q.** Yes. Under your no withdrawal scenario, you were  
 23 comparing what you modeled to be results from  
 24 Dr. Hornberger's no withdrawal scenario compared  
 25 to salinity levels in the bay that you simulated

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1 for Georgia's consumptive use in years 2007 to  
 2 2012. Correct?  
 3 **A. I compared the no withdrawal scenario to the**  
 4 **existing conditions or the observed conditions in**  
 5 **the bay.**  
 6 **Q.** All right. And these existing or observed  
 7 conditions were conditions that you simulated  
 8 through your hydrodynamic model; is that correct?  
 9 **A. That's correct.**  
 10 **Q.** All right. And these comparisons that you did  
 11 between the no withdrawal scenario and Georgia's  
 12 consumptive use that you simulated are shown in  
 13 figures that you have attached as an appendix to  
 14 your written direct testimony and also as an  
 15 attachment to your expert report for this matter.  
 16 Right?  
 17 **A. Yes.**  
 18 **Q.** All right. And under the no withdrawal scenario,  
 19 you found that if nobody used any water at all,  
 20 the bay would be less saline. Right?  
 21 **A. That's correct.**  
 22 **Q.** And you found that if nobody in Georgia used any  
 23 water at all, the bay would be less saline.  
 24 Correct?  
 25 **A. That's what the no withdrawal scenario**

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1 **represents.**

2 **Q.** And you're not suggesting, are you, doctor, that

3 as an outcome in this case, that Georgia should

4 not use any water?

5 **A. No. That wasn't the purpose of that scenario.**

6 **Q.** So this was just a scenario you simulated to see

7 what would happen to salinity in the bay if

8 nobody in Georgia ever used any water. Right?

9 **A. That's correct.**

10 **Q.** You wanted to see what the maximum change would

11 be. Right?

12 **A. That's correct.**

13 **Q.** And in your written direct testimony in

14 paragraph 4 -- and we can put that up on the

15 screen -- you actually identified that maximum

16 change in salinity across all your scenarios.

17 Right?

18 **A. That's correct.**

19 **Q.** And you maintained that Georgia's water

20 consumption has a total impact on salinity in the

21 bay of up to 8 parts per thousand. Right?

22 **A. That's what the results of the model were;**

23 **correct.**

24 **Q.** And you maintained that the largest impact on

25 salinity is in east bay. Right?

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1 **A. That's generally what I saw, yes.**

2 **Q.** All right. Now, 8 parts per thousand, parts per

3 thousand is how salinity levels are measured.

4 Right?

5 **A. Yes.**

6 **Q.** And salinity is the measure of salt dissolved in

7 water. Correct?

8 **A. Correct.**

9 **Q.** And 8 ppt means that in every kilogram of water,

10 8 grams are salt. Right?

11 **A. Correct.**

12 **Q.** And that means that out of a thousand grams of

13 water, 8 grams are salt. Correct?

14 **A. Correct.**

15 **Q.** And to put this in context, these salinity levels

16 are being measured in a bay where salinity levels

17 range from zero ppt near the source of fresh

18 water inflow. Right?

19 **A. Yes.**

20 **Q.** And salinity levels range up to 35 ppt near the

21 Gulf of Mexico. Correct?

22 **A. That's correct.**

23 **Q.** And that's because the Gulf of Mexico is

24 saltwater. Right?

25 **A. Correct.**

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1 **Q.** All right. And the highest change that you found

2 between salinity levels resulting from Georgia's

3 water use and a scenario in which nobody used any

4 water at all was 8 ppt. Right?

5 **A. That's correct.**

6 **Q.** All right. And the only modelled results that

7 include changes in salinity as high as 8 ppt came

8 from the no withdrawal scenario. Correct?

9 **A. That's correct.**

10 **Q.** And it's true, isn't it, that these changes of up

11 to 8 ppt were not seen throughout the entire bay?

12 **A. That's correct.**

13 **Q.** All right. Dr. Greenblatt, in your written

14 direct you include an attachment 2 which has

15 figures and tables from your expert report.

16 Correct?

17 **A. Yes.**

18 **Q.** All right.

19 MS. DeSANTIS: Your Honor, may I

20 approach with a demonstrative 3?

21 BY MS. DeSANTIS:

22 **Q.** And, Dr. Greenblatt, as we distribute this, I'm

23 going to represent that I'm handing to you what

24 is attachment 2 to your written direct testimony.

25 The only modifications that we have made is we

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1 have enlarged the pages for the ease of the Court

2 and for your ease in looking at them. And we

3 have put enlarged table numbers and pages on the

4 chart so the Court can see them.

5 MS. DeSANTIS: May I distribute them,

6 your Honor?

7 SPECIAL MASTER LANCASTER: Please.

8 BY MS. DeSANTIS:

9 **Q.** Dr. Greenblatt, if you could take a quick look at

10 demonstrative 3, please. These figures are the

11 figures that are contained in your expert report

12 submitted in this case. Correct?

13 **A. Yes.**

14 **Q.** And they're also attached to your written direct

15 testimony. Correct?

16 **A. That's right.**

17 **Q.** All right. And, Dr. Greenblatt, I want to go

18 over a few of these figures with you. We'll put

19 figure 3-3 on the screen to start with.

20 These figures -- and this is on page 25 for

21 your reference.

22 These figures represent an outline or a map

23 of the Apalachicola Bay. Right?

24 **A. Yes.**

25 **Q.** All right. And the river is shown flowing into

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<p>1750</p> <p>1 the bay. Correct?</p> <p>2 <b>A. Correct.</b></p> <p>3 <b>Q.</b> And the river is actually shown at the top of the</p> <p>4 bay -- at the top of the figures. Correct?</p> <p>5 <b>A. That's correct.</b></p> <p>6 <b>Q.</b> All right. And would you agree that figures 3-3</p> <p>7 to 3-8 on pages 25 to 30 of your direct testimony</p> <p>8 show your comparison between simulated 2007 to</p> <p>9 2012 bay salinity levels and your modeled no</p> <p>10 withdrawal scenario?</p> <p>11 <b>A. That's correct.</b></p> <p>12 <b>Q.</b> And you're depicting the change in salinity</p> <p>13 between Georgia's simulated water use from 2007</p> <p>14 to 2012 as estimated by Dr. Hornberger and a</p> <p>15 scenario where nobody used any water at all.</p> <p>16 Right?</p> <p>17 <b>A. I'm showing a change between the no withdrawal</b></p> <p>18 <b>scenario, which is where nobody used any water,</b></p> <p>19 <b>and the existing conditions.</b></p> <p>20 <b>Q.</b> And the existing conditions are conditions that</p> <p>21 you simulated. Correct?</p> <p>22 <b>A. I simulated the salinity distribution.</b></p> <p>23 <b>Q.</b> All right. And let's look at the scale. At the</p> <p>24 bottom of your maps, you have a scale that ranges</p> <p>25 from 1 all the way up to about 8. Correct?</p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>	<p>1752</p> <p>1 Georgia's simulated water use and a scenario</p> <p>2 where Georgia is using no water at all. Right?</p> <p>3 <b>A. Correct.</b></p> <p>4 <b>Q.</b> And the change in salinity between these</p> <p>5 scenarios varies across different parts of the</p> <p>6 bay. Right?</p> <p>7 <b>A. Yes.</b></p> <p>8 <b>Q.</b> And if I want to see the largest changes in</p> <p>9 salinity, I look at the yellow parts of the map.</p> <p>10 Right?</p> <p>11 <b>A. Correct.</b></p> <p>12 <b>Q.</b> And looking at this map, July, August, September,</p> <p>13 and October are the only months where there's a 7</p> <p>14 to 8 ppt change in salinity. Right?</p> <p>15 <b>A. Correct.</b></p> <p>16 <b>Q.</b> And those changes are shown by the yellow color.</p> <p>17 Correct?</p> <p>18 <b>A. Yes.</b></p> <p>19 <b>Q.</b> And those colors are kind of hard to see, aren't</p> <p>20 they, doctor, because they're small in these</p> <p>21 maps. Right?</p> <p>22 <b>A. I can see them.</b></p> <p>23 <b>Q.</b> All right. Let's see if we can point one out</p> <p>24 here. I see a small one right there in October.</p> <p>25 Correct?</p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>
<p>1751</p> <p>1 <b>A. Yes.</b></p> <p>2 <b>Q.</b> And dark blue represents a 1 to 2 parts per</p> <p>3 thousand change in salinity. Correct?</p> <p>4 <b>A. Correct.</b></p> <p>5 <b>Q.</b> And the scale goes all the way up to 7 to 8 parts</p> <p>6 per thousand change in salinity, which is shown</p> <p>7 as a yellow color. Right?</p> <p>8 <b>A. Yes.</b></p> <p>9 <b>Q.</b> And white on all of these maps and figures</p> <p>10 represents a change in salinity of less than 1</p> <p>11 ppt. Correct?</p> <p>12 <b>A. Correct.</b></p> <p>13 <b>Q.</b> All right. Now, let's focus first on figure 3-3,</p> <p>14 which we have up here. And in this figure, you</p> <p>15 are comparing bay salinity under Georgia's</p> <p>16 simulated water use with salinity levels under</p> <p>17 the no withdrawal scenario from May through</p> <p>18 October of 2007. Right?</p> <p>19 <b>A. Correct.</b></p> <p>20 <b>Q.</b> And you're including the months of May through</p> <p>21 October because those are the low flow months.</p> <p>22 Correct?</p> <p>23 <b>A. That's correct.</b></p> <p>24 <b>Q.</b> And the colors on the map show different areas</p> <p>25 where there is a change in salinity between</p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>	<p>1753</p> <p>1 <b>A. There is one in October.</b></p> <p>2 <b>Q.</b> All right. We're putting a box around it.</p> <p>3 There you go.</p> <p>4 That's the only point in September 2007 in</p> <p>5 the bay where you can see a change of up to 7 or</p> <p>6 8 ppt in salinity. Correct?</p> <p>7 <b>A. That's correct.</b></p> <p>8 <b>Q.</b> All right. And on the rest of these maps you see</p> <p>9 blue tones and purple tones. Right?</p> <p>10 <b>A. Correct.</b></p> <p>11 <b>Q.</b> And the blue and the purple represent the</p> <p>12 change of salinity of between 1 and 3 ppt.</p> <p>13 Correct?</p> <p>14 <b>A. Some of the blues go up to 4.</b></p> <p>15 <b>Q.</b> All right. So this lighter blue shade goes up to</p> <p>16 about 4. Right?</p> <p>17 <b>A. Correct.</b></p> <p>18 <b>Q.</b> And then we see a lot of white area, too.</p> <p>19 Correct?</p> <p>20 White represents where there is a change of</p> <p>21 less than 1 ppt in salinity. Correct?</p> <p>22 <b>A. In some of the months we see that.</b></p> <p>23 MS. DeSANTIS: Let's go ahead and put up</p> <p>24 figures 3.4 and 3.5, which are on pages 26</p> <p>25 and 27.</p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>



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1756

1 BY MS. DeSANTIS:  
 2 **Q.** And these show salinity levels under the no  
 3 withdrawal scenario from 2008 and 2009. Correct?  
 4 **A. Correct.**  
 5 **Q.** And, again, the maximum change in salinity levels  
 6 in these areas was 8 ppt. Correct?  
 7 **A. Yes.**  
 8 **Q.** And these changes of 7 to 8 ppt were limited to  
 9 near the mouth of the Apalachicola River and some  
 10 areas at east bay. Right?  
 11 **A. Generally correct.**  
 12 **Q.** All right. There's one; that's east bay. Right?  
 13 **A. Yes.**  
 14 **Q.** And there's a little yellow one right there;  
 15 that's the mouth of the river. Right?  
 16 **A. Correct.**  
 17 **Q.** All right. Is this one down here, doctor -- I  
 18 can't tell. Is that yellow?  
 19 **A. It looks like it's yellow.**  
 20 **Q.** All right. If that's yellow, that's near the  
 21 mouth of the river. Correct?  
 22 **A. Correct.**  
 23 **Q.** All right. Now, let's go to 3.6 on page 28.  
 24 And, again, we're comparing bay salinity under  
 25 the no withdrawal scenario to Georgia's simulated

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1 **A. That's correct. For this year.**  
 2 **Q.** All right. Doctor, before we turn to another  
 3 year, I would like to ask Mr. Smith to put up  
 4 table 3.1, which is on page 10 of your expert  
 5 report.  
 6 MS. DeSANTIS: It's table 3.1 on page 10.  
 7 BY MS. DeSANTIS:  
 8 **Q.** All right. Doctor, in figure 3.1 on your expert  
 9 report you are showing annual flows in the  
 10 Apalachicola River at Sumatra. Correct?  
 11 **A. Correct.**  
 12 **Q.** And looking at 2012 on this table, you would  
 13 agree that 2012 has the lowest observed annual  
 14 flow at the Sumatra Gage in the period of record  
 15 of Sumatra; is that correct?  
 16 **A. That's correct.**  
 17 MS. DeSANTIS: Now, Mr. Smith, could we  
 18 please put 3.8 on page 30 of Dr. Greenblatt's  
 19 attachment, please, up on the screen.  
 20 Back to the maps again.  
 21 BY MS. DeSANTIS:  
 22 **Q.** All right. Figure 3.8 shows your 2012 no  
 23 withdrawal scenario versus Georgia use scenario.  
 24 Correct?  
 25 **A. That's correct.**

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1 water use from May through October in 2010 this  
 2 time. Correct?  
 3 **A. Correct.**  
 4 **Q.** And I want to point out that the first two months  
 5 of the low flow season, May and June, are  
 6 completely white. Right?  
 7 **A. Although this is the low flow season, 2010 was**  
 8 **not a low flow year; so the results in the**  
 9 **patterns we see are going to be different.**  
 10 **Q.** All right. So this low flow season of even a  
 11 high flow year shows changes in salinity that  
 12 were less than 1 ppt in the bay. Correct?  
 13 **A. In those two months.**  
 14 **Q.** All right. And, again, this is modeled in your  
 15 scenario of how salinity would change in the bay  
 16 if no one in Georgia were using any water at all.  
 17 Correct?  
 18 **A. That's correct.**  
 19 **Q.** All right. And according to this map, at no  
 20 point does the difference between Georgia's  
 21 simulated water use and a scenario where nobody  
 22 uses any water at all result in more than a 6 ppt  
 23 change in salinity in any part of the bay?  
 24 MS. DeSANTIS: And, Mr. Smith, you can  
 25 put back up the full figure.

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1 **Q.** And in figure 3.8, again, we're looking at a  
 2 range of salinity levels in the bay. Right?  
 3 **A. Correct.**  
 4 **Q.** And in June, August, and September you're, again,  
 5 seeing some changes of up to 8 ppt in certain  
 6 areas of the bay. Right?  
 7 **A. That's what we're seeing.**  
 8 **I just want to clarify here. It's important**  
 9 **to recognize that we're looking at absolute**  
 10 **numbers. These are the absolute changes, which**  
 11 **is what my model predicts. But the impact on the**  
 12 **ecosystem is a function of the change. It's not**  
 13 **the absolute change; it's how the change affects**  
 14 **the ecosystem.**  
 15 **Q.** Doctor, you're not an expert on ecosystem; are  
 16 you?  
 17 **A. I'm not.**  
 18 **Q.** You're a salinity modeler. Correct?  
 19 **A. That's correct.**  
 20 **Q.** All right. Let's stick to the salinity.  
 21 So you would agree that these salinity  
 22 changes, to the extent that they reach the 7 to 8  
 23 ppt, are restricted to the area near the mouth of  
 24 the Apalachicola River. Right?  
 25 **A. They do occur near the mouth. Right.**

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1 Q. And a lot of these maps are in blue or purple.  
 2 Right?  
 3 A. **That's correct.**  
 4 Q. And that represents changes in salinity of about  
 5 1 to 4 ppt. Right?  
 6 A. **Correct.**  
 7 Q. All right. And we see white areas, too. Right?  
 8 A. **I'm not sure there's white areas on this one.**  
 9 Q. There's a few. Right?  
 10 A. **Those are outside of the model domain.**  
 11 Q. Okay. There is one over here?  
 12 A. **There may be some small white areas.**  
 13 Q. There are some small white areas in this map that  
 14 show changes in salinity of less than 1 ppt.  
 15 Right?  
 16 A. **Correct.**  
 17 Q. All right. Move on to your future scenario. You  
 18 ran simulations for an increased future  
 19 withdrawal scenario. Right?  
 20 A. **Correct.**  
 21 MS. DeSANTIS: Mr. Primis is telling me  
 22 this microphone is working better.  
 23 MR. PRIMIS: Does your Honor agree?  
 24 MS. DeSANTIS: Does this one work for  
 25 you?

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1 I just have to keep my head turned to  
 2 the left.  
 3 All right. Is that better?  
 4 BY MS. DeSANTIS:  
 5 Q. Okay. You ran simulations for an increased  
 6 future withdrawal scenario. Correct?  
 7 A. **Correct.**  
 8 Q. And, again, you used inputs from Dr. Hornberger.  
 9 Right?  
 10 A. **Yes.**  
 11 Q. And Dr. Hornberger relies on Dr. Flewelling's  
 12 assessment of future consumptive use. Correct?  
 13 A. **Yes.**  
 14 Q. And you have not assessed the assumptions in  
 15 Dr. Flewelling's future scenario. Right?  
 16 A. **That's correct.**  
 17 Q. And you haven't assessed his assumptions  
 18 regarding the percentage of increase in  
 19 irrigation withdrawals in Georgia. Right?  
 20 A. **Correct.**  
 21 Q. And you didn't look into Dr. Flewelling's  
 22 assumptions about future municipal and industrial  
 23 water use in Georgia. Right?  
 24 A. **Correct.**  
 25 Q. And you didn't look into Dr. Flewelling's

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1 assumptions about the increase in interbasin  
 2 transfers in Georgia. Correct?  
 3 A. **Right.**  
 4 Q. And you didn't independently verify whether any  
 5 of Dr. Flewelling's future scenario assumptions  
 6 regarding irrigation, municipal and industrial  
 7 water use, or interbasin transfers were correct.  
 8 Right?  
 9 A. **I did not evaluate his work.**  
 10 Q. All right. But you do know that Dr. Flewelling's  
 11 projections of future withdrawals assume a .4  
 12 percent increase in agricultural consumption.  
 13 Right?  
 14 A. **I don't recall the details of his future  
 15 scenario.**  
 16 Q. You don't know that they include a .4 percent  
 17 increase in agricultural consumption?  
 18 A. **I don't recall the details of his future  
 19 scenario.**  
 20 Q. All right. You don't know that it includes a 50  
 21 percent increase in any other consumption?  
 22 A. **I don't know the details.**  
 23 Q. You just took those assumptions and used them in  
 24 your modeling. Correct?  
 25 A. **I relied on his expert evaluation in that**

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1 **scenario.**  
 2 Q. All right. Let's turn to figure 3-17, which is  
 3 on page 38 of demonstrative 3. And figure 3-17  
 4 compares bay salinity under the future withdrawal  
 5 scenario to bay salinity under Georgia's  
 6 simulated water use from May through October of  
 7 2007. Right?  
 8 A. **Yes.**  
 9 Q. And the white areas of the map again indicate  
 10 where changes in bay salinity, if any occurred,  
 11 were less than 1 ppt. Right?  
 12 A. **Correct.**  
 13 Q. And it appears that the entire map is white for  
 14 every low flow month in 2007. Right?  
 15 A. **That's correct.**  
 16 Q. And this means that for 2007, at no point from  
 17 May through October of 2007 would an increase in  
 18 Georgia's consumptive use have increased salinity  
 19 in the bay by more than 1 ppt?  
 20 A. **That's what we see in this year.**  
 21 Q. All right. Let's move on to figure 3-18 on  
 22 page 39.  
 23 MS. DeSANTIS: And, Mr. Smith, if we  
 24 could, could we please blow up the months of  
 25 May, July, and August.

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1 BY MS. DeSANTIS:  
 2 **Q.** And in May, July, and August of 2008, an increase  
 3 in Georgia's consumption up to the levels  
 4 projected by Dr. Flewelling would have had an  
 5 impact of less than 1 ppt. Right?  
 6 **A. In those three months, that's correct.**  
 7 **Q.** All right.  
 8 MS. DeSANTIS: Let's put figure 3-22 on  
 9 the screen, which is on page 43.  
 10 BY MS. DeSANTIS:  
 11 **Q.** And, again, this figure compares bay salinity  
 12 under the future withdrawal scenario to the  
 13 scenario of Georgia's water use from May through  
 14 October of 2012. Right?  
 15 **A. Correct.**  
 16 **Q.** And every map in this figure is all white.  
 17 Right?  
 18 **A. That's what the model shows.**  
 19 **Q.** And the all white signifies that in all six of  
 20 the low flow months of 2012, the future  
 21 withdrawal scenario would not have impacted any  
 22 area in the bay by more than 1 ppt. Correct?  
 23 **A. That's correct.**  
 24 **Q.** All right. Let's move on to the remedy scenario,  
 25 doctor. And before we go through the maps, you

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1 maintain that the remedy scenario will make an  
 2 important difference, including by reducing  
 3 salinity as shown in your modeling. Right?  
 4 **A. Correct.**  
 5 **Q.** And in your direct testimony, you maintain that  
 6 Georgia's consumption is causing declines in  
 7 optimal salinity conditions over the oyster bars.  
 8 Right?  
 9 **A. That's correct.**  
 10 **Q.** All right. You don't have knowledge as to  
 11 whether changes in salinity levels in the bay  
 12 under Florida's remedy would materially impact  
 13 the ecology of the oyster bars. Right?  
 14 **A. No. I don't opine on the ecology.**  
 15 **Q.** And you have not analyzed the impact of Florida's  
 16 remedy scenario on the oysters. Right?  
 17 **A. Correct.**  
 18 **Q.** And so far as the impact of salinity on the  
 19 productivity of the oyster bars or the health of  
 20 the oyster bars, that's not something you're  
 21 giving opinions on. Right?  
 22 **A. That's correct.**  
 23 **Q.** Now, the remedy scenario that you modeled to  
 24 simulate salinity in the bay is, again, based on  
 25 data received from Dr. Hornberger. Right?

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1 **A. Correct.**  
 2 **Q.** And that represents a reduction in Georgia's  
 3 upstream water use. Right?  
 4 **A. Correct.**  
 5 **Q.** That's what the remedy scenario involves, a  
 6 reduction in Georgia's water use. Right?  
 7 **A. Yes.**  
 8 **Q.** Dr. Hornberger models the removal of interbasin  
 9 transfers out of Georgia. Right?  
 10 **A. Correct.**  
 11 **Q.** A reduction in agricultural water use?  
 12 **A. Yes.**  
 13 **Q.** And a reduction in the evaporation from small  
 14 impoundments. Correct?  
 15 **A. That's my understanding.**  
 16 **Q.** All right. And this scenario is the same remedy  
 17 scenario that Dr. Allan, another one of Florida's  
 18 experts, used. Correct?  
 19 **A. I don't know that for sure.**  
 20 **Q.** You don't know what Dr. Allan used?  
 21 **A. No.**  
 22 **Q.** You do know that Dr. Glibert and Dr. Kimbro used  
 23 this particular remedy scenario. Correct?  
 24 **A. Yes.**  
 25 **Q.** Because they used your salinity inputs. Correct?

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1 **A. Correct.**  
 2 **Q.** All right. Now, in your direct testimony you  
 3 described this remedy scenario as very  
 4 conservative. Right?  
 5 **A. Correct.**  
 6 **Q.** But you didn't define this scenario anywhere in  
 7 your direct testimony. Correct?  
 8 **A. I did not.**  
 9 **Q.** And you don't explain your bases for calling it a  
 10 very conservative scenario. Right?  
 11 **A. I didn't.**  
 12 **Q.** All right. Let's go through this very  
 13 conservative remedy scenario for the Court.  
 14 You know that Dr. Hornberger relies on  
 15 Dr. Flewelling to describe the cuts to  
 16 agricultural water use. Right?  
 17 **A. Yes.**  
 18 **Q.** And he relies on Dr. Flewelling to describe the  
 19 cuts in small impoundment incremental  
 20 evaporation. Right?  
 21 **A. Yes.**  
 22 **Q.** All right. Dr. Flewelling explains that the  
 23 remedy scenario involves wiping out 50 percent of  
 24 agricultural irrigation in Georgia. Correct?  
 25 **A. No, that's not correct.**

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1 **Q.** You don't understand Dr. Flewelling to be saying  
 2 the remedy scenario wipes out 50 percent of  
 3 irrigation in Georgia?  
 4 **A. I don't believe it wipes out 50 percent in all**  
 5 **months. It's in a subset of months.**  
 6 **Q.** All right. Let's -- do you remember testifying  
 7 in deposition in this case, Dr. Greenblatt?  
 8 **A. Yes.**  
 9 **Q.** And you were under oath?  
 10 **A. Yes.**  
 11 **Q.** And you told the truth?  
 12 **A. Yes.**  
 13 **Q.** All right.  
 14 Ms. DeSANTIS: Let's show from  
 15 Dr. Greenblatt's deposition transcript 157,  
 16 line 16 to 22. Mr. Smith, could you please  
 17 play clip 78 to 79.  
 18 Clip 78 and 79.  
 19 (Whereupon the video was played.)  
 20 BY MS. DeSANTIS:  
 21 **Q.** And were you asked that question, and did you  
 22 give that answer in your deposition?  
 23 **A. I did.**  
 24 **Q.** All right. And this scenario, this 50 percent  
 25 reduction scenario, is the remedy that you  

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1 described as very conservative. Right?  
 2 **A. Correct.**  
 3 **Q.** All right. Now, let's look -- you have not --  
 4 well, let me just ask you this first,  
 5 Dr. Greenblatt. You have not investigated the  
 6 impact on Georgia's economy if Georgia were to  
 7 cut irrigation use by 50 percent. Right?  
 8 **A. No. There are other experts in this case who**  
 9 **have investigated that.**  
 10 **Q.** But you haven't done it?  
 11 **A. I have not done that.**  
 12 **Q.** And you haven't investigated the effect of a 50  
 13 percent cut in evaporation from small  
 14 impoundments; have you?  
 15 **A. No.**  
 16 **Q.** And you haven't investigated the costs associated  
 17 with eliminating all interbasin transfers out of  
 18 the ACF Basin. Right?  
 19 **A. Correct.**  
 20 **Q.** All right. Let's look at figures 3-11 to 3-16 on  
 21 pages 32 to 37 of demonstrative 3.  
 22 MS. DeSANTIS: And let's put that up on  
 23 the screen.  
 24 Let's put 3-11 up for starters.  
 25 BY MS. DeSANTIS:  

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1 **Q.** Figures 3-11 to 3-16 together compare bay  
 2 salinity levels under Dr. Hornberger's 50 percent  
 3 cut remedy scenario with Georgia's simulated  
 4 water use in 2007 to 2012. Right?  
 5 **A. That's correct.**  
 6 **Q.** All right. And in all of your figures in 3-11 to  
 7 3-16 on pages 32 to 37, the greatest difference  
 8 between simulated consumptive use and the 50  
 9 percent cut scenario shows salinity levels  
 10 differing at most by 2 to 3 ppt. Right?  
 11 **A. That's correct.**  
 12 **Q.** All right. Let's look at 3-11, which is up  
 13 on the screen. And it's on page 32 of  
 14 demonstrative 3. Figure 3-11 compares bay  
 15 salinity under the 50 percent cut remedy scenario  
 16 with bay salinity under Georgia's consumptive use  
 17 for May through October of 2007. Right?  
 18 **A. Correct.**  
 19 **Q.** And, again, May through October represent the  
 20 lowest flow months of the year. Right?  
 21 **A. Typically.**  
 22 **Q.** And as with the last scenario, the white areas of  
 23 the map show areas where changes in salinity, if  
 24 any occurred, would be less than 1 ppt. Right?  
 25 **A. Correct.**  

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1 **Q.** And, Dr. Greenblatt, there are no months in 2007  
 2 where Florida's remedy scenario would have  
 3 decreased bay salinity by more than 2 to 3 ppt.  
 4 Right?  
 5 **A. Correct.**  
 6 **Q.** All right.  
 7 MS. DeSANTIS: Mr. Smith, can we please  
 8 blow up June of 2007.  
 9 BY MS. DeSANTIS:  
 10 **Q.** And, in fact, the month of June is the only month  
 11 in which Florida's 50 percent cut remedy scenario  
 12 would have decreased bay salinity by more than 2  
 13 ppt. Right?  
 14 **A. For this year, correct.**  
 15 **Q.** All right. And we're showing those changes very  
 16 close to the mouth of the river. Correct?  
 17 **A. Correct.**  
 18 **Q.** The rest of the bay is all white. Correct?  
 19 **A. Correct.**  
 20 **Q.** And that shows a change in salinity of less than  
 21 1 ppt. Correct?  
 22 **A. That's correct.**  
 23 **Q.** All right. Let's look at figure 3-12 on page 33  
 24 of demonstrative 3. And, again, we're comparing  
 25 bay salinity under the 50 percent cut remedy  

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<p>1770</p> <p>1 scenario to Georgia's use for October -- for May 2 through October 2008. Right? 3 <b>A. Yes.</b> 4 <b>Q.</b> All right. And the white areas of the map, 5 again, indicate where changes, if any occurred, 6 under Florida's proposed 50 percent cut remedy 7 would be less than 1 ppt. Right? 8 <b>A. Yes.</b> 9 <b>Q.</b> All right. 10 MS. DeSANTIS: Let's blow up May of 11 2008. 12 BY MS. DeSANTIS: 13 <b>Q.</b> Are you there, doctor? 14 <b>A. Yes.</b> 15 <b>Q.</b> All right. And in May 2008, if the proposed 16 remedy resulted in any change at all, it would 17 have been less than 1 ppt. Correct? 18 <b>A. That's correct.</b> 19 <b>Q.</b> All right. 20 MS. DeSANTIS: Let's blow up August of 21 2008. 22 BY MS. DeSANTIS: 23 <b>Q.</b> The same is true for August. Correct? 24 <b>A. That's correct.</b> 25 <b>Q.</b> Florida's proposed remedy in August of 2008, if</p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>	<p>1772</p> <p>1 remedy, if it made any difference in salinity 2 levels in the bay, would make a difference of 3 less than 1 ppt. Right? 4 <b>A. That's correct.</b> 5 <b>Q.</b> And August of 2009 was the only month in 2009 6 where Florida's proposed remedy would have 7 impacted salinity more than 1 ppt in the bay. 8 Right? 9 <b>A. That's correct.</b> 10 MS. DeSANTIS: Let's blow up August 2009 11 please, Mr. Smith. 12 BY MS. DeSANTIS: 13 <b>Q.</b> All right. It looks like there's a -- there's a 14 small purple area near the mouth of the river. 15 Right? 16 <b>A. Correct.</b> 17 <b>Q.</b> Can you see -- 18 MS. DeSANTIS: Can the Court see that 19 dot? 20 SPECIAL MASTER LANCASTER: Yes. 21 BY MS. DeSANTIS: 22 <b>Q.</b> All right. And that impact of more than 1 ppt 23 was limited to near the mouth of the river. 24 Right? 25 <b>A. That's correct.</b></p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>
<p>1771</p> <p>1 it made a difference, would result in a salinity 2 change of less than 1 ppt. Correct? 3 <b>A. That's correct.</b> 4 <b>Q.</b> And the same is true for September 2008. 5 Correct? 6 <b>A. Correct.</b> 7 <b>Q.</b> And the same is true for October of 2008. 8 Correct? 9 <b>A. That's correct.</b> 10 <b>Q.</b> All right. 11 MS. DeSANTIS: Let's put figure 3-13 on 12 page 34 up on the screen. 13 BY MS. DeSANTIS: 14 <b>Q.</b> And this shows the same comparison for May 15 through October of 2009. Correct? 16 <b>A. That's correct.</b> 17 <b>Q.</b> And the white areas of the map indicate where 18 changes, if any occurred, under Florida's 19 proposed remedy scenario were less than 1 ppt. 20 Right? 21 <b>A. That's correct.</b> 22 <b>And 2009 was a high flow year so, again, you</b> 23 <b>would see different patterns.</b> 24 <b>Q.</b> And in May, June, September, and October of 2009 25 Florida's proposed remedy, the 50 percent cut</p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>	<p>1773</p> <p>1 <b>Q.</b> All right. Let's turn now to figure 3-14 on 2 page 35 of demonstrative 3. 3 MS. DeSANTIS: And put that up on the 4 screen. 5 BY MS. DeSANTIS: 6 <b>Q.</b> And figure 3-14, likewise, compares bay salinity 7 under the 50 percent cut remedy scenario with 8 salinity levels under Georgia's simulated water 9 use for May through October 2010. Right? 10 <b>A. Yes.</b> 11 <b>Q.</b> And as shown on these maps, at no point in 2010 12 would Florida's remedy have decreased the 13 salinity in the bay by more than 2 ppt. Right? 14 <b>A. That's correct.</b> 15 <b>Q.</b> All right. Let's move on to figure 3-15 on 16 page 36 of demonstrative 3. 17 MS. DeSANTIS: And let's put that up on 18 the screen as well. 19 BY MS. DeSANTIS: 20 <b>Q.</b> Figure 3-15 compares salinity under the remedy 21 scenario with bay salinity under Georgia's water 22 use as simulated by you for May through October 23 2011. Right? 24 <b>A. Correct.</b> 25 <b>Q.</b> And in two of these low flow months, June and</p> <p style="text-align: center;">THE REPORTING GROUP Mason &amp; Lockhart</p>

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1 July, there are some areas where the salinity  
 2 difference is between 2 and 3 ppt. Right?  
 3 **A. Correct.**  
 4 **Q.** And these are small areas of impact limited to  
 5 near the mouth of the river. Right?  
 6 **A. That's correct.**  
 7 **Q.** And the white areas on all these maps show where  
 8 changes, if any, occurred under Florida's remedy  
 9 scenario were less than 1 ppt. Right?  
 10 **A. Correct.**  
 11 **Q.** All right. And, again, doctor, these figures are  
 12 showing what changes in salinity in the bay would  
 13 occur if Georgia cut its agricultural water use  
 14 in half. Right?  
 15 **A. Essentially. But, again, not for all months.**  
 16 **Q.** And the white areas of the map showing where  
 17 changes, if any, occurred under Florida's  
 18 proposed remedy scenario were less than 1 ppt.  
 19 Right?  
 20 **A. Correct.**  
 21 **Q.** All right.  
 22 MS. DeSANTIS: Let's put 2012 scenario  
 23 up. And that is page 37.  
 24 BY MS. DeSANTIS:  
 25 **Q.** All right. Doctor, we're looking at 3-16 on  
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1 page 37, which shows your remedy versus Georgia's  
 2 simulated use results for the year 2012. Right?  
 3 **A. Correct.**  
 4 **Q.** All right. And, doctor, you're aware that 2012  
 5 was the year of the oyster collapse. Right?  
 6 **A. Yes.**  
 7 **Q.** And in 2012, the year of the oyster collapse, if  
 8 Georgia had eliminated 50 percent of its  
 9 agricultural water use, the impact on salinity in  
 10 the bay would be what is shown in figure 3-16.  
 11 Right?  
 12 **A. That's correct.**  
 13 **Q.** And, in fact, as shown on the maps in figure  
 14 3-16, for almost all of the low flow months in  
 15 2012, the change of salinity in the bay is less  
 16 than 1 ppt. Right?  
 17 **A. For three of the six months.**  
 18 **Q.** The change of less than 1 ppt is shown in the  
 19 white areas on these maps. Correct?  
 20 **A. That's correct.**  
 21 **Q.** All right. And just to be clear, these are the  
 22 changes in salinity in the bay that your modeling  
 23 shows would result under Florida's remedy  
 24 scenario. Correct?  
 25 **A. That's correct.**  
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1 **Q.** And your maps in figure 3-16 show your modeled  
 2 salinity changes throughout the bay. Correct?  
 3 **A. That's correct.**  
 4 **Q.** Including at Cat Point. Correct?  
 5 **A. Yes.**  
 6 **Q.** Including at Dry Bar. Correct?  
 7 **A. Correct.**  
 8 **Q.** Including at east bay Station. Correct?  
 9 **A. Yes.**  
 10 **Q.** And including at St. Vincent Sound. Correct?  
 11 **A. Yes.**  
 12 **Q.** All right. And you maintain that Cat Point and  
 13 Dry Bar are the main oyster bars. Right?  
 14 **A. I know they're the commonly-studied oyster bars.**  
 15 **I don't know about main oyster bars.**  
 16 **Q.** All right. Let's put up your direct testimony at  
 17 page 13, please.  
 18 MS. DeSANTIS: Page -- Dr. Greenblatt's  
 19 direct testimony at page 13.  
 20 BY MS. DeSANTIS:  
 21 **Q.** Doctor, you indicate here -- and I'm looking at  
 22 the top of paragraph 26 -- that -- you say,  
 23 average salinity has been over 25 ppt of the bay  
 24 oyster bars, paren, Dry Bar --  
 25 MR. PRIMIS: You have got to slow down.  
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1 BY MS. DeSANTIS:  
 2 **Q.** -- and Cat Point. Do you see that?  
 3 **A. Yes, I see that.**  
 4 **Q.** All right.  
 5 MS. DeSANTIS: Mr. Smith, can you please  
 6 put figure 3 from Dr. Greenblatt's written  
 7 direct testimony on page 13 and figure 3-16  
 8 slide -- side by side on the screen.  
 9 BY MS. DeSANTIS:  
 10 **Q.** Okay. Now, doctor, I am just using your figure 3  
 11 on page 13 of your written direct to help orient  
 12 us to the locations of Dry Bar and Cat Point.  
 13 All right?  
 14 Can you see those on the map?  
 15 **A. Yes.**  
 16 **Q.** All right. And looking at your table 3 --  
 17 looking at your figure 3 and then looking at your  
 18 figure 3-16, it looks like Cat Point and Dry Bar  
 19 are shown in white in the months of 2012. Right?  
 20 **A. That's correct.**  
 21 **Q.** And that means that in 2012, the year of the  
 22 oyster collapse, if the remedy scenario proposed  
 23 by Florida had been in place, changes in salinity  
 24 at Cat Point and Dry Bar would be less than 1  
 25 ppt. Correct?  
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1 **A. That's what this simulation showed.**  
 2 **Q.** All right.  
 3 MS. DeSANTIS: I have no more questions.  
 4 Thank you.  
 5 MR. QURESHI: Your Honor, I'm happy to  
 6 proceed now; or would you like to take your  
 7 lunch break?  
 8 SPECIAL MASTER LANCASTER: Why don't you  
 9 go ahead.  
 10 MR. QURESHI: Thank you.  
 11 REDIRECT EXAMINATION  
 12 BY MR. QURESHI:  
 13 **Q.** Good afternoon, Dr. Greenblatt.  
 14 **A. Good afternoon.**  
 15 **Q.** I had some questions about your reliance on  
 16 information provided by Dr. Hornberger and  
 17 Dr. Flewelling.  
 18 **A. Yes.**  
 19 **Q.** Is that standard practice in your field?  
 20 **A. It is standard practice in my field. So**  
 21 **oftentimes, when we're looking at complex**  
 22 **problems, there's -- it requires expertise of**  
 23 **many different experts. And so it -- it's**  
 24 **frequently done that one expert will do an**  
 25 **evaluation or do a modeling study and provide**  
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1 **in my field where doing two different analyses by**  
 2 **different methods, when they result in similar**  
 3 **answers, that validates the results.**  
 4 **Q.** Okay. And what independent steps did you take to  
 5 verify the information you received from them?  
 6 **A. I did a low flow analysis similar to what**  
 7 **Dr. Hornberger did. So what -- what I did was I**  
 8 **looked at how flows have changed over time in the**  
 9 **Apalachicola River.**  
 10 **And it might be easier for me to explain this**  
 11 **from a figure.**  
 12 **Q.** Are you referring to a figure in your expert  
 13 report?  
 14 **A. I'm sorry. I think it's figure 5 in my PFD.**  
 15 **It's a figure showing -- oh, no. I'm sorry.**  
 16 **Figure 2, a figure showing flows.**  
 17 **Q.** I believe it's behind tab 2 of the binder that  
 18 you were provided. That's your expert report.  
 19 **A. Yes. Figure 1.2 in my expert report.**  
 20 **So Dr. Hornberger and I both did low flow**  
 21 **analyses, but we did it slightly differently; and**  
 22 **we both arrived at the same conclusion, which is**  
 23 **that low flows have become more frequent in**  
 24 **recent years.**  
 25 **Q.** Just give us one second.  
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1 **those results to another expert, as was the case**  
 2 **in this matter.**  
 3 **Q.** Who is Dr. Hornberger?  
 4 **A. Dr. Hornberger was the hydrologist who used the**  
 5 **analysis of Dr. Flewelling and then developed the**  
 6 **alternative scenarios that I used in my modeling.**  
 7 **Q.** What steps did you take to verify the information  
 8 you received from the hydrologists?  
 9 **A. I reviewed their reports so that I was**  
 10 **comfortable with the data that they used and the**  
 11 **methods that they used. And in Dr. Flewelling's**  
 12 **report, there was some question over some of the**  
 13 **data he used. And I reviewed some of his primary**  
 14 **sources so that I was comfortable with the**  
 15 **difference in the methods so that I was**  
 16 **comfortable with the values that Dr. Flewelling**  
 17 **used.**  
 18 **Dr. Hornberger then also reviewed**  
 19 **Dr. Flewelling's work. And in addition to**  
 20 **taking Dr. Flewelling's results, he did his own**  
 21 **analysis. So he did a second analysis, and he**  
 22 **was able to compare that to the analysis that**  
 23 **Dr. Flewelling did. And he found that he got**  
 24 **similar results.**  
 25 **And that's another common thing that's done**  
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1 **A. Yes. I'll wait for you to get there.**  
 2 **Q.** I believe that page it's on is not numbered, but  
 3 it is -- it may be the 28th page. It's, again,  
 4 figure 1-2.  
 5 **A. Correct. Right.**  
 6 **Q.** Thank you, Dr. Greenblatt.  
 7 **A. So to understand how flows have changed over**  
 8 **time, I looked at measured flows. These flows**  
 9 **were measured at the USGS Chattahoochee Flow Gage**  
 10 **on the Apalachicola River. This is the first**  
 11 **gage after the river enters the State of Florida.**  
 12 **And it encompasses the flow for most of the**  
 13 **watershed in the Apalachicola-Chattahoochee-Flint**  
 14 **Basin.**  
 15 **So I looked at daily measured flows from the**  
 16 **period of 1970 to 2015. And in order to do my**  
 17 **low flow analysis, I defined a value of low flow.**  
 18 **To do this, I did a statistical evaluation that**  
 19 **is very commonly done in my field where I**  
 20 **identified the flow that's what we call the 10th**  
 21 **percentile flow. So it's the flow that was**  
 22 **exceeded 90 percent of the time. And then I**  
 23 **proceeded to count the number of days where flow**  
 24 **was below this value over this period of -- of**  
 25 **record of -- in the measured data.**  
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1 **And what I can see from this figure is that**  
 2 **the frequency of low flows -- and these are**  
 3 **focused -- this graph is focused on the dry**  
 4 **season months. Increases in recent years are in**  
 5 **the later part of the record.**  
 6 **So we have more low flow days, and they occur**  
 7 **in more years. And that conclusion, again, is**  
 8 **similar to the conclusion that Dr. Hornberger**  
 9 **reached.**  
 10 **Q.** Dr. Greenblatt, you also had some questions about  
 11 the changes in salinity; and you made a comment  
 12 about absolute changes. What did you mean by  
 13 that?  
 14 **A.** **To look at the changes in salinity, the number on**  
 15 **its own is not a meaningful metric for salinity.**  
 16 **What matters is how the changes in salinity**  
 17 **affect the ecosystem. And although I'm not an**  
 18 **expert and I'm not offering opinions on how the**  
 19 **change affects the ecosystem, there have been --**  
 20 **we have heard that from Dr. White and Dr. Kimbro**  
 21 **that there are changes and impacts to the**  
 22 **ecosystem based on changes in salinity.**  
 23 MS. DeSANTIS: Objection, move to strike  
 24 testimony. The witness is proffering  
 25 testimony from other experts outside of her

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1 area of expertise.  
 2 SPECIAL MASTER LANCASTER: You may  
 3 proceed.  
 4 MR. QURESHI: Thank you, your Honor.  
 5 BY MR. QURESHI:  
 6 **Q.** Dr. Greenblatt, there was some discussion about  
 7 sea level rise and how you evaluated sea level  
 8 rise in connection with your modeling. Can you  
 9 explain in more detail the relationship you  
 10 determined existed between sea level rise and  
 11 salinity in Apalachicola Bay.  
 12 **A.** **Yes. I did a data-based evaluation of sea level**  
 13 **rise and salinity -- and, again, it might be**  
 14 **easier if we could look at a figure.**  
 15 **Q.** It's at -- this is figure 5 of your prefiled  
 16 direct.  
 17 **A.** **Thank you.**  
 18 **Q.** On page 17.  
 19 **A.** **The salinities have been measured in Apalachicola**  
 20 **Bay at several locations. And so I used the**  
 21 **measured salinity data as well as measured data**  
 22 **of sea level or the water depth that's been**  
 23 **measured in Apalachicola Bay for about 50 years.**  
 24 **And once we get our figure --**  
 25 **Q.** This is figure 5 on page 17?

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1 **A.** **Yes. If we could blow up the top, I think that**  
 2 **would be helpful.**  
 3 **So what we're looking at here is a plot that**  
 4 **relates sea level to salinity. So along the**  
 5 **horizontal axis is sea level, and we can see that**  
 6 **it varies from minus 4 to about 10. So 14 --**  
 7 **about 14 centimeters. And along the vertical**  
 8 **axis is salinity at two locations, at Cat Point**  
 9 **and Dry Bar.**  
 10 **And what this graph shows is that for the**  
 11 **14-centimeter change in sea level, we really see**  
 12 **no change and no consistent change or consistent**  
 13 **pattern in the measured salinity. So based on**  
 14 **this graph, it -- what it tells me is that**  
 15 **there's no discernible relationship between**  
 16 **salinity and sea level.**  
 17 **Q.** And as a general matter, Dr. Greenblatt, can you  
 18 explain the difference between sea level and sea  
 19 level rise?  
 20 **A.** **Yes. Sea level is a measured value for the water**  
 21 **depth; and sea level rise is the rate at which --**  
 22 **or the rate at which that is increasing over**  
 23 **time.**  
 24 **Q.** If we look at another figure in your prefiled  
 25 direct, in particular -- sorry. It's a figure in

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1 your expert report relating to sea level. I  
 2 would like to put that on the screen and have you  
 3 explain to us what it represents.  
 4 **A.** **This is a graph that was developed by NOAA. This**  
 5 **is the same sea level data that I had used, but**  
 6 **it's presented in a slightly different manner.**  
 7 **This is monthly average sea level for the period**  
 8 **of record, so about 50 years.**  
 9 **And what this graph shows is that there is a**  
 10 **wide variation in sea level from month to month.**  
 11 **It varies by about 20 centimeters over the**  
 12 **period. So from one month to another month we**  
 13 **see a wide variation in sea level. So given that**  
 14 **sea level varies all the time, it's going up and**  
 15 **down from month to month and year to year, and**  
 16 **that we don't see a discernible relationship**  
 17 **between sea level and salinity, I conclude that**  
 18 **there's -- there isn't a discernible relationship**  
 19 **between the two.**  
 20 **Q.** In your discussion of sea level rise in your  
 21 prefiled direct, there's a discussion of  
 22 sedimentation. What is sedimentation?  
 23 **A.** **Sedimentation is when particles such as silts and**  
 24 **clays that are in the water fall and settle out**  
 25 **onto the bay bottom. And sedimentation is**

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1 **important in this context because what drives**  
 2 **sedimentation is flow patterns in the bay. And**  
 3 **something like sea level rise will affect -- will**  
 4 **change the flow patterns in the bay.**  
 5 **So when the flow patterns in the bay change,**  
 6 **sedimentation will change. And so any**  
 7 **consideration of the impact of sea level rise on**  
 8 **salinity would need to take into account these**  
 9 **changes because when sedimentation happens and**  
 10 **the depth of the bay changes or the size of the**  
 11 **inlet changes, then flow patterns change. And**  
 12 **that will in turn affect salinity.**  
 13 **Q.** Okay. And --  
 14 SPECIAL MASTER LANCASTER: Sorry.  
 15 MR. QURESHI: That's fine, your Honor.  
 16 I can move on to a different topic or  
 17 take a lunch break if that is an appropriate  
 18 time to do so.  
 19 SPECIAL MASTER LANCASTER: Why don't you  
 20 move on to your new topic.  
 21 MR. QURESHI: Okay.  
 22 BY MR. QURESHI:  
 23 **Q.** Dr. Greenblatt, can you explain to the Court what  
 24 tools you relied upon to undertake your analysis?  
 25 **A. I developed a numerical model of hydrodynamics**  
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1 **and salinity to undertake my analysis.**  
 2 **Because the Apalachicola Bay is a complex**  
 3 **system and there's a lot of factors that affect**  
 4 **the salinity patterns we see in the bay, these**  
 5 **factors include the freshwater inflow, tides,**  
 6 **wind, the shape or what we call the bathymetry of**  
 7 **the bay. All of these things react in a complex**  
 8 **way to affect salinity and salinity patterns. So**  
 9 **in order to evaluate the salinity patterns for**  
 10 **both existing conditions and, importantly, for**  
 11 **future conditions where the only way we can**  
 12 **evaluate it is with some sort of predictive tool,**  
 13 **I developed a hydrodynamic model that includes**  
 14 **these factors.**  
 15 **Q.** And in your field of study, how common is it to  
 16 use the model to evaluate changes in flow?  
 17 **A. It's very common.**  
 18 **Q.** Okay. Can you explain the type of model you used  
 19 to perform this flow analysis?  
 20 **A. I used a model called the Regional Ocean Modeling**  
 21 **System. It's called a ROMS model.**  
 22 **So this -- I would like to think about**  
 23 **modeling as thinking about the modeling platform**  
 24 **and then the model application. And so the**  
 25 **modeling platform -- I like to compare it to**  
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1 **making cookies. And I think of the modeling**  
 2 **platform as the oven. And there are several**  
 3 **modeling platforms that are accepted in my field,**  
 4 **and all work about the same way; whereas, what**  
 5 **goes into the model you can think of as the**  
 6 **ingredients, the wind and the bathymetry and the**  
 7 **data that we use. And -- and so that is the**  
 8 **model that I used.**  
 9 **Q.** And have you evaluated other models that were  
 10 used by Georgia's experts to evaluate similar  
 11 issues?  
 12 **A. I did evaluate Georgia's model. And Georgia's**  
 13 **expert developed a model that's very similar to**  
 14 **mine. He used a different modeling platform --**  
 15 **so a different oven -- but it works about the**  
 16 **same way.**  
 17 **And he, in fact, used modeling input that I**  
 18 **used and ran it through his model; and he came**  
 19 **out with the same answer. So that's another**  
 20 **validation. That's a way to validate a model**  
 21 **when two different modelers can use the same**  
 22 **inputs and come out with a similar answer.**  
 23 **Q.** And who created the model that you relied upon?  
 24 **A. It was created by an engineering firm called**  
 25 **Intera Consulting.**  
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1 **Q.** And what steps did you take to verify the  
 2 appropriateness of this model?  
 3 **A. I reviewed the reports. So this model -- they**  
 4 **developed this model prior to this matter for the**  
 5 **Water Management District in Florida. So this**  
 6 **model was available to me as a potential tool**  
 7 **when I was retained on this matter.**  
 8 **So I reviewed the reports written about this**  
 9 **model. I had discussions with the modelers that**  
 10 **developed it. And I actually went and visited**  
 11 **with them and sat with them. And I had one of my**  
 12 **colleagues sit with the modeler and go through**  
 13 **the input file. So I have a high degree of**  
 14 **confidence in this model as a tool to support my**  
 15 **opinions.**  
 16 **Q.** Okay. I would like to move on now to your  
 17 modeling results and, first, ask you to describe  
 18 the relationship between flow and salinity in  
 19 Apalachicola Bay.  
 20 **A. So what my modeling shows is as fresh water**  
 21 **increases, salinities decline in the bay. So**  
 22 **that's what it shows generally. And then**  
 23 **specifically I looked at how that decline varies**  
 24 **in different flow scenarios at different**  
 25 **locations and at different times in the bay.**  
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1 **Q.** Okay. And there was reference in your  
 2 cross-examination about that you're  
 3 characterizing as the remedy scenario as a very  
 4 conservative scenario. Why did you call it a  
 5 very conservative scenario?

6 **A.** **It's my understanding that since that scenario**  
 7 **was developed for the modeling that I submitted**  
 8 **in my expert report last winter, that there's**  
 9 **been additional valuations of remedy scenarios**  
 10 **and that there's other scenarios that may result**  
 11 **in a greater -- other scenarios that could be**  
 12 **done, I think, for the -- I don't know the**  
 13 **details of them, but that could result in greater**  
 14 **reduction, which would be more freshwater inflow,**  
 15 **which would result in lower salinities or larger**  
 16 **changes from the existing conditions.**

17 **Q.** You mentioned Dr. Flewelling's work and your  
 18 reliance on it. Did you evaluate other sources  
 19 of information that consider the amount of water  
 20 being used by Georgia compared to the amount that  
 21 Dr. Flewelling computed was being used by  
 22 Georgia?

23 **A.** **I did. There are several reports that were**  
 24 **developed by USGS that estimate the -- among**  
 25 **other things, the agricultural consumptive use.**

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1 **was reported to them by Georgia. They didn't do**  
 2 **an independent analysis of these data.**

3 **Q.** In addition to evaluating the influence of  
 4 Apalachicola River flow on the salinity in the  
 5 bay, did you consider any other watersheds that  
 6 might have an impact on salinity in the bay?

7 **A.** **There is a small watershed called Tate's Hell**  
 8 **that's located in -- adjacent to east bay. And I**  
 9 **did consider the impacts of fresh water and flows**  
 10 **that would come from this watershed. And in**  
 11 **evaluating the relative amount of freshwater flow**  
 12 **from these watersheds to the Apalachicola River,**  
 13 **I found that it was very small, on the order of**  
 14 **1 to 5 percent.**

15 **And I was able to do that evaluation both**  
 16 **based on model flows in these watersheds, so I**  
 17 **compared the flows that were in the model coming**  
 18 **out of the creeks in this watershed to the flows**  
 19 **in Apalachicola River. And they were on the**  
 20 **order of a few percent.**

21 **I also looked at the watershed area. So it's**  
 22 **very common in my field to use watershed area as**  
 23 **a surrogate for flow when we don't have measured**  
 24 **flows. So the watershed area of the creeks in**  
 25 **Tate's Hell that -- that provide some fresh water**

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1 **And so Dr. Flewelling, in developing his**  
 2 **evaluations, he did review these reports; but**  
 3 **his -- his consumptive use -- agricultural**  
 4 **consumptive use differs from these reports for a**  
 5 **couple of reasons. One, there's two factors --**  
 6 **general factors that go into the development of**  
 7 **consumptive agricultural use. One is the**  
 8 **irrigated acres and one is irrigated depth.**

9 **And so what Dr. Flewelling found in reviewing**  
 10 **this work and all of the available data that he**  
 11 **reviewed is that the irrigated acres were -- were**  
 12 **underestimated in some of these reports. And he**  
 13 **relied on aerial photos to get the most updated**  
 14 **estimates of irrigated acres. His irrigation**  
 15 **depths also differ from what's done in these**  
 16 **reports for two reasons. For one, he relies on**  
 17 **some metering data which became available in the**  
 18 **late 2000's. This is data that measures water he**  
 19 **found, agricultural water. So he used these data**  
 20 **to back-calculate irrigation depths for years**  
 21 **prior to that data being available. He also**  
 22 **calculated crop-specific irrigation depths. So**  
 23 **that's why his numbers differ and are a more**  
 24 **thorough analysis.**

**The USGS reports also rely on the data that**  
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1 **are about 1 percent or 2 percent of the total**  
 2 **watershed area in Apalachicola Bay.**

3 **And finally, although I didn't do a**  
 4 **sensitivity analysis myself on the flows in**  
 5 **Apalachicola -- in Tate's Hell, Georgia's expert,**  
 6 **Dr. McAnally, did do an evaluation of the impacts**  
 7 **of this freshwater inflow. And what he found is**  
 8 **that for a change of 30 percent in these flows in**  
 9 **these small watersheds in Tate's Hell resulted in**  
 10 **a change in simulated salinity of less than 1**  
 11 **percent. So they had very little impact on**  
 12 **salinity in the bay.**

13 **Q.** Okay. Dr. Greenblatt, a few more topics to  
 14 cover. And the next one I would like to move on  
 15 to is the testing you did to confirm that your  
 16 model matches actual data.

17 **Are you familiar with the concept of an**  
 18 **uncertainty analysis?**

19 **A.** **I am familiar with that concept.**

20 **Q.** What is it?

21 **A.** **An uncertainty analysis is a means of looking at**  
 22 **uncertainty in all of the parameters that go into**  
 23 **your model and then understanding how that**  
 24 **uncertainty would affect your results. It also**  
 25 **provides a way to put uncertainty bounds on your**

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1 **modeled predicted estimates. It doesn't change**  
 2 **your estimates; it just puts bounds on those**  
 3 **estimates.**  
 4 **Q.** And are there other ways to put bounds on your  
 5 estimates or to evaluate how well your model fits  
 6 actual data?  
 7 **A. Yes. Typically what's done in a model is to do**  
 8 **what I call goodness of fit statistics. So you**  
 9 **run a series of statistical tests to look at how**  
 10 **well your model simulations match measured data.**  
 11 **And I -- I did run those tests and -- including a**  
 12 **statistical test of error.**  
 13 **And to understand how my results compared,**  
 14 **I -- I looked at -- I used a document developed**  
 15 **by the Army Corps of Engineers. This was not for**  
 16 **Apalachicola Bay, but for a project in Louisiana.**  
 17 **And although there's no guidance values, there**  
 18 **were recommended values in that document on**  
 19 **acceptable error statistics. And my error**  
 20 **statistics were well within that range that was**  
 21 **cited in that document.**  
 22 **Q.** How many different testing stations or nodes did  
 23 you evaluate in reaching your conclusions?  
 24 **A. Well, the model is -- the original model that was**  
 25 **developed by Intera calculated the data that was**

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1 **collected at 37 locations throughout the bay. So**  
 2 **that's a significant dataset for model**  
 3 **calibration. So to -- in the -- then the**  
 4 **calibration is the process of comparing the**  
 5 **metrix data to the modeled predictions and making**  
 6 **any adjustments that are necessary in the model**  
 7 **in order to have the best fit. So the modeled**  
 8 **predictions were compared to measured values of**  
 9 **salinity and water level and velocity at these 37**  
 10 **locations, and then the statistics were performed**  
 11 **to test the goodness of fit.**  
 12 **Q.** Dr. Greenblatt, if we could turn to your prefiled  
 13 direct testimony for a moment, in particular on  
 14 page 15. I would like to discuss with you  
 15 paragraph 29.  
 16 I would like you to read that to yourself and  
 17 then explain to us what you mean by the last  
 18 sentence in paragraph 29.  
 19 **A. So this -- this paragraph is providing a general**  
 20 **summary of what I found in my modeled results.**  
 21 **And the last sentence -- what that means is that**  
 22 **if I had a different remedy scenario that**  
 23 **resulted in more freshwater inflow, then I would**  
 24 **see lower salinities in Apalachicola Bay in my**  
 25 **modeling. To the extent of how they would**

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1 **change, I wouldn't know without running the**  
 2 **model. But that's what we would see. With**  
 3 **increased freshwater inflows, you would see lower**  
 4 **salinity.**  
 5 **Q.** The exact amounts you would need to compute in  
 6 your model, but the general relationship is  
 7 established?  
 8 **A. That's correct.**  
 9 **Q.** Okay. We talked when we were looking through the  
 10 various remedy scenarios that were in that -- the  
 11 handout that was provided, can you explain  
 12 generally why the amounts vary according to  
 13 months?  
 14 **A. The amounts will vary according to months based**  
 15 **on -- based on the flow patterns. So both the**  
 16 **existing conditions and the remedy or the future**  
 17 **scenario, depending on what we're comparing it**  
 18 **to, you're going to see different patterns. For**  
 19 **each year and each month there's going to be**  
 20 **different flows in that month.**  
 21 **And the model looks at time-varying flows.**  
 22 **So we had flows -- so even though we have a low**  
 23 **flow month, there may be a period in that month**  
 24 **where flows are higher. And then what I**  
 25 **presented is an average for each month.**

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1 **Q.** If we could please turn to page 38.  
 2 SPECIAL MASTER LANCASTER: Let's take a  
 3 noon recess, counsel.  
 4 MR. QURESHI: Thank you, your Honor.  
 5 SPECIAL MASTER LANCASTER: Sorry.  
 6 (Time Noted: 11:58 a.m.)  
 7 (Recess Called)  
 8 (Time Noted: 1:05 p.m.)  
 9 SPECIAL MASTER LANCASTER: I hope you  
 10 haven't been standing there waiting since we  
 11 left.  
 12 MR. QURESHI: No, your Honor.  
 13 Before I begin, I would like to  
 14 introduce my colleague --  
 15 SPECIAL MASTER LANCASTER: Please.  
 16 MR. QURESHI: -- Stijn van Osch.  
 17 MR. OSCH: Good afternoon, your Honor.  
 18 BY MR. QURESHI:  
 19 **Q.** Dr. Greenblatt, before we broke, we were  
 20 referring to the charts you were shown during  
 21 your cross-examination. Do you recall that?  
 22 **A. I do.**  
 23 **Q.** What do these charts tell us about the absolute  
 24 values of salinity at any particular point in  
 25 time?

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1 **A. These charts show us the results of the modeled**  
 2 **predictions looking at differences in salinity**  
 3 **between the various scenarios that I ran in my**  
 4 **model. So at any point in time they show a**  
 5 **monthly average value of the salinity difference**  
 6 **for each of the months for each of the years.**  
 7 **Q.** But the particular salinity that would exist at a  
 8 specific location in the bay is not depicted on  
 9 these charts?  
 10 **A. Not the particular salinity at a particular point**  
 11 **in time. These are monthly average values.**  
 12 **Q.** And, doctor, we would -- can you remind us who  
 13 are the ecologists you worked with in evaluating  
 14 the impact salinity changes would have?  
 15 **A. The ecologists are Dr. Kimbro and Dr. White and**  
 16 **Dr. Glibert.**  
 17 **Q.** In addition to salinity, your testimony and  
 18 expert report also discussed residence time.  
 19 What is residence time?  
 20 **A. Residence time is the time a particle remains in**  
 21 **a certain water body. So the longer the**  
 22 **residence time, the longer a particle remains in**  
 23 **there. And typically, if flows are lower,**  
 24 **residence times are higher.**  
 25 **Q.** What impact would persistent low flows have on  
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1 residence time and salinity?  
 2 **A. Persistent low flows would increase residence**  
 3 **time; and they would reduce salinity -- I'm**  
 4 **sorry, increase -- low flows would be to**  
 5 **increased salinity.**  
 6 **Q.** Okay. And what impact would persistent low flows  
 7 have on residence time?  
 8 **A. They would lead to longer residence times.**  
 9 **Q.** Okay. Counsel for Georgia questioned you about  
 10 the remedy scenario and suggested it involved a  
 11 50 percent cut in all agriculture. Do you  
 12 understand that the remedy scenario actually  
 13 involves cuts in water use at specific points of  
 14 time in the year and only for specific crops?  
 15 **A. I understood that in general. I don't know the**  
 16 **details of the remedy scenario, but I know it's**  
 17 **not a straight 50 percent cut.**  
 18 **Q.** Okay. Thank you, Dr. Greenblatt.  
 19 SPECIAL MASTER LANCASTER: Counsel?  
 20 MS. DeSANTIS: No further questions,  
 21 your Honor.  
 22 SPECIAL MASTER LANCASTER: Dr. Greenblatt,  
 23 am I correct in understanding that your oven  
 24 model, as you called it, based upon the  
 25 information that you had from the other  
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1800

1 experts causes you to conclude that decreased  
 2 flows in the bay cause higher salinity?  
 3 THE WITNESS: Decreased flows in the  
 4 river that come into the bay --  
 5 SPECIAL MASTER LANCASTER: Yes.  
 6 THE WITNESS: -- do lead to higher  
 7 salinities; that's correct. That's what the  
 8 model shows.  
 9 SPECIAL MASTER LANCASTER: Is that a  
 10 correct summary of your testimony?  
 11 THE WITNESS: Yes.  
 12 SPECIAL MASTER LANCASTER: Thank you.  
 13 Any other questions, counsel?  
 14 MR. QURESHI: No, your Honor.  
 15 MS. DeSANTIS: No, your Honor.  
 16 SPECIAL MASTER LANCASTER: Thank you.  
 17 THE WITNESS: You're welcome.  
 18 MS. WINE: Florida is calling our next  
 19 witness, Mr. Tommy Ward.  
 20 Mr. Ward is a third-generation oyster  
 21 dealer. He and his family have owned and  
 22 managed the largest privately-leased oyster  
 23 bars in Apalachicola Bay for over 60 years.  
 24 THE CLERK: Please raise your right  
 25 hand.  
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1801

1 Do you solemnly swear that the testimony  
 2 you shall give in the cause now in hearing  
 3 shall be the truth, the whole truth, and  
 4 nothing but the truth, so help you God?  
 5 THE WITNESS: I do.  
 6 THE CLERK: Please be seated.  
 7 Pull yourself right up to the microphone  
 8 and please state your name and spell your  
 9 last name.  
 10 THE WITNESS: My name is Thomas Lee  
 11 Ward. T H -- T H O M A S, L E E, W A R D.  
 12 DIRECT EXAMINATION  
 13 BY MS. WINE:  
 14 **Q.** Good afternoon, Mr. Ward.  
 15 **A. Good day.**  
 16 MS. WINE: Your Honor, may I approach  
 17 the witness to provide him with his  
 18 testimony?  
 19 SPECIAL MASTER LANCASTER: Please.  
 20 **A. Thank you.**  
 21 **Q.** Mr. Ward, I have just handed you your prefiled  
 22 direct testimony in this matter. Do you  
 23 recognize that document?  
 24 **A. Yes, ma'am.**  
 25 **Q.** And do you adopt it as your own, sir?  
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1802

1 **A. Yes, ma'am.**  
 2 MS. WINE: Your Honor, Georgia's counsel  
 3 has told us that they intended -- they intend  
 4 not to cross Mr. Ward. However, Mr. Ward  
 5 wanted to be here today. He feels strongly  
 6 about this matter. He's prepared to testify.  
 7 And he's certainly available to answer any  
 8 questions that your Honor may have about his  
 9 testimony if Georgia so chooses not to cross  
 10 him today.  
 11 SPECIAL MASTER LANCASTER: Thank you.  
 12 MR. ALLEN: Good afternoon, your Honor.  
 13 SPECIAL MASTER LANCASTER: Good afternoon.  
 14 MR. ALLEN: As Ms. Wine indicated, we  
 15 have no cross-examination of Mr. Ward.  
 16 SPECIAL MASTER LANCASTER: Ms. Wine?  
 17 MS. WINE: Your Honor, if you would  
 18 permit me to ask some questions, we're  
 19 certainly prepared to do so. We weren't sure  
 20 if you would allow that given that Georgia  
 21 chose not to cross Mr. Ward.  
 22 And as I said, he's certainly here  
 23 prepared to testify today and happy to answer  
 24 any questions that you allow me to ask him or  
 25 that you want to pose to him yourself.

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1803

1 SPECIAL MASTER LANCASTER: You may  
 2 proceed.  
 3 MS. WINE: Thank you, sir.  
 4 BY MS. WINE:  
 5 **Q.** Good afternoon again, Mr. Ward.  
 6 **A. Good day.**  
 7 **Q.** Mr. Ward, could you tell the Court how long you  
 8 have run your business in Apalachicola Bay?  
 9 **A. I have run it for about 30 years.**  
 10 **Q.** And did your family run the business prior to you  
 11 taking it over?  
 12 **A. Yes, ma'am.**  
 13 **Q.** And what is that business?  
 14 **A. We're in the seafood business, oysters, shrimp**  
 15 **business.**  
 16 **Q.** And as it relates to oysters, what is your  
 17 business?  
 18 **A. I manage the oyster house and the oyster leases**  
 19 **which we hold.**  
 20 **Q.** And you're an oyster dealer; is that correct,  
 21 sir?  
 22 **A. Yes, ma'am.**  
 23 **Q.** You have experience as well in the past being an  
 24 oyster fishermen as well; is that correct?  
 25 **A. Correct.**

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1804

1 **Q.** And, sir, how long has your family owned and  
 2 managed the private leases that it holds in  
 3 Apalachicola Bay?  
 4 **A. About 60 years, you know, when my dad got it.**  
 5 **And on my mother's side, I would say from the**  
 6 **early 1920's, '30's.**  
 7 **Q.** And, sir, we have only heard a little bit about  
 8 the private oyster leases or the oyster bars in  
 9 the bay so far. Could you please explain to the  
 10 Court what those private leases are.  
 11 **A. It's where you take barren bottom, and you make**  
 12 **it productive into oyster beds, you know, if the**  
 13 **State permits you to do that. We have perpetual**  
 14 **leases, which the State does not give out**  
 15 **perpetual leases anymore in Apalachicola Bay.**  
 16 **Q.** And, sir, who is allowed to fish on your private  
 17 leases?  
 18 **A. Only people that work for us.**  
 19 **Q.** And so it's not open to oyster harvesting to the  
 20 public?  
 21 **A. It's not open to the public, no, ma'am.**  
 22 **Q.** Okay. And, sir, I'm going to pull up a map of  
 23 Apalachicola Bay.  
 24 MS. WINE: If Mr. Walton could do that.  
 25 BY MS. WINE:

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1805

1 **Q.** And, sir, it might be easier if the Court would  
 2 allow you to walk over to the map. And I would  
 3 love for you to point out where your leases are  
 4 in Apalachicola Bay.  
 5 MS. WINE: Would that be okay, your  
 6 Honor?  
 7 SPECIAL MASTER LANCASTER: Yes, but keep  
 8 your voice up because this nice young lady  
 9 has to record what you're saying.  
 10 THE WITNESS: Yes, sir.  
 11 **A. The oldest lease we have is lease 525. We have**  
 12 **had it since the early '20's, '30's. And this is**  
 13 **in what we call Big Bayou up in St. Vincent Sound**  
 14 **or in Saint Vincent Island. And then over to the**  
 15 **northeast -- I mean, northwest we have another**  
 16 **lease which is called -- is lease 609 that we**  
 17 **also -- that is the newest lease. We acquired it**  
 18 **in 1964.**  
 19 **Q.** Thank you, sir.  
 20 Sir, how big are your leases in terms of  
 21 total acres?  
 22 **A. Lease 609 is 88.4 acres; and lease 525, which is**  
 23 **in Big Bayou, is 173 acres, I believe, ma'am.**  
 24 **Q.** So a little more than 250 acres total?  
 25 **A. Yes, ma'am.**

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1806

1808

- 1 **Q.** And, sir, have these oyster bars and these leases
- 2 historically been productive?
- 3 **A. Yes, ma'am.**
- 4 **Q.** And can you give us a sense of the productivity
- 5 of your oyster bars that are on these leases?
- 6 **A. Well, we have always been able to harvest oysters**
- 7 **pretty much year-round. You know, you have**
- 8 **seasonal oyster harvesting areas. Sometimes**
- 9 **you're planning and, you know, waiting for spat**
- 10 **set, so you may not harvest for two or three,**
- 11 **four, five months at a time because you don't**
- 12 **want to interrupt the spat set you have of the**
- 13 **juvenile oysters so you don't kill them when**
- 14 **you're, you know, harvesting them. So, you know,**
- 15 **it just depends.**
- 16 **Q.** Prior -- prior to 2011 and 2012, other than when
- 17 there's been an event like a hurricane, have your
- 18 leases historically been consistently productive?
- 19 **A. Yes, ma'am.**
- 20 **Q.** And what happened to them in the 2011-2012 time
- 21 period?
- 22 **A. They was decimated. They're completely dead at**
- 23 **this time.**
- 24 **Q.** And -- I know this is difficult for you, sir.
- 25 What -- do you need a minute?

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- 1 **of conchs.**
- 2 **Q.** So by the end, for every 50 to 60 pounds of
- 3 oysters, how many approximately pounds of conchs
- 4 were you getting?
- 5 **A. I would four to 500 pounds.**
- 6 **Q.** Four to 500 pounds of conchs?
- 7 **A. Yes, ma'am.**
- 8 **Q.** And this is in the 2012 time period?
- 9 **A. Yes, ma'am. It completely annihilated these**
- 10 **beds.**
- 11 **Q.** And, sir, what have you done on your private
- 12 leases to help the bars recover since 2012?
- 13 **A. Well, I have -- I have tried planting; and, you**
- 14 **know, we tried to diversify and grow oysters in**
- 15 **cages.**
- 16 **A perpetual lease, you can only use the**
- 17 **bottom. You cannot use the upper water column to**
- 18 **grow oysters. So we put them in cages. And the**
- 19 **predators would eat the oysters through the**
- 20 **cages.**
- 21 **Q.** So just so we understand, after the crash, you
- 22 tried to harvest oysters by putting the oysters
- 23 in cages or baskets, as I think you described it
- 24 in your prefiled testimony?
- 25 **A. Yes, ma'am.**

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1807

1809

- 1 **A. Okay. I'm ready.**
- 2 **Q.** What did you see happen on these oyster bars
- 3 during 2011 and 2012?
- 4 **A. I seen the predators come in and start killing**
- 5 **off the oysters.**
- 6 **Q.** And what kind of predators did you see on your
- 7 bars?
- 8 **A. I'm referring to conchs. You got the southern**
- 9 **conch and the crown conch.**
- 10 **Q.** Is another name for a conch an oyster drill?
- 11 **A. Yes, ma'am. That would be the southern conch.**
- 12 **Q.** And, sir, what is the severity or magnitude of
- 13 the conchs that you started to observe on your
- 14 bars?
- 15 **A. Well, you know, at the time we was probably**
- 16 **producing 50, 60 bags a day without a chemical**
- 17 **harvesting boat. And it got to where every**
- 18 **couple days it was falling off five to 10 bags of**
- 19 **oysters. And the increase of the conchs from,**
- 20 **you know, where you may get 15 or 20 pounds, it**
- 21 **was getting, you know, every day, 60, you know,**
- 22 **120. And at the end, we was catching, you know,**
- 23 **maybe 500 pound of conchs and maybe 60 to 80**
- 24 **pounds of oysters where we was getting 50 to**
- 25 **60 -- 60 pound bags of oysters and 25 pound bags**

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- 1 **Q.** And what happened to the oysters that were in
- 2 those cages or baskets?
- 3 **A. The predators would -- the oyster drills, conchs,**
- 4 **however your Honor wants it worded, it would --**
- 5 **it would go through the holes in the baskets and**
- 6 **eat -- and eat the oysters. You know, drill into**
- 7 **it and eat the oyster.**
- 8 **Q.** And I think you also mentioned planting. By that
- 9 do you -- are you talking about planting shell?
- 10 **A. Yes, ma'am.**
- 11 **Q.** So reshelling your leases -- your leased bars?
- 12 **A. I reshelled my leases extensively, and it did no**
- 13 **good.**
- 14 **Q.** So extensively since the crash in 2012?
- 15 **A. Yes, ma'am. And before.**
- 16 **Q.** Okay. And in connection with the reshelling, you
- 17 also -- I don't know if this is the right word,
- 18 planted or spread spat on those shells?
- 19 **A. Yes. We put, you know, spat out; and they would**
- 20 **not live.**
- 21 **And, you know, mainly we would like to catch**
- 22 **a wild spat set, is what I call it, you know,**
- 23 **where you catch the organism floating through the**
- 24 **water, you know, on shell. And if you would get**
- 25 **a small spat set, the -- the conchs would eat**

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1810

1 **them, you know, before they got half an inch.**

2 **Q.** So none of that reshelling and spreading of spat

3 has allowed your bars to recover since 2012?

4 **A. No, ma'am. My bars have not recovered.**

5 **Q.** And, sir, has anybody been harvesting on your

6 bars since the crash in 2012?

7 **A. Not really. We -- you know, we test our bars to**

8 **see if we're getting any recovery whatsoever,**

9 **but not to the extent I would say we was**

10 **harvesting oysters off of them, you know.**

11 **I think in 2015 we may have got 100 bags of**

12 **oysters off of it to where --**

13 **Q.** Okay. And other than that limited harvesting and

14 testing, has anybody been harvesting on your

15 leased bars?

16 **A. No, ma'am.**

17 **Q.** Sir, when you go out on your leases now in 2016,

18 what do you see?

19 **A. Oh, I see decimation, dead shell to where, you**

20 **know, when -- when the crash happened, you would**

21 **have a full oyster, you know, top and bottom**

22 **shell. And after the conchs eat this, you will**

23 **have an empty shell.**

24 **And, also, it seems like a lot of shell are**

25 **deteriorating from, you know, I assume, the acid**

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1811

1 **or whatever that the conch drills into the shell.**

2 **Q.** And, sir, are you still seeing conchs when you go

3 out onto your private bars?

4 **A. If there's any live oysters, yes, ma'am.**

5 **Q.** And, sir, how has the -- well, let me ask you

6 this. What is your view of why this has happened

7 in the bay based on all of your years of

8 experience harvesting oysters in the bay?

9 **A. Lack of fresh water, high salinity.**

10 **Q.** And, sir, how has the lack of fresh water and its

11 impact on the bay impacted your family and its

12 business?

13 **A. Well, it's just about put me out of business.**

14 **I'm down probably 95 percent in production over**

15 **the whole bay. I don't only harvest oysters off**

16 **of private beds, but we also buy from oyster**

17 **fishermen that work in Apalachicola Bay. And I**

18 **used to have 30 or 40 oyster fishermen. At this**

19 **time I have zero.**

20 **Q.** And, sir, how has this impacted the community of

21 the Apalachicola Bay and the oystermen within

22 that community?

23 **A. Well, this affected the whole economy because the**

24 **fishermen, you know, not only can't make a**

25 **living, but they're not able to go to the grocery**

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1812

1 **store, buy groceries for their family, gas. You**

2 **know, it don't just affect the oyster dealer**

3 **itself. It affects the community, the other**

4 **businesses which are in the community that buy**

5 **other goods to be able to sustain and live.**

6 **Q.** Thank you, sir. And thank you for being here

7 today.

8 MS. WINE: Thank you, your Honor.

9 **A. Thank you.**

10 MR. ALLEN: Your Honor, I do have few

11 questions.

12 SPECIAL MASTER LANCASTER: Sure.

13 CROSS-EXAMINATION

14 BY MR. ALLEN:

15 **Q.** Good afternoon, Mr. Ward.

16 **A. Good day.**

17 **Q.** My name is Winn Allen. I'm counsel for the State

18 of Georgia. It's a pleasure to meet you, sir.

19 **A. Nice to meet you.**

20 **Q.** Sir, if I understand things correctly, you are

21 the former president of the Apalachicola Bay

22 Oyster Dealers Association. Correct?

23 **A. That is correct.**

24 **Q.** Okay. I want to hand you a document, sir, that

25 we got from the Oyster Dealers' files. Okay?

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1813

1 **A. Okay.**

2 MR. ALLEN: Your Honor, can I approach?

3 SPECIAL MASTER LANCASTER: Please.

4 BY MR. ALLEN:

5 **Q.** Mr. Ward, this is a letter dated July 28, 2010.

6 It was produced to us from the Apalachicola Bay

7 Oyster Dealers. It's from a gentleman named Mike

8 Voisin. Do you know who --

9 **A. Voisin.**

10 **Q.** Voisin. So I take it you know Mr. Voisin?

11 **A. Mr. Voisin is deceased now, sir.**

12 **Q.** Okay. All right. Did you know him when he was

13 alive, sir?

14 **A. Yes, sir. Very well.**

15 **Q.** Take a second just to review the letter for me

16 silently to yourself.

17 **A. Okay.**

18 **Q.** And just for the record, the letter is GX-1322.

19 Now, Mr. Ward, in July of 2010, you shared

20 the same feeling as Mr. Voisin --

21 **A. Voisin.**

22 **Q.** Voisin, I apologize, sir.

23 In July of 2010, you shared the same feelings

24 as Mr. Voisin that undersized oysters were being

25 put in the marketplace; is that correct?

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1 **A. That is correct.**  
 2 **Q.** And it was your understanding -- just so we're  
 3 clear, it was your understanding that grossly  
 4 undersized oysters from Apalachicola Bay were  
 5 being supplied to the market in 2010. Correct?  
 6 **A. Correct.**  
 7 **Q.** And, sir, you understand it's the government of  
 8 the State of Florida who is responsible for  
 9 ensuring that people are not violating the law.  
 10 Correct?  
 11 **A. That's correct.**  
 12 **Q.** And you understand it's the State of Florida who  
 13 has responsibility for enforcing regulations on  
 14 harvesting limits and harvesting sizes in  
 15 Apalachicola Bay. Correct?  
 16 **A. Yes, sir.**  
 17 **Q.** Let's jump forward in time to September of 2014.  
 18 Okay, sir?  
 19 **A. Okay.**  
 20 **Q.** In September of 2014, it's correct, sir, you  
 21 wrote a letter to Nick Wiley requesting that  
 22 Florida close Apalachicola Bay for the remainder  
 23 of the winter harvesting season. Correct?  
 24 **A. That may be correct. Yes, sir.**  
 25 **Q.** You -- do you think --

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1 **you know, we have worked long and hard to make**  
 2 **Apalachicola world famous oysters. And we like**  
 3 **to put a premium product on the market. And**  
 4 **that's what I do in my business. And if -- if --**  
 5 **if you go buy a bag of oysters to take home to**  
 6 **your family to eat, or you and your buddies are**  
 7 **watching a football game, and you sit down and**  
 8 **are eating that bag of oysters, and half of that**  
 9 **bag is a quality product that you can eat, and**  
 10 **half or a quarter of that bag is not quality; and**  
 11 **you throw it away, then you feel like you got**  
 12 **gypped, you know.**  
 13 **I look at it from an economic standpoint. I**  
 14 **wasn't looking at it as if it was going to**  
 15 **decimate the bay. I believed in putting a**  
 16 **quality premium product on the market. And I**  
 17 **believe that's what we tried to do with**  
 18 **Apalachicola Bay product.**  
 19 **Q.** I very much appreciate that, sir.  
 20 My question was in the fall of 2014 you were  
 21 of the view, were you not, that damage was being  
 22 done every day that Florida left the bay open.  
 23 Correct?  
 24 **A. Yeah.**  
 25 **Q.** You were also of the view in the fall of 2014

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1 **A. Yes.**  
 2 **Q.** Yes, okay. And Nick Wiley is the director of  
 3 FWC. Correct?  
 4 **A. That's correct.**  
 5 **Q.** And the State of Florida did not, in fact, close  
 6 Apalachicola Bay for the remainder of the  
 7 2014-2015 winter season --  
 8 **A. No, sir.**  
 9 **Q.** -- correct?  
 10 No, sir; they did not do that?  
 11 **A. They did not close it.**  
 12 **Q.** Okay. We'll try not to talk over each other.  
 13 **A. I apologize.**  
 14 **Q.** No, no, no.  
 15 And, sir, you thought it was a big mistake  
 16 for Florida not to close the bay in the 2014-2015  
 17 winter season. Correct?  
 18 **A. Yeah.**  
 19 **Q.** And in the fall of 2014, sir, you were of the  
 20 view that damage was being done every day that  
 21 Florida left the bay open. Correct?  
 22 **A. Well, let's look at it from a business**  
 23 **standpoint. You're putting -- you know, I**  
 24 **believe in putting a premium quality product out**  
 25 **on the market. And if you're not putting a --**

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1 that there was a lack of enforcement by the State  
 2 of Florida with respect to undersized oysters.  
 3 Correct, sir?  
 4 **A. They was harvesting juvenile oysters, yes, sir.**  
 5 **Q.** Okay. And you were of the view in October 2014  
 6 that Florida's inaction to protect the oysters in  
 7 Apalachicola Bay was causing harm to the bay.  
 8 Correct, sir?  
 9 **A. It wasn't helping it, but it wasn't killing it.**  
 10 **Q.** I'll ask it again, sir. You were of the view in  
 11 October of 2014 that Florida's inaction to  
 12 protect the bay was causing harm to the bay.  
 13 Correct?  
 14 **A. Do you have the letter that I could read that,**  
 15 **please?**  
 16 **Q.** I'm not reading it from a letter, sir.  
 17 **A. You're not reading it from a letter?**  
 18 **Q.** No, sir; I'm not.  
 19 **A. Then, you know, I'm under the assumption that**  
 20 **the -- you know, like I said, again, I was**  
 21 **looking at it from a business standpoint.**  
 22 **Q.** I appreciate that, sir.  
 23 **A. Okay.**  
 24 **Q.** I'll just ask it one more time.  
 25 **A. That's going to be my answer to you.**

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1 Q. I understand. One more time.  
 2 In October of 2014, sir, you were of the view  
 3 that Florida's inaction to protect oysters in  
 4 Apalachicola Bay was causing harm to the bay.  
 5 Right, sir?  
 6 A. Okay. **If that's the way you want to look at it.**  
 7 Q. No, sir. I'm not asking for -- I'm not trying to  
 8 testify for you. I'm just asking for your  
 9 testimony here in court.  
 10 A. **It wasn't helping it; but I don't think it was,**  
 11 **you know -- like I say again, my main concern was**  
 12 **from a, you know, economical standpoint of it.**  
 13 Q. Okay. Sir, you remember giving a deposition in  
 14 this case. Right?  
 15 A. Yes, sir.  
 16 Q. Okay.  
 17 MR. ALLEN: Your Honor, may I approach  
 18 the witness briefly?  
 19 Thank you.  
 20 BY MR. ALLEN:  
 21 Q. Sir, here is your deposition transcript.  
 22 A. Okay.  
 23 SPECIAL MASTER LANCASTER: Thank you.  
 24 BY MR. ALLEN:  
 25 Q. And, Mr. Ward, if you would turn with me to page  
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1 109, please.  
 2 A. Okay.  
 3 Q. And you're with me on page 109, sir?  
 4 A. Yes.  
 5 Q. And do you see line 1 that says, question, was  
 6 it; do you see that?  
 7 A. **Page 106 -- okay.**  
 8 Q. Do you see page 109, line 1, sir?  
 9 A. Yes, sir.  
 10 Q. Okay. And, sir, were you asked this question;  
 11 and did you give this answer during your  
 12 deposition.  
 13 Question. Was it the Oyster Dealers' view --  
 14 the Oyster Dealers Association view at the time  
 15 that Florida's inaction to protect oysters in  
 16 Apalachicola Bay was causing harm to the bay?  
 17 And there's an objection or two and then an  
 18 answer.  
 19 Yes. Yeah. You know, maybe -- that's more  
 20 personal than maybe the whole Dealers  
 21 Association, but I'm going to say yes.  
 22 Sir, were you asked that question and did you  
 23 give that answer during your deposition?  
 24 A. Yes, sir.  
 25 Q. Thank you, sir.  
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1 MR. ALLEN: I have no further questions.  
 2 REDIRECT EXAMINATION  
 3 BY MS. WINE:  
 4 Q. Just briefly, sir.  
 5 I believe you just testified that your bars  
 6 have effectively been closed to harvesting since  
 7 the crash in 2012. Is that correct?  
 8 A. Yes, ma'am.  
 9 Q. And, sir, in retrospect, sitting here in 2016  
 10 looking at everything that's happened in the bay,  
 11 do you think a closure of the bay in 2014 would  
 12 have done anything to help this bay recover?  
 13 A. No, ma'am.  
 14 Q. And why is that your view?  
 15 A. **Because I have closed my beds. I planted --**  
 16 **replanted shells on my beds. You know, I tried**  
 17 **to diversify to grow oysters. And I have grown**  
 18 **oysters for 30 years, and I have put a premium**  
 19 **product on the market. And I have not been able**  
 20 **to grow no oysters. They do not survive.**  
 21 Q. Thank you, sir.  
 22 MR. ALLEN: No further questions, your  
 23 Honor.  
 24 SPECIAL MASTER LANCASTER: Mr. Ward?  
 25 THE WITNESS: Yes, you Honor.  
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1 SPECIAL MASTER LANCASTER: Has the water  
 2 quality in the bay improved since 2012?  
 3 THE WITNESS: No, sir.  
 4 SPECIAL MASTER LANCASTER: How much  
 5 harvesting occurred on your leases in 2011  
 6 and 2012?  
 7 THE WITNESS: May I look --  
 8 SPECIAL MASTER LANCASTER: Sure.  
 9 THE WITNESS: -- right here, sir?  
 10 2011, off of lease 525 we harvested  
 11 1,878 bags and 59 pounds. And off of lease  
 12 609, we harvested 3,953 bags and 5 pounds.  
 13 And when I refer to bags, sir, that  
 14 would be a 60 pound.  
 15 SPECIAL MASTER LANCASTER: Was that  
 16 consistent with your prior harvesting level?  
 17 THE WITNESS: Yes, pretty much. You  
 18 know, some years it would be a little better.  
 19 It depends on, you know, how many  
 20 recruitments you get during a year's time and  
 21 how fast they grow.  
 22 SPECIAL MASTER LANCASTER: Counsel?  
 23 MR. ALLEN: Nothing from Georgia, your  
 24 Honor.  
 25 MS. WINE: Nothing further, your Honor.  
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1 SPECIAL MASTER LANCASTER: Thank you  
 2 very much, Mr. Ward.  
 3 THE WITNESS: Yes, sir. My pleasure.  
 4 Thank you.  
 5 MS. WINE: Your Honor, Florida would  
 6 like to call its next witness, Dr. Patricia  
 7 Glibert. Dr. Glibert is an estuarine  
 8 ecologist who is here to testify about the  
 9 impact of freshwater flow on the ecology of  
 10 the Apalachicola Bay.  
 11 Your Honor -- sorry. I jumped the gun.  
 12 THE CLERK: Please raise your right  
 13 hand.  
 14 Do you solemnly swear that the testimony  
 15 you shall give in the cause now in hearing  
 16 shall be the truth, the whole truth, and  
 17 nothing but the truth, so help you God?  
 18 THE WITNESS: I do.  
 19 THE CLERK: Please be seated.  
 20 Pull yourself right up to the microphone  
 21 and please state your name and spell your  
 22 last name.  
 23 THE WITNESS: My name is Patricia  
 24 Marguerite Glibert, P A T R I C I A,  
 25 M A R G U E R I T E, G L I B E R T.  
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1823

1 DIRECT EXAMINATION  
 2 BY MS. WINE:  
 3 Q. Good afternoon, Dr. Glibert.  
 4 A. Good afternoon.  
 5 MS. WINE: Your Honor, may I approach  
 6 the witness to hand her her prefiled  
 7 testimony?  
 8 SPECIAL MASTER LANCASTER: Please.  
 9 BY MS. WINE:  
 10 Q. Dr. Glibert, I have handed you your prefiled  
 11 testimony in this case. Do you recognize that  
 12 document?  
 13 A. I do.  
 14 Q. And do you adopt it as your testimony in this  
 15 case?  
 16 A. I do.  
 17 Q. Thank you.  
 18 MS. DeSANTIS: Good afternoon, your  
 19 Honor.  
 20 SPECIAL MASTER LANCASTER: Good  
 21 afternoon.  
 22 CROSS-EXAMINATION  
 23 BY MS. DeSANTIS:  
 24 Q. Good afternoon, Dr. Glibert. We have met before.  
 25 A. Good afternoon.  
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1 MS. DeSANTIS: We're going to distribute  
 2 the document binders for the examination, if  
 3 that's acceptable to the Court.  
 4 BY MS. DeSANTIS:  
 5 Q. Dr. Glibert, are you ready to proceed?  
 6 A. Yes, I am.  
 7 Q. Dr. Glibert, you have not done any analysis that  
 8 would permit you to identify minimal flows into  
 9 Apalachicola Bay that would be required for the  
 10 ecosystem in the bay not to be in peril.  
 11 Correct?  
 12 A. That's correct.  
 13 Q. And you have not identified minimal flows because  
 14 of the complexity of the interaction of flows and  
 15 the broader ecology of the bay. Correct?  
 16 A. That's correct. I identified a number of  
 17 relationships between flow and water quality  
 18 parameters and the composition of the lower food  
 19 web; but I was not identified -- I did not  
 20 identify minimal flows.  
 21 Q. All right. You have not identified a numerical  
 22 value for minimal flows that would be required  
 23 for the bay not to be in peril. Correct?  
 24 A. However -- yes, that's correct. However --  
 25 Q. We'll talk about your other work as we move  
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1 forward.  
 2 A. Sure.  
 3 Q. And I would like for the Court -- in order for  
 4 the Court to more readily understand this cross-  
 5 examination, Dr. Glibert, I do want to go over a  
 6 brief background of the work that you were asked  
 7 to do and the work that you did for this matter.  
 8 A. Sure.  
 9 Q. Your task in this case was to look at changes in  
 10 the Apalachicola Bay food web. Correct?  
 11 A. My task in this case was to examine the  
 12 relationships between flows and the broader  
 13 ecology focusing on the water quality parameters  
 14 and the organisms that comprise the lower food  
 15 web.  
 16 Q. And you were asked to look at the Apalachicola  
 17 Bay estuary particularly from the perspective of  
 18 the lower food web; is that correct?  
 19 A. That's correct.  
 20 MS. DeSANTIS: If I may, your Honor, I  
 21 would like to publish a demonstrative that  
 22 might assist the Court in understanding the  
 23 food web of the bay. Is that acceptable?  
 24 SPECIAL MASTER LANCASTER: Sure.  
 25 MS. DeSANTIS: Please, let's publish  
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1 demonstrative 1 on the screen.

2 BY MS. DeSANTIS:

3 Q. Now, Dr. Glibert, would you agree --

4 MS. WINE: Counsel, do you have copies

5 of the demonstrative?

6 MS. DeSANTIS: I don't know that we

7 brought -- this is it for demonstrative 1. I

8 don't think that we brought hard copies.

9 BY MS. DeSANTIS:

10 Q. Dr. Glibert, would you agree that demonstrative 1

11 shows the very basic structure of a food web in

12 areas such as Apalachicola Bay?

13 A. **It's probably a minimalistic representation of a**

14 **food web in an estuary. It shows that the base**

15 **of the food web is comprised of the primary**

16 **producers, the phytoplankton, the algae, and the**

17 **SAV, which we should define as the submersed**

18 **aquatic vegetation, the bay grasses. They are --**

19 **they form the base of the food web on which the**

20 **zooplankton, oysters, fish, shellfish ultimately**

21 **depend.**

22 Q. And that's all we're trying to do here,

23 Dr. Glibert, is show something very basic to

24 assist the Court as we talk about SAV,

25 phytoplankton, zooplankton, and the upper food

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1 web.

2 A. **Sure.**

3 Q. Is that fair?

4 A. **Sure.**

5 Q. Now, phytoplankton or algae are at the base of

6 food web. Correct?

7 A. **Phytoplankton are the microscopic algae that**

8 **float in the water. And they are the primary**

9 **producers; that is, they grow based on light**

10 **photosynthesis. They're the microscopic plants.**

11 **And, ultimately, it's their production that forms**

12 **all of the food or virtually all of the food that**

13 **supports the upper levels.**

14 Q. And phytoplankton and algae are terms that can be

15 used interchangeably. Correct?

16 A. **For this purpose, yes. There are some technical**

17 **differences, but for this purpose we can use**

18 **those terms interchangeably.**

19 Q. So for this purpose today, we can talk about

20 either phytoplankton or algae as being the base

21 of the food web --

22 A. **Right.**

23 Q. -- interchangeably. Correct?

24 A. **Right. There are some algae that are not**

25 **phytoplankton.**

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1 Q. But for today --

2 A. **Yes.**

3 Q. -- phytoplankton, algae, interchangeable terms.

4 Correct?

5 A. **Sure.**

6 Q. And SAV, which you have said is submerged aquatic

7 vegetation, is also at the base of the food web.

8 Correct?

9 A. **Yes, because it is a plant. And it is a plant**

10 **that grows underwater. It's a grass. And there**

11 **are many species of these SAV that grow**

12 **underwater. And because they are plants, they**

13 **are grazed by organisms that eat that plant**

14 **material. And they serve as structure and**

15 **habitat for many other organisms.**

16 Q. All right. So SAV at the base of the food web

17 provides food for some organisms. Correct?

18 A. **Absolutely.**

19 Q. And SAV at the base of the food web also provides

20 habitat for some organisms?

21 A. **Absolutely.**

22 Q. All right. Then if we look at demonstrative 1,

23 you see zooplankton in the middle of the paper.

24 Correct?

25 A. **Yes.**

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1 Q. All right. And these are tiny microscopic

2 animals in the middle of the food web. Correct?

3 A. **Yes. And there are many different types of**

4 **species that are zooplankton.**

5 Q. And at the top of the food web, you will see that

6 we have fish and shellfish. Correct?

7 A. **Yes.**

8 Q. And you have actually called fish, shellfish,

9 upper level of the food web higher trophic levels

10 of the food web. Correct?

11 A. **Yes.**

12 Q. All right. Fish and shellfish eat zooplankton.

13 Correct?

14 A. **It certainly depends on the fish species because**

15 **many fish eat other fish, so not all fish eat**

16 **zooplankton.**

17 Q. All right. But some fish eat zooplankton.

18 Correct?

19 A. **Some fish eat zooplankton.**

20 Q. And some shellfish eat zooplankton?

21 A. **And some shellfish depend on many other food**

22 **sources as well.**

23 Q. And some fish also eat algae. Correct?

24 A. **Some eat algae.**

25 Q. And that's why we have shown an arrow from algae

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1 up to fish. Right?

2 **A. Yes.**

3 **Q.** All right. And some shellfish also eat algae.

4 Right?

5 And that's, again, what we have shown, an

6 arrow going up to the upper level. Correct?

7 **A. Yes.**

8 **Q.** All right. In this matter, you maintain that

9 reduced freshwater flow into the Apalachicola Bay

10 has impacted the base of the food web. Right?

11 **A. Yes.**

12 **Q.** And you have documented a change in the

13 composition of algae in low flow years. Correct?

14 **A. I have documented a compositional change, as have**

15 **others who have also investigated the same data**

16 **that I have.**

17 **Q.** And so you're maintaining that low flows have

18 affected the mix or the composition of algae at

19 the base the food web. Right?

20 **A. The change in flow affects the composition of the**

21 **base of the food web because of the change in**

22 **salinity and the change in delivery of the**

23 **important nutrients on which these algae grow.**

24 **Q.** And you maintain that this change in algae at the

25 base of the food web has affected higher levels

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1 of the food web. Right?

2 **A. Indeed, because changes in the various species of**

3 **the algae affect upper trophic levels for a**

4 **number of reasons.**

5 **Q.** And you maintain, for example, that changes in

6 algae at the base of the food web have affected

7 zooplankton. Right?

8 **A. Different species of zooplankton are affected by**

9 **their food source. And as the composition of the**

10 **very base of the food web changes, those species**

11 **that graze on the algae or phytoplankton change,**

12 **different types of zooplankton may be favored or**

13 **disfavored.**

14 **Q.** And you actually maintain that these changes at

15 the base of the food web have ramifications all

16 the way up the food web to the top, fish; right?

17 **A. This is basic estuarine science, yes.**

18 **Q.** All right. Now, before we move up the food web,

19 I want the Court to understand the context for

20 your conclusions that reduced flow causes changes

21 at the base of the food web. You attribute these

22 changes in algae at the base of the food web to

23 Georgia's upstream consumptive use. Right?

24 **A. I attribute the changes at the base of the food**

25 **web to changes in the fundamental water quality**

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1 **changes that occur that are associated with**

2 **changes in flow. And I have used various remedy**

3 **scenarios to determine how much of that flow**

4 **differential is due to upstream consumption.**

5 **Q.** But you're blaming Georgia for the changes in

6 flow that are changing the base of the web food.

7 Right?

8 **A. I have used various scenarios to identify the**

9 **contribution of upstream consumption to the**

10 **changes that we see in flow and, therefore, the**

11 **effects that that has on water quality.**

12 **Q.** But you, yourself, then, Dr. Glibert, are not

13 directly attributing reduced flow to consumption

14 by Georgia; am I right?

15 **A. The various scenarios that I have examined do,**

16 **indeed, show that there is a significant**

17 **percentage of flow reduction that is attributable**

18 **to Georgia that in turn has impacts on the water**

19 **quality that in turn has impacts on the**

20 **phytoplankton community.**

21 **Q.** It's true, isn't it, doctor, that there are

22 factors other than Georgia's consumptive use that

23 can affect flow into the bay?

24 **A. Yes.**

25 **Q.** And precipitation influences flow into the bay.

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1 Correct?

2 **A. Yes.**

3 **Q.** Meteorological conditions like storms or

4 hurricanes can affect flow into the bay.

5 Correct?

6 **A. Yes.**

7 **Q.** And drought can influence flow into Apalachicola

8 Bay. Right?

9 **A. Yes. And it is during those drought periods when**

10 **upstream consumption exacerbates the low flow**

11 **conditions in the bay.**

12 **Q.** And, doctor, you didn't examine whether

13 operations by the Army Corps of Engineers affects

14 flow into the bay; did you?

15 **A. No, I did not.**

16 **Q.** Doctor, I would like to talk about zooplankton,

17 again, on demonstrative 1 in the middle of the

18 food web. Zooplankton, as we discussed, some

19 types of zooplankton feed on algae. Right?

20 **A. Yes.**

21 **Q.** And you would agree that grazers like zooplankton

22 can eat different kinds of algae. Right?

23 **A. There are food preferences by different types of**

24 **zooplankton. So not all zooplankton eat all**

25 **algae.**

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1 **Q.** You would agree that even when there are changes  
 2 in the types of algae present at the base of the  
 3 food web, the integrity of the food web can still  
 4 be maintained. Right?

5 **A. I don't understand your question.**

6 **Q.** Even when there are changes at the base of the  
 7 food web in terms of the composition or the mix  
 8 of algae, a food web still exists in the bay.  
 9 Correct?

10 **A. There can be a substantially changed food web,  
 11 which can, indeed, be harmed to the species that  
 12 we are concerned about.**

13 **Q.** But a food web still exists. Correct?

14 **A. There has been no opinion expressed here that the  
 15 bay becomes sterile.**

16 **Q.** All right. For the purposes of your testimony  
 17 here today, you're not testifying that there  
 18 isn't a food web in Apalachicola Bay. Right?

19 **A. The food web that emerges under low flow  
 20 conditions is a food web that is consistent with  
 21 the food web that is more like the Gulf of Mexico  
 22 as opposed to the estuarine food web that has  
 23 classically maintained the productivity in  
 24 Apalachicola Bay.**

25 **Q.** But there is a food web in the bay. Correct?

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1 **A. Again --**

2 **Q.** There is a food web in the bay?

3 **A. Again, the bay does not go sterile.**

4 **Q.** All right. You, yourself, have not assessed  
 5 whether or not any changes in the algae community  
 6 have affected zooplankton in the bay. Correct?

7 **A. That's not correct.**

8 **Q.** Doctor, you gave a deposition in this case.  
 9 Correct?

10 **A. Uh-huh.**

11 **Q.** And in your deposition you were under oath.  
 12 Correct?

13 **A. Yes.**

14 **Q.** And you told the truth. Correct?

15 **A. Yes.**

16 **Q.** All right. I would like to refer you and the  
 17 Court, please, to your deposition transcript,  
 18 which is tab 3 in your binder, page 46, line 19,  
 19 to page 47, line 5.  
 20 MS. DeSANTIS: And, Mr. Smith, will you  
 21 queue up clip 8 for us, please.  
 22 (Whereupon the video was played.)  
 23 BY MS. DeSANTIS:

24 **Q.** Did you give that testimony at your deposition,  
 25 doctor?

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1 **A. I did. However, the question you just asked me  
 2 about any zooplankton is different from the  
 3 question that you asked me during my deposition.  
 4 And we spoke extensively in my deposition about  
 5 microzooplankton grazers, which at the time of my  
 6 deposition I used the term mixotrophs, which are  
 7 the kind of zooplankton that we call the Venus  
 8 flytraps of the microbial world. They can be the  
 9 microzooplankton that can be plants at some  
 10 points in time, but they can also eat other  
 11 organisms. We spoke extensively about that  
 12 during my deposition.**

13 **Q.** Doctor, the data on zooplankton in Apalachicola  
 14 Bay, as you testified in that deposition clip, is  
 15 very minimal. Correct?

16 **A. We were talking in that clip -- specifically  
 17 in the lines just above we were talking about  
 18 the work on acartia tonsa, which is a  
 19 macrozooplankton species. There are data on  
 20 acartia tonsa. However, the data that are  
 21 available on acartia tonsa are only available as  
 22 syntheses. We do not have access to raw data on  
 23 acartia tonsa. This particular clip was about  
 24 acartia tonsa.  
 25 And your question earlier was about did I do**

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1 **anything on any zooplankton. So I do believe  
 2 that analyses on microzooplankton was part of a  
 3 discussion that we had in my deposition.**

4 **Q.** Doctor, let's approach it this way. You have no  
 5 direct evidence that the zooplankton community in  
 6 Apalachicola Bay has changed; do you?

7 **A. I do have evidence that the microzooplankton  
 8 community has changed.**

9 **Q.** Doctor, again, in your deposition in this case  
 10 you were under oath. Correct?

11 **A. Yes.**

12 **Q.** And you told the truth. Correct?

13 **A. Yes.**

14 **Q.** And I would like to refer you, again, to tab 3,  
 15 your deposition transcript.

16 **A. Yes.**

17 **Q.** Page 53, line 19, to page 54, line 5.  
 18 MS. DeSANTIS: And I would like to ask  
 19 Mr. Smith to queue up clip 11, please.  
 20 (Whereupon the video was played.)  
 21 BY MS. DeSANTIS:

22 **Q.** And were you asked that question, and did you  
 23 give that answer in your deposition?

24 **A. Yes. And, again, in the deposition in that  
 25 conversation we were talking about acartia tonsa.**

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1 **And that's different than the conversations we**  
 2 **had about microzooplankton.**  
 3 **Q.** With respect to oysters, oysters, like  
 4 zooplankton, are a type of grazer. Right?  
 5 **A. Yes. They eat food.**  
 6 **Q.** And you are not an oyster biologist, are you,  
 7 doctor?  
 8 **A. I'm not an oyster biologist; that's correct.**  
 9 **Q.** And you're not an expert on stressors that affect  
 10 the oyster population. Correct?  
 11 **A. I have published a number of papers on stressors**  
 12 **to oysters, particularly harmful algal bloom**  
 13 **species.**  
 14 **Q.** But back to my question, you're not an expert on  
 15 stressors that affect oyster populations.  
 16 Correct?  
 17 **A. I am an expert in the particular area of harmful**  
 18 **algal bloom stressors on oysters.**  
 19 **Q.** Are you saying you are an expert on stressors  
 20 that affect oyster populations?  
 21 **A. I'm not an expert in all stressors of oysters.**  
 22 **But I have considerable expertise in stressors of**  
 23 **harmful algae on oysters.**  
 24 **Q.** When you considered changes in the upper levels  
 25 of the food web, you primarily considered

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1 oysters. Right?  
 2 **A. I primarily considered oysters. However, I used**  
 3 **general principles to understand that the other**  
 4 **components of the upper food web would also**  
 5 **respond --**  
 6 **Q.** And you --  
 7 **A. -- to changes.**  
 8 **Q.** -- used general principles to link changes at the  
 9 base of the food web to changes at the upper  
 10 levels of the food web. Correct?  
 11 **A. That's correct.**  
 12 **Q.** All right. And we'll go into those general  
 13 principles later, doctor.  
 14 **A. Sure.**  
 15 **Q.** For now, I want to focus on oysters for a minute.  
 16 **A. Sure.**  
 17 **Q.** You would agree that the specific relationship  
 18 between low flow, any decline in oysters, and  
 19 algae is not well documented for Apalachicola  
 20 Bay. Right?  
 21 **A. I would agree it's not well documented for**  
 22 **Apalachicola Bay.**  
 23 **Q.** You have not actually sampled or experimented on  
 24 any oysters that you have procured from  
 25 Apalachicola Bay to determine whether or not

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1 these oysters are eating a certain kind of algae.  
 2 Right?  
 3 **A. That is correct. However, it's the exact same**  
 4 **oyster species that I have done considerable**  
 5 **experiments with.**  
 6 **Q.** But my question was you haven't actually taken  
 7 oysters from the bay and conducted any  
 8 experiments on them to see what they're eating.  
 9 Right?  
 10 **A. That's correct.**  
 11 **Q.** All right. Now, you have used before, doctor,  
 12 when we have met, the term in situ. Correct?  
 13 **A. Yes.**  
 14 **Q.** All right. And that means on site. Correct?  
 15 **A. Right.**  
 16 **Q.** Yes?  
 17 **A. Yes.**  
 18 **Q.** All right. So, for example, in situ sampling  
 19 with respect to the Apalachicola Bay would refer  
 20 to sampling done at the bay as opposed to off  
 21 site. Right?  
 22 **A. That's correct.**  
 23 **Q.** All right. And you actually have no in situ data  
 24 that oysters in Apalachicola Bay were impacted by  
 25 impaired food availability. Correct?

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1 **A. There's considerable in situ data collected by**  
 2 **the broader monitoring programs ongoing in**  
 3 **Apalachicola Bay. And it is that in situ data**  
 4 **from phytoplankton and oysters that I related.**  
 5 **Q.** You do not have any in situ data using  
 6 experiments on oysters procured from the bay that  
 7 impaired food availability was affecting those  
 8 oysters. Right?  
 9 **A. That's correct.**  
 10 **Q.** Did you say that is correct?  
 11 **A. That's correct.**  
 12 **Q.** All right. Now, factors besides changes in the  
 13 algae community can affect oyster abundance in  
 14 the bay. Right?  
 15 **A. Yes.**  
 16 **Q.** You have not examined how harvesting practices,  
 17 for example, have affected the abundance of  
 18 oysters in the bay?  
 19 **A. That is correct.**  
 20 **Q.** And you didn't consider how fisheries management  
 21 practices have affected the abundance of oysters  
 22 in the bay. Right?  
 23 **A. That is correct.**  
 24 **Q.** And you didn't consider how storm surge or  
 25 hurricanes have affected the abundance of oysters

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1 in the bay. Right?

2 **A. That is correct.**

3 **Q.** And you don't know whether agencies under the

4 Florida Department of Environmental Protection

5 still have the authority to close areas of

6 Apalachicola Bay to commercial harvesting; do

7 you?

8 **A. That's -- no, I don't.**

9 **Q.** All right. And you don't know if any management

10 actions have been taken to restore the oyster

11 reefs after the 2011-2012 collapse of oysters; do

12 you?

13 **A. No.**

14 **Q.** You would agree, would you not, that oysters in

15 Apalachicola Bay have the ability to regrow and

16 recuperate. Right?

17 **A. If provided the right environmental conditions.**

18 **Q.** But you didn't look at the ability of oysters to

19 recover or to recuperate in the bay. Right?

20 That wasn't part of your work?

21 **A. That's correct.**

22 **Q.** Now, doctor, you have maintained in your written

23 direct testimony that you expect Georgia's

24 consumptive use of water to have an effect on

25 fish. Right?

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1 **A. Dr. Jenkins's report was one of the materials on**

2 **which I relied. However, I was also familiar**

3 **with the broader literature that is available on**

4 **changes in the upper food web; and I also looked**

5 **at that.**

6 **Q.** And in your deposition, you indicated that this

7 Dr. Jenkins, on whom you relied in part, he

8 analyzed changes in the upper level of the food

9 web. Right?

10 **A. Yes, he did.**

11 **Q.** You indicated that the analysis of fish is housed

12 in Dr. Jenkins's expert report. Correct?

13 **A. Yes.**

14 **Q.** And Dr. Jenkins was one of Florida's experts in

15 this matter. Right?

16 **A. Yes.**

17 **Q.** And he submitted an expert report, as you have

18 acknowledged in your expert report. Right?

19 **A. Correct.**

20 **Q.** And in addition to submitting an expert report,

21 Dr. Jenkins gave a deposition in this matter;

22 didn't he?

23 **A. Yes.**

24 **Q.** And, in fact, in the course of your deposition, I

25 showed you portions of Dr. Jenkins's deposition

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1 **A. The effect on fish that I expect is based on**

2 **general ecological principles and my**

3 **understanding of the changes in water quality and**

4 **the changes at the base of the food web.**

5 **Q.** And you're, again, mentioning, doctor, these

6 ecological principles. Right?

7 **A. That is correct.**

8 **Q.** And we will get to your ecological principles in

9 this exam. I promise you we'll get there.

10 For now, focusing on the fish, fish are at

11 the upper level of the food web. Right?

12 **A. Yes.**

13 **Q.** Okay. And in your written testimony and your

14 expert report in this matter, you maintain that

15 changes at the base of the food web have affected

16 the fish. Right?

17 **A. Again, applying general understanding of how the**

18 **base of the food web has repercussions throughout**

19 **the entire system.**

20 **Q.** All right. In your expert report, you refer to a

21 Dr. Jenkins. Correct?

22 **A. Yes.**

23 **Q.** And your expert report indicates that

24 Dr. Jenkins's expert report provides the detailed

25 analysis of changes in the food web. Correct?

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1 transcript?

2 **A. Yes.**

3 **Q.** You remember that?

4 **A. Yes.**

5 **Q.** In your expert report we actually counted -- I

6 believe you mentioned Dr. Jenkins's name more

7 than 20 times. Does that sound about right to

8 you?

9 **A. I don't know.**

10 **Q.** All right. Sound approximately right?

11 **A. I know I cited him.**

12 **Q.** All right. And you cited him repeatedly. Right?

13 **A. Yes. I cited him more than once --**

14 **Q.** All right.

15 **A. -- for sure.**

16 **Q.** You relied on the work of Dr. Jenkins in part to

17 link changes in the phytoplankton community that

18 impacted higher levels of the food web. Right?

19 **A. In a general sense. However, I also relied on**

20 **the broader literature to understand. But I was**

21 **focused on the changes at the lower food web.**

22 **Q.** And you relied on Dr. Jenkins for your opinions

23 on overall fish ecology. Right?

24 **A. I relied on a number of sources for my opinions**

25 **on overall fish ecology.**

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1 **Q.** But you relied on Dr. Jenkins in part for your  
 2 opinions on overall fish ecology?  
 3 **A. Yes.**  
 4 **Q.** All right. And in his deposition, Dr. Jenkins  
 5 was asked about his opinions on fish ecology.  
 6 And I want you to now review with me some  
 7 deposition testimony from Dr. Jenkins regarding  
 8 fish ecology and then ask you some questions  
 9 about his testimony regarding fish ecology.  
 10 MS. DeSANTIS: And we actually have  
 11 Dr. Jenkins's deposition transcript ready to  
 12 hand up to the Court, to Dr. Glibert, and to  
 13 distribute.  
 14 You can go ahead and --  
 15 BY MS. DeSANTIS:  
 16 **Q.** All right. Dr. Glibert, I would like to ask you  
 17 and ask the Court to please turn to Dr. Jenkins's  
 18 transcript beginning at page 65, line 18.  
 19 MS. DeSANTIS: And I'm going to be  
 20 asking Mr. Smith to queue up the first clip,  
 21 which runs from 65, line 18, to page 70, line  
 22 21. And we'll just play that on the screen  
 23 for the Court.  
 24 (Whereupon the video was played.)  
 25 BY MS. DeSANTIS:  
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1 **Q.** Dr. Glibert, Dr. Jenkins in that testimony talks  
 2 about the nursery function of east bay. Correct?  
 3 **A. He does.**  
 4 **Q.** And you, yourself, in your testimony have also  
 5 talked about the function of east bay. Correct?  
 6 **A. I do. As does much of the literature.**  
 7 **Q.** And Dr. Jenkins, in this testimony clip,  
 8 identifies the blue crab as a species that may be  
 9 affected in the east bay. Correct?  
 10 **A. He does.**  
 11 **Q.** He does not identify any fish that have been  
 12 affected in this clip by reduced salinity in the  
 13 bay. Correct?  
 14 **A. He does not identify fish in that clip.**  
 15 **I think it's worth, just for the purpose of**  
 16 **the Court identifying east bay as that upper**  
 17 **northern freshwater area in the bay because it**  
 18 **hasn't been identified here yet.**  
 19 **Q.** Yes. And I believe the Court is familiar with  
 20 the region of east bay from some maps that have  
 21 previously been used in court, including with  
 22 Dr. Greenblatt today.  
 23 MS. DeSANTIS: Is that right, your  
 24 Honor?  
 25 SPECIAL MASTER LANCASTER: That's  
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1 correct.  
 2 **A. I want to just make sure that --**  
 3 **Q.** And --  
 4 **A. But the nursery function --**  
 5 **Q.** We'll talk about the nursery function in your  
 6 view. But I just wanted to review that clip with  
 7 you.  
 8 Now, we have one much shorter clip that I  
 9 would like to show, so as not to take too much  
 10 time from the Court, and then I would like to ask  
 11 you a couple of questions --  
 12 **A. Sure.**  
 13 **Q.** -- about that clip as well.  
 14 If I could refer you and the Court, please,  
 15 to page 90, line 9 of Dr. Jenkins's deposition  
 16 transcript to page 92, line 1.  
 17 MS. DeSANTIS: And ask Mr. Smith to  
 18 please queue that up for us.  
 19 (Whereupon the video was played.)  
 20 BY MS. DeSANTIS:  
 21 **Q.** Now, Dr. Glibert, in this particular video clip,  
 22 Dr. Jenkins used the word change. Correct?  
 23 **A. He did.**  
 24 **Q.** He did not characterize changes in fish  
 25 composition or abundance as harm. Correct?  
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1 **A. He did not.**  
 2 **Q.** And it was outside of the scope of your work to  
 3 analyze the fish data. Correct?  
 4 **A. That's right.**  
 5 **Q.** And it was outside of the scope of your work to  
 6 examine individual fish species. Correct?  
 7 **A. That's correct. I did not take that narrow**  
 8 **perspective.**  
 9 **Q.** And you have not fully analyzed, independent from  
 10 Dr. Jenkins, the abundance of any fish species in  
 11 Apalachicola Bay. Right?  
 12 **A. Well, I'm aware of literature reports that relate**  
 13 **abundance of certain types of species to flow.**  
 14 **And so I -- I'm familiar with that literature.**  
 15 **Q.** You don't have any data or information specific  
 16 to Apalachicola Bay that you have analyzed  
 17 indicating that there was a change in fish  
 18 abundance in the bay. Right?  
 19 **A. Not that I have analyzed, but that I have read**  
 20 **and I'm familiar with.**  
 21 **Q.** And you have not analyzed that data. Right?  
 22 That was outside the scope of your work?  
 23 **A. Right. I'm familiar with it through the**  
 24 **literature.**  
 25 **Q.** Right. You have not explored the relationship  
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1 between changes in the algae community and impact  
 2 on individual fish species. Right?  
 3 **A. I did not take that narrow perspective other than**  
 4 **the work that we have talked about and would**  
 5 **likely talk about with respect to oysters.**  
 6 **Q.** And so you have not analyzed the impact of  
 7 changes in the algae community on blue crab, for  
 8 example; have you?  
 9 **A. I have not.**  
 10 **Q.** And you have not analyzed the impact of changes  
 11 in the algae community on white shrimp. Right?  
 12 **A. That's correct.**  
 13 **Q.** And you have not analyzed the impact of any  
 14 changes in the algae community on any particular  
 15 species of fish in the bay. Right?  
 16 **A. That's correct. Although I'm aware of some of**  
 17 **the literature on that.**  
 18 **Q.** And you have not evaluated yourself any in situ  
 19 data from Apalachicola Bay showing harm to fish?  
 20 **A. I'm familiar with the analyses of Dr. Livingston,**  
 21 **for example, which is based on in situ data. But**  
 22 **it's not data that I myself examined.**  
 23 **Q.** All right. And you have no information or data  
 24 that food availability for white shrimp is  
 25 impaired in Apalachicola Bay. Right?

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1 **A. However, Dr. Livingston shows that under low flow**  
 2 **conditions, white shrimp can -- white shrimp**  
 3 **populations can decline by upwards of 90 percent.**  
 4 **Q.** Doctor, again, in this case you gave a  
 5 deposition. Correct?  
 6 **A. Uh-huh.**  
 7 **Q.** And you told the truth?  
 8 **A. Yes.**  
 9 **Q.** You were under oath. Correct?  
 10 **A. Yes.**  
 11 **Q.** All right. I would like to refer you and the  
 12 Court to your deposition transcript page 73, line  
 13 13, to page 73, line 18.  
 14 **A. Uh-huh.**  
 15 **Q.** And ask Mr. -- and this is tab 3 in the binder.  
 16 **A. Uh-huh.**  
 17 MS. DeSANTIS: And ask Mr. Smith please  
 18 to play clip 25.  
 19 (Whereupon the video was played.)  
 20 BY MS. DeSANTIS:  
 21 **Q.** Were you asked that question, and did you give  
 22 that answer in deposition?  
 23 **A. Yes, I did.**  
 24 **And the very next question goes on to say**  
 25 **other than literature, I did not investigate that**

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1 **directly.**  
 2 **Q.** All right. With respect to salinity preference  
 3 ranges for species in the upper food web in  
 4 Apalachicola Bay, you didn't do any analysis on  
 5 that; did you?  
 6 **A. That's correct.**  
 7 **Q.** Okay. You don't have data or information  
 8 indicating that any fish species in Apalachicola  
 9 Bay has been negatively impacted by impaired food  
 10 availability. Right?  
 11 **A. I did not investigate fish species directly.**  
 12 **Q.** You have identified east bay as a nursery region  
 13 for species in the bay. Correct?  
 14 **A. I have, and many others have also identified it**  
 15 **as such, yes.**  
 16 **Q.** But you did not do any assessment of the species  
 17 that use east bay as a nursery. Correct?  
 18 **A. That's well documented in the literature, so I**  
 19 **didn't have to.**  
 20 **Q.** You, yourself, didn't do any --  
 21 **A. No.**  
 22 **Q.** -- independent analysis of which species use east  
 23 bay as a nursery. Correct?  
 24 **A. Other than being familiar with the literature,**  
 25 **correct.**

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1 **Q.** You were focused primarily on the food web.  
 2 Right?  
 3 **A. Particularly the lower food web, yes, and**  
 4 **relation to water quality.**  
 5 **Q.** Okay. Now, doctor, you referred a couple of  
 6 times in your testimony here in court to  
 7 principles that you have used to link changes at  
 8 the base of the food web to changes in the upper  
 9 food web. Right?  
 10 **A. That is correct.**  
 11 **Q.** All right. And, doctor, I would like to list  
 12 these principles out for the Court.  
 13 I promised you we would get here. All right?  
 14 **A. Sure.**  
 15 **Q.** So, first, you relied on basic ecology. Correct?  
 16 Let's just make a list of these.  
 17 Is that right; you relied on basic ecology?  
 18 **A. Sure.**  
 19 **Q.** You also relied on basic nutrition. Right?  
 20 **A. With respect to aquatic biology, yes. Uh-huh.**  
 21 **Q.** You relied on trophodynamics. Correct?  
 22 **A. Yes. Which is the study of interactions of**  
 23 **species and how they relate in and among the food**  
 24 **web.**  
 25 **Q.** You relied on ecological stoichiometry. Correct?

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- 1 **A. Yes. Which is -- just so I can explain it, it's**
- 2 **the study of how nutrient content in different**
- 3 **supply levels or in different organisms affect**
- 4 **the nutrition of the next level.**
- 5 **Q.** And you relied on biogeochemistry. Correct?
- 6 **A. Yes. Which is the cycling and fluxes of all of**
- 7 **the elements in the recycling processes within an**
- 8 **aquatic system.**
- 9 **Q.** And you relied on bio-oceanography. Correct?
- 10 **A. Biological oceanography.**
- 11 **Q.** Biological oceanography. Well, then we have
- 12 mistyped it.
- 13       Somebody fixed that.
- 14       Okay. Biological oceanography. Correct?
- 15 **A. Yes. The study of all the aquatic organisms in a**
- 16 **marine environment, yes.**
- 17 **Q.** All right. And you relied on estuarine dynamics.
- 18 Correct?
- 19 **A. True.**
- 20 **Q.** And these are the principles on which you relied,
- 21 based your opinion that changes at the base of
- 22 the food web can have effect on the upper food
- 23 web. Right?
- 24 **A. Well, these are some of the fundamental**
- 25 **concepts -- the understanding of some of the**

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- 1 **Q.** But you have not presented any analysis of that
- 2 long-term --
- 3 **A. That's right.**
- 4 **Q.** -- hydrological regime?
- 5 **A. That's correct.**
- 6 **Q.** But you recognize the importance of it. Correct?
- 7 **A. That's correct.**
- 8 **Q.** And you didn't examine any meteorological records
- 9 concerning Apalachicola River and Bay. Correct?
- 10 **A. No. Although I did look at some of the**
- 11 **precipitation data, but not in a long-term**
- 12 **analysis.**
- 13 **Q.** All right. So you didn't do a long-term analysis
- 14 of any meteorological records concerning the
- 15 Apalachicola River and Bay. Right?
- 16 **A. Right.**
- 17 **Q.** And you didn't examine any sediment or geological
- 18 records pertaining to the hydrological history of
- 19 the river and the bay. Right?
- 20 **A. That's correct.**
- 21 **Q.** That is correct?
- 22 **A. That's correct.**
- 23 **Q.** And you didn't do any or examine any records of
- 24 tree ring analysis in the Apalachicola River and
- 25 Bay. Correct?

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- 1 **fundamental processes and dynamics that go on**
- 2 **within an estuary and within organisms that live**
- 3 **within that estuary.**
- 4 **Q.** All right. Now, doctor -- and we're almost at
- 5 the time where I may suggest to the Court we take
- 6 a break; but I have just a couple more questions
- 7 before it's a good time if the Court would like
- 8 to break.
- 9       You did not examine the historical
- 10 hydrological regime; did you?
- 11 **A. I did not carry out a long-term hydrologic**
- 12 **analysis; that is correct.**
- 13 **Q.** And the ecology of an estuary depends on the
- 14 historical hydrological regime under which it has
- 15 evolved. Correct?
- 16 **A. Well, the historic hydrological regime will**
- 17 **determine the type of an estuary that emerges.**
- 18 **So whether it's a river-dominated estuary with a**
- 19 **high flow of river input or a -- at the other**
- 20 **extreme, a coastal lagoon which does not have a**
- 21 **lot of inflow of river sources and the water has**
- 22 **a much longer residence time. So it's that**
- 23 **long-term hydrological regime that sets the**
- 24 **trajectory for what kind of estuary will**
- 25 **ultimately emerge.**

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- 1 **A. That's correct.**
- 2 **Q.** And any information regarding historical
- 3 precipitation patterns in the Apalachicola River
- 4 and Bay was outside the scope of what you looked
- 5 at here. Right?
- 6 **A. Right. Although I'm aware that that has been**
- 7 **looked at and published, for example, by**
- 8 **Dr. Livingston. And I reviewed some of that**
- 9 **work.**
- 10 **Q.** And decreases in precipitation can affect the
- 11 length of low flow periods. Right?
- 12 **A. Yes.**
- 13 **Q.** And decreases in precipitation can affect the
- 14 severity of low flow periods. Right?
- 15 **A. Yes.**
- 16 **Q.** All right.
- 17       MS. DeSANTIS: Your Honor, if you would
- 18 like to break, this is actually an
- 19 appropriate time to break in the course of my
- 20 examination; but it is certainly up to the Court.
- 21       SPECIAL MASTER LANCASTER: Thank you.
- 22       While I think of it, counsel, the first
- 23 demonstrative screen thing you showed that
- 24 had all the arrows --
- 25       MS. DeSANTIS: The food web?

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1 SPECIAL MASTER LANCASTER: Yes. Would  
 2 you tomorrow bring us hard copies of that?  
 3 MS. DeSANTIS: We certainly will, your  
 4 Honor. We may even be able to get those this  
 5 afternoon.  
 6 SPECIAL MASTER LANCASTER: Thank you.  
 7 We'll be in recess.  
 8 (Time Noted: 2:32 p.m.)  
 9 (Recess Called)  
 10 (Time Noted: 2:42 p.m.)  
 11 SPECIAL MASTER LANCASTER: Counsel, for  
 12 your planning purposes, I have an unexpected  
 13 conflict; and we will recess at 4:00 today.  
 14 BY MS. DeSANTIS:  
 15 Q. Dr. Glibert, in your expert report submitted in  
 16 this matter, you evaluated some different flow  
 17 conditions using scenarios that were provided to  
 18 you by Dr. Hornberger. Am I right?  
 19 A. **That is correct.**  
 20 Q. And Dr. Hornberger is another one of Florida's  
 21 experts. Correct?  
 22 A. **Yes.**  
 23 Q. And Dr. Hornberger gave those scenarios to  
 24 Dr. Greenblatt, and she translated them into  
 25 flows. Right?

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1 **A. She actually -- I think I perhaps may have**  
 2 **misspoken in my deposition. She simply**  
 3 **translated those into an Excel spread sheet**  
 4 **which allowed me to use them in my Excel spread**  
 5 **sheets. So they were not her scenarios; rather,**  
 6 **she was the pass-through in order to get it in**  
 7 **the format that I could use.**  
 8 Q. All right. And you estimated how different water  
 9 quality parameters in the bay would change under  
 10 these different scenarios. Right?  
 11 A. **Yes.**  
 12 Q. And in one of these scenarios you compare  
 13 observed flows at the Sumatra Gage to  
 14 Dr. Hornberger and Dr. Greenblatt's remedy  
 15 scenario; is that right?  
 16 A. **Dr. Hornberger's scenario, yes.**  
 17 Q. That's Dr. Hornberger's remedy scenario. Right?  
 18 So you compared observed flows at Sumatra  
 19 Gage to Dr. Hornberger's remedy scenario. Right?  
 20 A. **Yes.**  
 21 Q. And is that --  
 22 A. **Well, I took those flows and compared those flows**  
 23 **to the parameters -- water quality parameters,**  
 24 **biological parameters that I was interested in.**  
 25 **I didn't specifically manipulate the flow data**

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1 **independent of the comparison of the flow data to**  
 2 **those water quality parameters.**  
 3 Q. All right. And the remedy scenario that you used  
 4 as part of your analysis, you described that in  
 5 your written direct testimony as a very  
 6 conservative scenario with reduced Georgia  
 7 consumption of water. Right?  
 8 A. **I do.**  
 9 Q. And you don't explain the basis in your written  
 10 direct testimony for characterizing that remedy  
 11 scenario as very conservative. Do you?  
 12 A. **I do not.**  
 13 Q. And you're not a hydrologist. Correct?  
 14 A. **I am not.**  
 15 Q. And you're not an economist. Correct?  
 16 A. **No.**  
 17 Q. And it's not within the scope of your work to  
 18 know that Dr. Hornberger's remedy scenario  
 19 included a 50 percent reduction in agricultural  
 20 water use in the Georgia portion of the ACF  
 21 Basin. Right?  
 22 A. **For the purpose of my report as a biologist, I'm**  
 23 **interested in the flows that are entering the**  
 24 **bay. And I understand that there are a series of**  
 25 **scenarios and there have been scenarios that have**

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1 **been developed since my original report, and this**  
 2 **was one of the more conservative ones. I**  
 3 **understand there are a range of other scenarios**  
 4 **that have been developed.**  
 5 Q. But you, yourself, don't have the basis to  
 6 characterize that remedy scenario as very  
 7 conservative. Right?  
 8 A. **Other than what I'm aware of that there are some**  
 9 **scenarios that do allow for more water flow for**  
 10 **the same investment.**  
 11 Q. And you have not done any --  
 12 A. **But I have not done that analysis.**  
 13 Q. You have not done any analysis with respect to  
 14 any new scenarios that Florida has proposed for  
 15 remedy. Correct?  
 16 A. **No. No. The scenarios in my testimony are the**  
 17 **same scenarios used in my report.**  
 18 Q. All right. And you -- you used Dr. Hornberger's  
 19 remedy scenario, which included a 50 percent  
 20 reduction in agricultural water use in the  
 21 Georgia portion of the ACF Basin. Right?  
 22 A. **I will leave the assumption of his scenarios for**  
 23 **him to explain.**  
 24 Q. So you didn't know that Dr. Hornberger's remedy  
 25 scenario involved a 50 percent cut in

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1862

1 agricultural use in water in Georgia?

2 MS. WINE: Objection. I'm just going to

3 note, again, counsel is mischaracterizing

4 that report.

5 BY MS. DeSANTIS:

6 Q. Did you know that Dr. Hornberger's remedy

7 scenario involved a 50 percent cut in

8 agricultural water use in Georgia?

9 **A. I know that there were a number of assumptions**

10 **that go into these scenarios, and I'll leave it**

11 **to him to describe his assumptions.**

12 Q. So you didn't actually examine the assumptions

13 that went into Dr. Hornberger's remedy scenario.

14 Right?

15 **A. That's right.**

16 Q. All right. You simply used what he provided to

17 you; is that right?

18 **A. That's correct.**

19 Q. All right. It's true, is it not, Dr. Glibert,

20 that estuaries are dynamic systems?

21 **A. Estuaries are dynamic systems. And the extent to**

22 **which they are dynamic depends on what type of**

23 **estuary they may be.**

24 Q. And you discussed in your written direct

25 testimony -- I'm sorry, in your expert report, a

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1863

1 tipping point. Correct?

2 **A. Yes.**

3 Q. And you defined tipping point as a state in which

4 an ecological threshold has been passed and the

5 system's resilience is exceeded, and a new state

6 becomes established. Correct?

7 **A. Correct.**

8 Q. And in your expert -- in your expert report you

9 maintain that a tipping point can be reached

10 during low flow years. Correct?

11 **A. That's correct.**

12 Q. And you also maintain that during the years when

13 there were not low flows, the ecology of the bay

14 did not reach a tipping point. Correct?

15 **A. Historically when low flows have occurred, the**

16 **system has recovered.**

17 Q. And, in fact, in high flow years, the estuary

18 functions as a highly productive ecosystem.

19 Correct?

20 **A. Classically, that is how it has performed.**

21 Q. Pardon?

22 **A. Classically, that is how it has performed, yes.**

23 Q. And classically, that is how the Apalachicola Bay

24 has performed. Correct?

25 **A. Yes. It is a productive estuary and has been**

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1864

1 **historically.**

2 Q. And you maintain that a tipping point was reached

3 in 2011 and 2012 based on change at the base of

4 the food web. Correct?

5 **A. Correct.**

6 Q. And 2011 and 2012 were low flow years. Right?

7 **A. Yes.**

8 Q. And you didn't identify any period prior to 2011

9 and 2012 when the Apalachicola Bay estuary did

10 not recover from stresses at the base of the food

11 web. Correct?

12 **A. That is correct.**

13 Q. And the ecosystem in the bay does have the

14 ability to rebound once favorable conditions are

15 restored. Correct?

16 **A. It depends on the extent to which the unfavorable**

17 **conditions have been prolonged and the extent of**

18 **harm to the system. The greater the extent of**

19 **harm, the longer it may take and the more**

20 **difficult it may be for the system to ultimately**

21 **return to its original state.**

22 Q. But, again, doctor, you have not identified any

23 period prior to 2011 and 2012 when the estuary in

24 Apalachicola Bay has not recovered from stresses

25 at the bay of the food web. Right?

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1 **A. That's right. 2011 and 2012 were the driest**

2 **years.**

3 Q. Right. You haven't identified any period when

4 the Apalachicola Bay hasn't been able to recover

5 from stresses at the base of food web. Right?

6 **A. That's correct.**

7 Q. And you are not going to provide a specific flow

8 number that needs to be attained -- a specific

9 number -- so that the ecology of the bay is not

10 in peril. Right?

11 **A. That's correct.**

12 MS. DeSANTIS: I have no more questions.

13 SPECIAL MASTER LANCASTER: Thank you.

14 REDIRECT EXAMINATION

15 BY MS. WINE:

16 Q. Good afternoon, Dr. Glibert.

17 **A. Good afternoon.**

18 Q. Dr. Glibert, the bulk of your testimony and

19 opinions relate to the lower food web; is that

20 correct?

21 **A. That is correct.**

22 Q. And can impacts from low flow on the lower food

23 web constitute harm to the bay?

24 **A. Absolutely. It can constitute harm to the bay.**

25 **And it can constitute harm to the bay in a number**

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1 **of very specific ways. First, it can change the**  
 2 **abundance of these primary producers. It can**  
 3 **change the species composition of these primary**  
 4 **producers. The harm that we specifically saw was**  
 5 **a change in the size of these primary producers**  
 6 **and in the species composition, leading to some**  
 7 **that are less nutritious than others.**  
 8 **Q.** And you did an analysis looking at the  
 9 relationship between freshwater flow and water  
 10 quality; is that correct?  
 11 **A.** That's correct.  
 12 **Q.** And what did that analysis show?  
 13 **A.** **The analysis showed that reductions in freshwater**  
 14 **flow changed water quality in a number of**  
 15 **substantial ways, which in turn altered the**  
 16 **quantity and quality of nutrients. They are the**  
 17 **nitrogen and phosphorus, the fertilizers, as it**  
 18 **were, that support the base of the food web and**  
 19 **changed other important water quality parameters**  
 20 **that have ultimate harm for species.**  
 21 **Q.** And how did the relationships that you found  
 22 between low flow and these parameters that you  
 23 just mentioned relate back to your overall  
 24 opinions regarding Apalachicola Bay?  
 25 **A.** **The reductions in freshwater flow, particularly**  
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1867

1 **when these low flow conditions -- natural low**  
 2 **flow conditions are exacerbated by upstream**  
 3 **extractions by Georgia, lead to impaired water**  
 4 **quality and an impaired lower food web, which in**  
 5 **turn has repercussions for the upper food web.**  
 6 **Q.** Now, you talk about productivity in your prefiled  
 7 direct testimony. Do you recall that?  
 8 **A.** Yes, I do.  
 9 **Q.** And what do you mean by productivity?  
 10 **A.** **Productivity is a term that we use to mean the**  
 11 **sum total of the production of all the organisms**  
 12 **in a system, in an estuary.**  
 13 **Q.** And is productivity the same throughout a bay  
 14 like Apalachicola Bay?  
 15 **A.** **In a dynamic system such as an estuary, there are**  
 16 **indeed going to be regions of the bay which are**  
 17 **going to have different productivity, different**  
 18 **species, different water quality. And it's going**  
 19 **to be very different from the northern bay**  
 20 **region, east bay region, to the lower bay.**  
 21 **So, yes, indeed, there are many different**  
 22 **zones of the bay that have different types of**  
 23 **productivity.**  
 24 **Q.** And what are the differences you see in  
 25 productivity as between the east bay and other  
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1868

1 areas of Apalachicola Bay?  
 2 **A.** **As we talked earlier, that east bay region is**  
 3 **considered the primary nursery area for juvenile**  
 4 **fish, for white shrimp, for crabs. And as such,**  
 5 **it is considered a highly productive area. And**  
 6 **it is most impacted when freshwater flows are**  
 7 **reduced. And the reduction in the nursery**  
 8 **function of that east bay area has impacts that**  
 9 **have repercussions for years to come because the**  
 10 **life cycle of many of these organisms is over the**  
 11 **course of many years.**  
 12 **Q.** How do changes in salinity impact the ecology of  
 13 Apalachicola Bay?  
 14 **A.** **As freshwater flow decreases, salinity increases**  
 15 **because that salt intrudes from the Gulf of**  
 16 **Mexico; and, in terms of productivity for the**  
 17 **estuary, the organisms that depend primarily on**  
 18 **that freshwater zone, their habitat shrinks. And**  
 19 **they begin to have increased stressors from**  
 20 **exposure to salt that they would not normally**  
 21 **experience.**  
 22 **Q.** And is the impact of salinity that you just noted  
 23 particularly important in the east bay area of  
 24 Apalachicola Bay?  
 25 **A.** **Because east bay is the fresher region, and under**  
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1 **normal conditions its salinity will range from**  
 2 **zero to about 4 or 5 parts per thousand -- parts**  
 3 **of salt per parts of water -- the Gulf of Mexico**  
 4 **has a salinity of 30. The organisms, for**  
 5 **example, some of the submerged grasses that live**  
 6 **in that east bay area and form the nursery**  
 7 **function for juvenile fish, they can tolerate**  
 8 **salinities of only about 5, 6, or 7. In general**  
 9 **estuarine science, we know that these freshwater**  
 10 **organisms begin to experience stress when**  
 11 **salinity reaches about 7.**  
 12 **So any intrusion of salinity imposes stress**  
 13 **on these species, and this causes metabolic**  
 14 **stress for these organisms. And many of them are**  
 15 **not able to live in that east bay area any**  
 16 **longer.**  
 17 **Q.** Georgia's counsel asked you about salinity  
 18 changes with respect to Dr. Greenblatt's  
 19 modeling --  
 20 **A.** Yes.  
 21 **Q.** -- of the remedy scenario. Do you recall that?  
 22 **A.** Yes.  
 23 **Q.** And in your opinion, what impact would those  
 24 salinity changes have on the health of the  
 25 Apalachicola Bay ecosystem if the remedy scenario  
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1870

1 were imposed?

2 **A. In east bay, the remedy scenario would be**

3 **particularly effective because when the normal**

4 **salinity is only in a range of zero to about 5**

5 **parts per thousand, an improvement in salinity of**

6 **just a couple of parts per thousand may reduce**

7 **that salt stress by 20, 30 percent. Moreover,**

8 **the improvement in water flow can lead to**

9 **improvement in other water quality parameters**

10 **such as dissolved oxygen stress or temperature**

11 **stress. So there are many improvements if we**

12 **impose the remedy scenario.**

13 **Q.** And you just mentioned dissolved oxygen. Could

14 you explain to the Court what dissolved oxygen is

15 and its importance to your opinions.

16 **A. Dissolved oxygen is very -- is a very important**

17 **measure of water quality. Just as you have**

18 **dissolved oxygen in your blood, there is**

19 **dissolved oxygen in seawater. And organisms need**

20 **this for respiration. And under conditions of**

21 **low flow when the phytoplankton community**

22 **accumulates because the residence time becomes**

23 **very long and the organisms just stay in place,**

24 **many of them are not grazed by the zooplankton we**

25 **were just talking about. And they fall to the**

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1871

1 **bottom. They die and they decay. And in the**

2 **rotting of that material, dissolved oxygen is**

3 **consumed. When dissolved oxygen is no longer**

4 **available, all organisms suffer stress.**

5 **Q.** And your analysis and work in this case found a

6 correlation between dissolved oxygen and low

7 flow, as you just described. Correct?

8 **A. That is correct.**

9 **Q.** It was mentioned -- I'm sorry?

10 **A. I should say there are significantly more**

11 **episodes of low dissolved oxygen under low flow.**

12 **Q.** It was mentioned in your testimony -- there was

13 discussion of harmful algae blooms. Do you

14 recall that?

15 **A. Yes.**

16 **Q.** And what are harmful algae blooms?

17 **A. Harmful algae are those algae that can intoxicate**

18 **seafood with toxins. For example, in Maine when**

19 **mussel beds are closed, they're closed because of**

20 **the toxin that is ingested by the mussels from**

21 **the local harmful algal bloom species here in**

22 **Maine. They can also cause fish kills. They**

23 **cause many disruptions to ecosystems. And**

24 **they're particularly harmful to some of the very**

25 **fragile life stages of fish and shellfish.**

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1872

1 **Q.** And did your work in this case find a correlation

2 between harmful algae blooms and low flow?

3 **A. There are quite a number of species of harmful**

4 **algae in Apalachicola Bay. Many of the species**

5 **that are now found more frequently are species**

6 **that are associated with higher salinity. So as**

7 **salinity increases with low flow, the risk of**

8 **these harmful algal blooms occurring increases.**

9 **Q.** And what does that mean in particular for an

10 estuary like Apalachicola Bay?

11 **A. Well, when they're -- Apalachicola Bay has a**

12 **number of these species. The presence of these**

13 **species has a number of specific impacts that may**

14 **relate to oysters, one of which is there is a**

15 **specific type of harmful algal bloom species that**

16 **when oysters are in the presence of this species,**

17 **they don't spawn. They don't reproduce. There**

18 **is another harmful algal bloom species that**

19 **causes harm to the larvae. And the delicate**

20 **membranes of the larvae are attacked, and the**

21 **larvae do not survive.**

22 **So recruitment failure can occur when**

23 **reproduction of oysters occurs in the presence of**

24 **these harmful algal bloom species.**

25 **Q.** Now, counsel asked you about the relationship

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1873

1 between low flows and algae and oysters. Do you

2 recall that?

3 **A. Yes.**

4 **Q.** And she noted that there's not a lot of

5 evidence -- well-documented evidence from

6 Apalachicola Bay itself regarding this

7 relationship. Correct?

8 **A. I have documented that relationship.**

9 **Q.** Yes. And she was saying that you had not done

10 any in situ work in Apalachicola Bay. Correct?

11 **A. The -- I have not done experiments in**

12 **Apalachicola Bay; but the data comes from**

13 **Apalachicola Bay.**

14 **Q.** Right. And I wanted to clarify why you're

15 confident in your opinion about this relationship

16 between low flows and algae and oysters based on

17 the work that you have done.

18 **A. I have done a considerable amount of experiments**

19 **on algae and oysters. I also worked in a**

20 **laboratory where on the floor below we housed the**

21 **largest oyster hatchery in the East Coast. We**

22 **produced a billion spat on shell every year for**

23 **Chesapeake restoration. So we have considerable**

24 **understanding of the eastern oyster, the same**

25 **oyster, and its nutritional needs, especially at**

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1874

1876

1 **these early life stages.**

2 **And, therefore, understanding that there has**

3 **been a shift in the phytoplankton community**

4 **composition over time -- and that data comes from**

5 **a number of Ph.D. theses -- and analyses**

6 **correlations with flow, we know the species**

7 **composition of algae have changed. They have**

8 **changed in size, so the oysters no longer can**

9 **efficiently filter them. And they have changed**

10 **to a phytoplankton species that do not provide**

11 **the full complement of nutrition that's necessary**

12 **for oysters to go through that reproductive phase**

13 **in these very early days.**

14 **Q.** And is there any reason to believe that the

15 relationship between low flows and algae and then

16 algae to oysters is different in Apalachicola

17 Bay?

18 **A. There's absolutely no reason to believe that**

19 **there's a unique response by the eastern oyster**

20 **in Apalachicola Bay. The nutritional needs of**

21 **oysters have been well studied in not only our**

22 **hatchery, but in hatcheries and in experiments**

23 **worldwide. There's a vast literature that has**

24 **reported that these oysters can feed only on**

25 **certain types of food; and they can -- that they**

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1 larger species in the upper food web of the bay?

2 **A. The lower food web is the foundation on which the**

3 **upper food web depends. I term -- the term I use**

4 **is that the lower food web is the bridge to the**

5 **upper food web. Dr. Livingston in his writings**

6 **says the lower food web is inextricably linked to**

7 **the upper food web. The upper food web depends**

8 **on all of the nutrition, the amount, quantity,**

9 **quality of food that is available. The -- it**

10 **depends on the timing of that food. It depends**

11 **on the amount. And it depends on the -- what**

12 **kind of food they can eat. So there are many,**

13 **many changes that occur in upper food webs when**

14 **the diet that is available at the lower food web**

15 **changes.**

16 **Q.** In addition to reviewing the report of

17 Dr. Jenkins, what work or analysis did you do to

18 form your opinions regarding the linkage between

19 your evaluation of the lower food web and the

20 impacts on the upper food web?

21 **A. There were several approaches that I took.**

22 **First, my general understanding of principles, as**

23 **we spoke earlier, of food webs of ecological**

24 **stoichiometry, which is a term that refers to the**

25 **nutrition at one level of the food web and how it**

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1875

1877

1 **have certain nutritional needs, and they only get**

2 **that from certain types of foods.**

3 **Q.** And how does your opinion regarding low flows

4 and algae and oysters relate to the opinions that

5 Dr. Kimbro provided in this case?

6 **A. Dr. Kimbro spoke about the increased predators**

7 **that arrive under conditions of increased**

8 **salinity. My opinions in no way are**

9 **contradictory. My opinions add to his opinions**

10 **by showing that the oysters are stressed by the**

11 **predators that eat them; but they are also**

12 **stressed under these low conditions by the fact**

13 **that they're not getting adequate nutrition, and**

14 **they are not able to reproduce at a high rate**

15 **because they're not getting the right nutrition**

16 **both as an adult and as young larvae. So**

17 **multiple stressors both from the top and the**

18 **bottom.**

19 **Q.** Now, Georgia's counsel asked you some questions

20 about your evaluation of the upper food web as

21 well.

22 **A. Yes.**

23 **Q.** And I would like to just step back and first ask

24 you what is the relationship between your

25 evaluation of the lower food web and then the

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1 **advances to the next. I understand that**

2 **different life cycles of organisms depend on**

3 **different types of food at different phases of**

4 **their life. And I also reviewed a considerable**

5 **amount of the literature to understand that these**

6 **effects do, indeed -- have, indeed, been seen by**

7 **others with regard to changes and flow in the**

8 **upper food web.**

9 **Q.** And are these studies in literature that you

10 reviewed consistent with the general principles

11 of nutritional science that you have mentioned

12 today?

13 **A. Yes. Absolutely.**

14 **Q.** In what way?

15 **A. When we change the amount and the quality and the**

16 **timing of food available, we change the success**

17 **of the next generation.**

18 MS. WINE: Your Honor, if you would, I

19 would like to hand up a few documents that

20 I'm going to ask the witness about.

21 BY MS. WINE:

22 **Q.** Dr. Glibert, I have handed you a few exhibits

23 that we have discussed in court over the past few

24 days. I would like to first ask you about

25 Exhibit GX-0568, which is titled Apalachicola Bay

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1878

1 Oyster Situation Report. Do you have that?

2 **A. Yes, I do.**

3 **Q.** And, Dr. Glibert, are you familiar with this

4 report?

5 **A. Yes. This report came to my attention about a**

6 **year ago.**

7 **Q.** And you have reviewed it?

8 **A. Yes.**

9 **Q.** And is this report consistent with the

10 conclusions and opinions that you have reached in

11 this case?

12 **A. The particular focus that I was paying attention**

13 **to in this report is the section -- I don't see**

14 **page numbers on this -- that refers to nutrient**

15 **inputs to the bay. And the initial conclusion**

16 **that they cite is, indeed, consistent with the**

17 **overall principle that I was applying in this**

18 **case.**

19 **Q.** And apart from the overall conclusion being

20 consistent, is the study and the analysis that

21 they performed in this article consistent with

22 the study and the analysis that you did?

23 **A. The initial statement that this report provides**

24 **is that the Apalachicola Bay is the major source**

25 **of nutrients to the bay. It fuels the food web**

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1879

1 **that supports oyster, shrimp, fish and other**

2 **marine organisms. When flows decline, so do**

3 **inputs of nutrients. And this phenomenon lasts**

4 **for a long period of time. The abundance of all**

5 **the organisms mentioned above may decline.**

6 **I completely agree with that statement. What**

7 **took me very much by surprise when I was**

8 **reviewing this document is the very next sentence**

9 **goes on to say, there are no continuous**

10 **measurements of nutrient input to the bay.**

11 **And I was quite surprised by this because**

12 **there are thousands of records of nutrients that**

13 **have been measured in Apalachicola Bay for the**

14 **past decade and a half on a monthly basis. They**

15 **seemed completely unaware of that data. They**

16 **also seemed completely unaware of the vast**

17 **literature that has described nutrients to the**

18 **bay.**

19 **So they then tried to carry out an analysis**

20 **to look at this connection between nutrients and**

21 **flows, and they resorted to a very limited**

22 **dataset that was available from the Northwest**

23 **Florida Water Management District conducted in**

24 **the early 2000's. They extrapolate that data**

25 **through a model to 2011 and 2012.**

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1880

1 **But what was quite surprising to me is that**

2 **this limited dataset was from the Jim Woodruff**

3 **Dam. So they had very limited data. It was from**

4 **a site 100 miles away from that which was in the**

5 **bay.**

6 **And they conclude that they have difficulty**

7 **linking water quality to the oyster population**

8 **responses. And it was simply because they failed**

9 **to look at the available data. They failed to**

10 **look at the right data. And they failed to make**

11 **the connection, the very connections that I was**

12 **able to make because I had access to all of this**

13 **publicly-available data.**

14 **Q.** And what is that in general terms? What is that

15 available and right data that you looked at in

16 doing your analysis?

17 **A. In my analysis I primarily depended on the**

18 **monitoring data from the Apalachicola National**

19 **Estuarine Research Program -- we can brief it**

20 **ANERR.**

21 **Apalachicola Bay is one of the best-monitored**

22 **estuaries in the country. It rivals Chesapeake**

23 **Bay and San Francisco Bay as the best data on**

24 **water quality and long-term records. This**

25 **dataset has thousands of records of each of the**

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1881

1 **water quality parameters.**

2 **In addition to that dataset, I depended on**

3 **Florida Fish and Wildlife's harmful algal bloom**

4 **dataset which has tens of thousands of records of**

5 **phytoplankton community. I depended on a number**

6 **of theses that have excellent phytoplankton**

7 **identification. I depending on the ANERR data on**

8 **dissolved oxygen, a dataset that has hundreds of**

9 **thousands of data records. So it was quite**

10 **surprising to me that in this report they were**

11 **unaware of this extensive dataset.**

12 **Q.** And now, if you could take the other two exhibits

13 that I handed you. They are marked GX-789 and

14 FX-866. They are two articles on which Bill Pine

15 is at least one of the authors. Do you see that?

16 **A. Yes, I see.**

17 **Q.** And are you familiar with these articles?

18 **A. Yes, I am.**

19 **Q.** And have you reviewed these articles?

20 **A. Again, these articles came to my attention last**

21 **year several months after I had started my**

22 **investigation here.**

23 **Q.** And are these articles consistent with your

24 findings and opinions in this matter?

25 **A. Both of these articles draw the conclusion that**

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1882

1 **there was a reduction in recruitment that**  
 2 **affected the oyster fishery in Apalachicola Bay.**  
 3 **And with respect to that specific part of the**  
 4 **conclusion, I agree, because that was the initial**  
 5 **hypothesis based on my knowledge of the**  
 6 **nutritional requirements of the early life stages**  
 7 **of oysters.**

8 **What surprised me very much in reading both**  
 9 **of these papers is that they seemed to be**  
 10 **completely unaware of the vast literature and/or**  
 11 **data that relates to recruitment and nutrition**  
 12 **and the lower food web. They simply leap from**  
 13 **the idea that there's a loss of recruitment to**  
 14 **the idea that this relates to shelling when, in**  
 15 **fact, they failed to realize that young oysters**  
 16 **have a several-week period of time before they**  
 17 **actually settle on shell. And it's that larval**  
 18 **phase, that phase when they go from embryo to**  
 19 **larvae, that food -- critical food is absolutely**  
 20 **essential to the success of the larvae. They**  
 21 **don't even make it to the -- to the spat stage if**  
 22 **they are stressed with poor quality food. And**  
 23 **poor quality food can come both in the food that**  
 24 **they are taking in directly as these young**  
 25 **larvae; poor quality food can also come from the**

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1883

1 **mothers that are stressed because the nutrition**  
 2 **that gets into the egg is inadequate for their**  
 3 **survival.**

4 **It just surprised me that none of these**  
 5 **topics were in any way considered, given the fact**  
 6 **that these are phenomena that are well known**  
 7 **throughout the literature.**

8 **Q.** Now, Dr. Glibert, in your prefiled direct  
 9 testimony in paragraph 93, you state, if  
 10 Georgia -- I'll wait for Mr. Walton to get there.  
 11 It's paragraph 93.

12 You have the opinion if Georgia consumption  
 13 is not curbed, the ecology and the food web of  
 14 the bay will continue to see declines in  
 15 productivity and will likely be harmed  
 16 permanently. Why is that your opinion here?

17 **A. It's my opinion that it will be very difficult**  
 18 **for the system to recover if consumption is not**  
 19 **curbed because each of the water quality**  
 20 **parameters, whether it's salinity, dissolved**  
 21 **oxygen, temperature, are negatively affected,**  
 22 **each of these causes stressors to organisms. The**  
 23 **nursery function of the east bay will not**  
 24 **recover. Without the recovery of the east bay**  
 25 **nursery function, the upper food web will not**

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1 **recover. We know that the plankton species**  
 2 **composition will not recover without a curb on**  
 3 **Georgia consumption; and consequently, the system**  
 4 **will not revert to its previously productive**  
 5 **condition.**

6 **Q.** And in your opinion, what will happen to  
 7 Apalachicola Bay if there were a remedy capping  
 8 Georgia's consumption?

9 **A. It's my opinion that -- and this is based on**  
 10 **multiple analyses in which I have a great deal of**  
 11 **confidence, that as flows are restored, there are**  
 12 **not only positive effects on individual water**  
 13 **quality parameters, but they, in fact, start to**  
 14 **create positive reinforcing feed-backs. And the**  
 15 **system will begin to not only recover, but that**  
 16 **recovery can be accelerated.**

17 **For example, if the stress from salinity is**  
 18 **removed as well as the stress from low dissolved**  
 19 **oxygen and there's a little bit better**  
 20 **temperature regime combined with improved**  
 21 **nutrients, we begin to re-establish the submerged**  
 22 **aquatic vegetation that may have declined that,**  
 23 **in turn, begins to create a positive environment**  
 24 **for that nursery area. We begin to see oysters**  
 25 **starting to recover because their food is of**

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1 **higher quality. And so one by one we begin to**  
 2 **see positive reinforcing feed-backs. Those**  
 3 **oysters that become re-established will begin to**  
 4 **filter the water, keeping the water at a higher**  
 5 **quality. They will begin also to create their**  
 6 **own shell, which will, again, create more**  
 7 **substrate for the next generation.**

8 **Q.** Thank you, Dr. Glibert.  
 9 SPECIAL MASTER LANCASTER: Any recross?  
 10 MS. DeSANTIS: Very brief recross, your  
 11 Honor.

12 RECCROSS-EXAMINATION

13 BY MS. DeSANTIS:

14 **Q.** Doctor, counsel for the State of Florida  
 15 questioned you about the effect of harmful algal  
 16 blooms on oysters. Right?

17 **A. Yes.**

18 **Q.** And you based your conclusions regarding the  
 19 effects of harmful algal blooms on oysters on  
 20 laboratory studies. Right?

21 **A. And on literature studies.**

22 **Q.** All right. And the laboratory studies do not  
 23 pertain specifically to oysters procured from  
 24 Apalachicola Bay. Correct?

25 **A. They pertain to the exact same species of oyster**

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1 **and the exact same species of harmful algae.**

2 **Q.** Yet, the laboratories themselves were not

3 conducted on oysters that were procured from

4 Apalachicola Bay. Correct?

5 **A. That is correct. But we have no reason to**

6 **believe that Apalachicola Bay oysters would**

7 **behave physiologically any different.**

8 **Q.** Doctor, my question was simply those oysters that

9 were experimented on were not procured from

10 Apalachicola Bay. Correct?

11 **A. That's correct.**

12 **Q.** All right. Doctor, you have maintained that the

13 relationship between algae and flow is complex.

14 Right?

15 **A. Yes.**

16 **Q.** And, in fact, you have noted that the EPA has

17 encouraged caution in any effort to establish a

18 direct causal link between a decrease in flow and

19 an increase in the abundance of phytoplankton.

20 Correct?

21 **A. Can you please repeat that.**

22 **Q.** Yes. The EPA -- you have noted that the EPA has

23 encouraged caution in any effort to establish a

24 direct causal link between a decrease in flow and

25 an increase in the abundance of phytoplankton.

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1 Correct?

2 **A. There's caution urged there because flow delivers**

3 **the nutrients that support the phytoplankton, and**

4 **it depends on the amount of flow and the**

5 **constituents coming with that flow.**

6 **Q.** But the EPA has encouraged caution in an effort

7 to establish a direct causal link between a

8 decrease in flow and an increase in the abundance

9 of phytoplankton. Right?

10 **A. Yes.**

11 **Q.** Okay.

12 MS. DeSANTIS: I have no more questions.

13 SPECIAL MASTER LANCASTER: Anything?

14 MS. WINE: I have nothing further.

15 SPECIAL MASTER LANCASTER: Doctor,

16 counsel should have told you that I'm a very

17 simple-minded person. If they haven't, I'm

18 about to prove it.

19 What is an estuarine ecologist?

20 THE WITNESS: Somebody who studies the

21 ecology of estuaries.

22 SPECIAL MASTER LANCASTER: Okay. And

23 what estuaries were you testifying about

24 here?

25 THE WITNESS: Apalachicola Bay.

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1 SPECIAL MASTER LANCASTER: So I should

2 understand that Apalachicola Bay is an

3 estuary?

4 THE WITNESS: Yes. An estuary is an

5 embayment where freshwater and saltwater mix.

6 SPECIAL MASTER LANCASTER: Thank you for

7 that.

8 You were, as I understand it, not asked

9 to testify as to the cause of the low flows;

10 is that correct?

11 THE WITNESS: That's correct.

12 SPECIAL MASTER LANCASTER: Counsel?

13 MS. WINE: Nothing further, your Honor.

14 MS. DeSANTIS: Nothing further, your

15 Honor.

16 SPECIAL MASTER LANCASTER: Thank you.

17 MR. PERRY: Your Honor, we're prepared,

18 if we can have just a couple minutes, to call

19 another witness.

20 SPECIAL MASTER LANCASTER: Sure.

21 MR. PERRY: But we're also prepared to

22 do so tomorrow morning.

23 We expect that Dr. Hornberger, our next

24 witness, will take quite a bit of time from

25 Georgia. So we're prepared to go either way,

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1 now or tomorrow.

2 SPECIAL MASTER LANCASTER: I had planned

3 to recess at 4:00. If this is acceptable to

4 counsel, we'll recess now.

5 MR. PERRY: Yes, your Honor.

6 MR. PRIMIS: That's fine, your Honor.

7 SPECIAL MASTER LANCASTER: Let me just

8 say one more thing. I told you that I have

9 committed to stick to this job to the end and

10 write a report. And then I'm going to go to

11 my home in Nova Scotia. If you want to know

12 the address and how to get there, just ask

13 Josh.

14 We'll stand in recess.

15 (Time Noted: 3:30 p.m.)

16 (Proceeding adjourned to Thursday,

17 November 10, 2016, at 9:00 a.m.)

18 (End of day)

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CERTIFICATE

I, Claudette G. Mason, a Notary Public  
in and for the State of Maine, hereby certify  
that the foregoing pages are a correct  
transcript of my stenographic notes of the  
Proceedings.

I further certify that I am a  
disinterested person in the event or outcome  
of the above-named cause of action.

IN WITNESS WHEREOF, I subscribe my hand  
this 6th day of December, 2016.

/s/ Claudette G. Mason  
Claudette G. Mason, RMR, CRR  
Court Reporter.

My Commission Expires  
June 9, 2019.

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