

SUPREME COURT OF THE UNITED STATES  
No. 142, Original

STATE OF FLORIDA, )  
Plaintiff, )  
V. ) VOLUME XIV  
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 22, 2016, commencing at 8:53 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.  
CHRISTOPHER J. FAWAL, ESQ.  
BENJAMIN M. LAWLESS, ESQ.  
GEORGE C. CHIPEV, ESQ.  
ANDREW D. PRINS, ESQ.

For the State of Georgia: CRAIG S. PRIMIS, ESQ.  
K. WINN ALLEN, ESQ.  
CHRISTOPHER J. MANER, ESQ.  
ARUN S. AVVA, ESQ.

Also Present: JOSHUA D. DUNLAP, ESQ.

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1 PROCEEDINGS  
2 SPECIAL MASTER LANCASTER: Good morning,  
3 everyone.  
4 MR. ALLEN: Good morning, your Honor.  
5 MR. FAWAL: Good morning.  
6 SPECIAL MASTER LANCASTER: Crisp is the  
7 word. Crisp.  
8 MR. ALLEN: Yes, indeed.  
9 SPECIAL MASTER LANCASTER: 20's this  
10 morning.  
11 I hope you all, despite the cold, got to  
12 a restaurant and got a good meal last night  
13 and that you're ready to roll.  
14 MR. ALLEN: Ready to roll.  
15 Good morning, your Honor.  
16 SPECIAL MASTER LANCASTER: Good morning.  
17 MR. ALLEN: Today we'll be calling Peter  
18 Mayer and then Mark Masters. We'll start  
19 with Mr. Mayer, if I could ask Mr. Mayer to  
20 please take the stand.  
21 THE CLERK: Please raise your right  
22 hand.  
23 Do you solemnly swear that the testimony  
24 you shall give in the cause now in hearing  
25 shall be the truth, the whole truth, and  
  
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1 nothing but the truth, so help you God?  
2 THE WITNESS: I do.  
3 THE CLERK: Please be seated.  
4 Pull yourself right up to the microphone  
5 and please state your name and spell your  
6 last name.  
7 THE WITNESS: My name is Peter Mayer,  
8 P E T E R, M A Y E R.  
9 MR. ALLEN: Your Honor, Mr. Mayer is an  
10 expert in civil engineering and municipal and  
11 industrial water use.  
12 May I approach the witness to provide  
13 him his testimony?  
14 SPECIAL MASTER LANCASTER: Please.  
15 Good morning.  
16 THE WITNESS: Good morning.  
17 DIRECT EXAMINATION  
18 BY MR. ALLEN:  
19 Q. Mr. Mayer, do you recognize this as a true and  
20 accurate copy of the written direct testimony you  
21 have provided in this case?  
22 A. Yes, I do.  
23 Q. And do you adopt it as your own?  
24 A. Yes, I do.  
25 MR. ALLEN: Tender the witness.  
  
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1 CROSS-EXAMINATION

2 BY MR. FAWAL:

3 Q. Good morning, Mr. Mayer.

4 A. **Good morning.**

5 Q. My name is Chris Fawal. I'm one of the attorneys

6 for the State of Florida.

7 MR. FAWAL: Your Honor, may I approach

8 to provide the witness with his binder?

9 SPECIAL MASTER LANCASTER: Please.

10 BY MR. FAWAL:

11 Q. Mr. Mayer, you have offered expert opinions in

12 this case regarding Georgia's municipal and

13 industrial water consumption. Correct?

14 A. **Correct.**

15 Q. As your counsel mentioned, you're a professional

16 engineer. Right?

17 A. **Yes, I am.**

18 Q. You don't have a Ph.D. Correct?

19 A. **I do not have a Ph.D.**

20 Q. And I just want to make sure the Court understands.

21 I'll just refer to you as mister instead of

22 doctor.

23 A. **That's perfectly fine.**

24 Q. And I'll also refer to municipal and industrial

25 water as M & I, if that works.

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1 You should have a copy of your prefiled

2 direct testimony in tab 1 of the binder. Could

3 you turn to that.

4 A. **Yes.**

5 Q. In paragraph 3 on page 1 you offer an opinion on

6 the scope and effectiveness of Georgia's water

7 conservation and efficiency policy plans and

8 measures. Correct?

9 A. **Yes.**

10 Q. And in that same paragraph you offered an opinion

11 on the overall reasonableness of municipal and

12 industrial water use by Georgia in the ACF Basin.

13 Correct?

14 A. **Correct.**

15 Q. Mr. Mayer, I'm going to start with your opinion

16 on the overall reasonableness of Georgia's M & I

17 water use. You have concluded that Georgia's

18 M & I use is reasonable. Right?

19 A. **Yes, I have.**

20 Q. And you agree that reasonable in the water use

21 context means using water in a way that is

22 conscious of the ecosystem and of other water

23 users who also rely on the same water. Correct?

24 A. **Yes. That is correct. I think that there's**

25 **other aspects of reasonableness as well; but that**

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1 **is -- that is certainly part of reasonable water**

2 **use.**

3 Q. It's not just part of reasonable water use;

4 that's the definition that you gave at your

5 deposition?

6 A. **I did give that definition at my deposition, but**

7 **we also discussed other aspects of reasonable**

8 **water use.**

9 Q. Okay. Mr. Mayer, a determination of

10 reasonableness requires being conscious of

11 Georgia's water use on ecosystems and other water

12 users in the entire ACF Basin. Right?

13 A. **That's correct.**

14 Q. Okay. And while you offer the opinion that

15 Georgia's M & I water use is reasonable, you have

16 not evaluated the impact of Georgia's water use

17 on the ecosystems or other water users in the ACF

18 Basin. Correct?

19 A. **No. The impact of Georgia's water use was**

20 **something that was looked at by other experts.**

21 Q. You didn't evaluate that. Right?

22 A. **No.**

23 Q. And you didn't include any discussion of the

24 impact on ecosystems or other water users in your

25 prefiled direct testimony. Correct?

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

2 Q. You didn't include any discussion of impact on

3 downstream water users or ecosystems in your

4 testimony. Correct?

5 A. **No. I did not.**

6 Q. And you didn't analyze the impact of Georgia's

7 water use on any fish, wildlife species, or

8 downstream habitats. Right?

9 A. **No. That's something that other experts have**

10 **looked at.**

11 Q. Mr. Mayer, if you will turn to paragraph 42,

12 still in tab 1. It is your -- it's page 15.

13 A. **Yes.**

14 Q. If you will read that silently to yourself.

15 A. **Yes.**

16 Q. You said it's difficult to understand how

17 Florida's proposed remedy consumptive measure

18 impacts the amount of water to Florida because of

19 the size difference. Right?

20 A. **Well, I think looking at this -- this paragraph**

21 **refers to the next figure, which is figure 6.**

22 **And that figure shows the flow at the**

23 **Chattahoochee Gage in the Apalachicola River in**

24 **the top line. And the bottom line shows**

25 **Georgia's municipal and industrial consumptive**

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1 **use in comparison to that flow. And if you look**  
 2 **at that, you can just see how small the**  
 3 **consumptive use is in comparison to the flows**  
 4 **that enter the State of Florida.**  
 5 Q. Thank you, Mr. Mayer. And your only analysis is  
 6 to look at the size of consumptive use versus the  
 7 size of the flows. Correct?  
 8 A. **No. I also looked at the size of the population.**  
 9 **I mean, you have to understand that this small**  
 10 **amount of flow that's being represented here and**  
 11 **the consumptive use supports 5.1 million people**  
 12 **in Georgia and an economy of billions and**  
 13 **billions of dollars of great significance to the**  
 14 **State of Georgia and to the nation. To me,**  
 15 **that's an important aspect of whether their water**  
 16 **use is reasonable.**  
 17 Q. Mr. Mayer, I'm just asking you a yes or no  
 18 question. You have compared a big number and a  
 19 small number. Right?  
 20 That's what you have done in paragraph 42 and  
 21 the figure that follows. Right?  
 22 A. **I have compared the flow into -- at the state**  
 23 **line into Florida with the municipal and**  
 24 **industrial consumptive use in Georgia.**  
 25 Q. That's --  
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1 A. **Now, you -- those are your words, big and small.**  
 2 Q. Correct. You did not analyze the impact of flows  
 3 and Georgia's M & I water use on ecosystems of  
 4 the ACF basin or on downstream water users.  
 5 Right?  
 6 A. **No. That's not something I looked at.**  
 7 Q. Mr. Mayer, you also testified that you believe  
 8 Georgia's future M & I consumptive uses will be  
 9 reasonable. Correct?  
 10 A. **Correct.**  
 11 Q. Your prefiled testimony indicates you believe  
 12 that the future M & I water assumption will be  
 13 small. Right?  
 14 A. **Correct.**  
 15 Q. And that's based on the Metro District's 2050  
 16 projections. Correct?  
 17 A. **Yes. That's based on the water supply request --**  
 18 **the most recent water supply request, which has**  
 19 **actually gone down considerably from the previous**  
 20 **water supply request.**  
 21 Q. And you were familiar with that water supply  
 22 request when you wrote your expert report.  
 23 Right?  
 24 A. **Yes, I was.**  
 25 Q. You were familiar with the projections contained  
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1 in that request. Right?  
 2 A. **Yes, I was.**  
 3 Q. But you didn't factor any future projections into  
 4 the work you did when you prepared your expert  
 5 report. Right?  
 6 A. **No. That's not something that they asked me to**  
 7 **do at that point in time.**  
 8 Q. And so you had not done any analysis to compare  
 9 metro Atlanta's return flow percentages and  
 10 future return flow projections. Right?  
 11 A. **I did not look at future return flow projections.**  
 12 Q. And, again, there's, in your assessment of future  
 13 growth, still no analysis of impacts on  
 14 downstream users. Correct?  
 15 A. **Again, that was something that other experts were**  
 16 **tasked with.**  
 17 Q. You have concluded that the water use was  
 18 reasonable. Right?  
 19 A. **Yes, I have.**  
 20 Q. And you defined reasonable to include impacts on  
 21 downstream users and ecosystems. Right?  
 22 A. **Including that, but also including the population**  
 23 **supported and the economy supported by that water**  
 24 **use. Those are also very important aspects of**  
 25 **reasonable water use.**  
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1 Q. Mr. Mayer, will you turn to tab 2 in your binder.  
 2 You gave a deposition in this case. Correct?  
 3 A. **Yes, I did.**  
 4 Q. And you swore to tell the truth?  
 5 A. **Yes, I did.**  
 6 Q. And there was a court reporter who took down your  
 7 testimony. Correct?  
 8 A. **Yes, there was.**  
 9 Q. Will you turn to page 60. Specifically look at  
 10 line 23. You were asked a simple question, what  
 11 is your definition of reasonable?  
 12 You answered, I would think that reasonable  
 13 in the water use context means that you're using  
 14 water in a way that is conscious of the ecosystem  
 15 and of other water users who also rely on the  
 16 same water.  
 17 Were you asked that question, and did you  
 18 give that answer?  
 19 A. **Yes, I did. But I would also note that in**  
 20 **the previous pages we had a discussion about**  
 21 **Dr. Flewelling's report where we talked about the**  
 22 **level of consumption, and it was important to**  
 23 **understand the population supported by that**  
 24 **consumption as part of reasonable. And also**  
 25 **later on we discussed other aspects besides just**  
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1 **the ecosystem.**

2 **Q.** You have also offered an opinion on the

3 effectiveness of Georgia's conservation and

4 efficiency policies, the ones you reviewed.

5 Correct?

6 **A. Yes, I have.**

7 **Q.** You listed several such conservation policies and

8 plans and measures. Right?

9 **A. Yes, I did.**

10 **Q.** Policies that Georgia has undertaken since 2003?

11 **A. Some of them have been taken since 2003, yes.**

12 **Some of them may have started earlier.**

13 **Q.** You included the Metro District plan for 2003,

14 the updated plan 2009, Water Stewardship Act just

15 as examples. Correct?

16 **A. Yes.**

17 **Q.** Mr. Mayer, you did not do anything to analyze

18 what water savings are attributable to any

19 particular conservation policy, plan, or measure

20 that Georgia put in place over that period of

21 time. Right?

22 **A. No. I chose to look at the totality of**

23 **consumptive use and per capita use that represent**

24 **the impact of all of the measures together. I**

25 **didn't look at any individual measure.**

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1 **at the impact of the totality of all of the**

2 **measures and policies that Georgia has put into**

3 **place.**

4 **Q.** Mr. Mayer, just a yes or no. I take it that's a,

5 no, you didn't look at the results and quantify

6 the results of those measures in terms of

7 affecting withdrawals, returns, or consumptive

8 use?

9 **A. Again, I disagree. I think I did look at the**

10 **impact of those -- the totality of those**

11 **measures. I did not -- I would agree I didn't**

12 **look at the impact of any individual measure; but**

13 **I think my analysis takes into consideration the**

14 **totality of those measures.**

15 **Q.** Mr. Mayer, will you turn back to tab 2, to your

16 deposition. Again, you swore to testify

17 truthfully. Correct?

18 **A. Yes, I did.**

19 **Q.** If you will turn to page 185 now. You were

20 asked, did you make any effort to quantify the

21 results of those measures in terms of affecting

22 withdrawals or returns or consumptive use?

23 And you answered, that's not something that I

24 was asked to look at.

25 **A. And, again, I --**

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1 **Q.** Mr. Mayer, I'm going to ask you narrow questions;

2 and I would appreciate, if you can, answering yes

3 or no. Your counsel will have an opportunity to

4 ask you about them if there's anything that's

5 unclear or anything you need to explain. Is that

6 okay?

7 **A. That's perfectly fine.**

8 **Q.** You also did not make any effort to quantify the

9 results of your conservation policies, plans, and

10 measures in terms of specific impacts on

11 withdrawals, return rates, or consumptive use.

12 Right?

13 **A. I would disagree. I think by looking at the**

14 **significant reduction in per capita use and by**

15 **looking at the consumptive use over the last 20**

16 **years, which has essentially stayed stable and**

17 **actually declined slightly, I think I have looked**

18 **at that.**

19 **Q.** Mr. Mayer, I'm just going to ask one more time.

20 You did not make any effort to quantify the

21 results of those conservation measures in terms

22 of affecting withdrawals, returns, or consumptive

23 use. Correct?

24 **A. I did not look at the impact of any individual**

25 **conservation measure. I think my analysis looked**

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1 **Q.** Were you asked that question, and did you give

2 that answer?

3 **A. I did give that answer.**

4 **Q.** Okay.

5 **A. But what I'm hearing in your question is a**

6 **reference to specific individual measures.**

7 **Q.** Mr. Mayer, I asked you the exact same question.

8 I would like to talk to you now about

9 specific conservation methods that you note in

10 your direct testimony. Okay?

11 You're familiar with leak abatement.

12 Correct?

13 **A. Yes. I'm familiar with leak abatement. It's**

14 **also called water loss control.**

15 **Q.** Water loss. And in the 2010 Water Stewardship

16 Act there is references to water loss. Right?

17 **A. Yes.**

18 **Q.** There is a water loss audit required. Correct?

19 **A. Correct.**

20 **Q.** And you discuss in your prefiled direct testimony

21 some of the steps that Georgia has taken to try

22 to address water loss through audits and leak

23 abatement. Correct?

24 **A. Yes, I do.**

25 **Q.** You were here when Ms. Kirkpatrick testified

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1 yesterday, I believe; correct?

2 **A. Yes, I was.**

3 **Q.** So you would agree with her that leak abatement

4 generally is considered a good thing. Correct?

5 **A. Oh, it's an extremely important aspect of urban**

6 **water management and water efficiency.**

7 **Q.** And you don't think that should stop. Right?

8 **A. No, I do not.**

9 **Q.** In preparing your expert report, you didn't look

10 at specific measures taken in metro Atlanta for

11 leak abatement. Right?

12 **A. No. I looked at the -- the specific measures**

13 **associated with leak abatement are pretty much**

14 **the same. There's pressure management, leak**

15 **detection, line replacement.**

16 **Q.** But you didn't look at the specifics for that?

17 **A. I didn't look at the impact of any of those**

18 **specific measures.**

19 **Q.** You also don't know to what extent metro Atlanta

20 is, in fact, losing less water as a result of any

21 leak abatement. Correct?

22 **A. No. I didn't specifically look at that,**

23 **although -- yes.**

24 **Q.** So now, in your prefiled testimony, you talked a

25 little bit about some of the leaks that Atlanta

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1 interbasin transfers. Correct?

2 **A. Yes, it does.**

3 **Q.** You have testified that Georgia's approach has

4 reduced interbasin transfers. Correct?

5 **A. Yes. If you look at the trend in interbasin**

6 **transfers, they have gone down since 1990.**

7 **Q.** And specifically you testified that guidance for

8 the 2009 Metro District plan aims to minimize

9 future interbasin transfers. Right?

10 **A. Correct.**

11 **Q.** You didn't look at whether interbasin transfers

12 have actually been limited since that 2009

13 guidance, though; did you?

14 **A. No. I didn't.**

15 **Q.** And, in fact, were you aware there's been an

16 increase in that interbasin transfers since 2009?

17 **A. No.**

18 **Q.** You're not aware?

19 **A. I'm not aware of that.**

20 **Q.** As part of your analysis of interbasin transfers,

21 you didn't look at interbasin transfer permit

22 approvals either; did you?

23 **A. No, that's not something that I looked at.**

24 **Q.** You didn't do any analysis to see whether since

25 the 2009 guidance you referenced there was

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1 has repaired since 2012. Do you recall that?

2 **A. Yes.**

3 **Q.** Again, you have not tied any amount of water

4 savings to those repaired leaks. Right?

5 **A. No. But I think it's significant that Atlanta**

6 **has repaired over 10,000 leaks in the past few**

7 **years, and across the Metro Water District they**

8 **have repaired over 42,000 leaks.**

9 **Q.** And you --

10 **A. The other thing to -- I think it's important to**

11 **realize is that as you repair leaks, more leaks**

12 **appear, particularly in older water systems. So**

13 **it's -- water loss control and leak abatement is**

14 **an ongoing process that really will never end for**

15 **water utilities. It's something that they have**

16 **to do every single year.**

17 **Q.** And part of the reason is Atlanta has an old pipe

18 system, so they will need to keep repairing

19 things. Right?

20 **A. Atlanta has one of the oldest systems, I believe,**

21 **in the Metro Water District. They have almost**

22 **3,000 miles of buried pipe of water main. So**

23 **that's 3,000 miles of opportunity for water loss**

24 **also.**

25 **Q.** Mr. Mayer, your testimony also addresses

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1 actually a reduction in the number of interbasin

2 transfer permit approvals?

3 **A. No. I did not.**

4 **Q.** We're going to shift topics a little bit now, and

5 I want to discuss with you Georgia's drought and

6 conservation policies. Okay?

7 **A. Okay.**

8 **Q.** You reviewed Georgia's drought responses over the

9 past couple decades or so. Right?

10 **A. I have looked -- it's really since 1994.**

11 **Q.** Okay. And you looked in particular at Georgia's

12 responses to dry and drought conditions during

13 that time period. Right?

14 **A. Yes.**

15 **Q.** Is it your belief that whether or not a drought

16 is declared in the Flint River Basin has no

17 bearing on Atlanta's drought management?

18 **A. Well, Atlanta -- Atlanta sits above the Flint**

19 **River Basin; so a drought in the Flint would not**

20 **necessarily have an impact on Atlanta. It would**

21 **not necessarily --**

22 **Q.** And you didn't look at whether droughts were

23 declared in the Flint River Basin for your

24 report. Right?

25 **A. No. I focused on whether they were declared in**

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1 **the Metro Water District or across the entire**  
 2 **state.**  
 3 **Q.** And you weren't familiar with the Flint River  
 4 Drought Protection Act. Correct?  
 5 **A. No.**  
 6 **Q.** Mr. Mayer, will you turn to page 20 in tab 1 --  
 7 this is, again, your prefiled direct testimony --  
 8 and specifically figure 9. It's a timeline that  
 9 I believe you put together of Georgia's urban  
 10 water management and drought.  
 11 **A. Yes.**  
 12 **Q.** Do you see it?  
 13 **A. Yes.**  
 14 **Q.** Just to get your understanding of what's  
 15 depicted, is it your opinion that a drought  
 16 occurs only if one is declared and actions are  
 17 taken to reduce demand?  
 18 **A. No. A drought could occur if it's not declared;**  
 19 **but I -- in this figure, I specifically listed**  
 20 **the declared droughts.**  
 21 **Q.** And your view is that whether or not a drought  
 22 occurred is not dependent on whether it's  
 23 declared. Right?  
 24 **A. A drought could occur without it being declared.**  
 25 **Q.** The timeline depicts a series of Acts,  
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1 regulations, and droughts for Georgia. Right?  
 2 **A. It does.**  
 3 **Q.** You don't have any conservation measures from  
 4 1992 to 2001. Right?  
 5 **A. I beg your pardon?**  
 6 **Q.** Well, there is no conservation measures  
 7 identified between 1992 and the creation of the  
 8 Metro District in 1991 -- or 2002?  
 9 **A. No, there's not any measures listed here; but I**  
 10 **believe there's a number of measures in place and**  
 11 **there were active water conservation programs at**  
 12 **the utility level going on during that time.**  
 13 **Q.** You just didn't include them on the timeline?  
 14 **A. Well, the time -- this is a timeline of**  
 15 **management and drought, not of individual utility**  
 16 **water conservation measures.**  
 17 **Q.** That's not part of the management that you  
 18 evaluated?  
 19 **A. It certainly is part of the management I**  
 20 **evaluated, but that's not what is shown in this**  
 21 **figure.**  
 22 **Q.** You show a drought from 1998 to 2003. Do you see  
 23 that?  
 24 **A. Yes.**  
 25 **Q.** Are you aware former Director Turner testified to  
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1 a drought from approximately 1999 to 2001?  
 2 **A. I was here. I don't specifically recall that,**  
 3 **but I'll accept that.**  
 4 **Q.** You have got it listed as a five-year drought.  
 5 Correct?  
 6 **A. Yes.**  
 7 **Q.** You also show a drought from 2006 to 2009?  
 8 **A. Yes.**  
 9 **Q.** Do you see that?  
 10 **A. Yes, I do.**  
 11 **Q.** You're aware that Georgia did not ban outdoor  
 12 water use until September 2007 during that  
 13 drought. Right?  
 14 **A. Yes. They implemented a full ban on outdoor**  
 15 **water use at that point, which continued all the**  
 16 **way through 2008.**  
 17 **Q.** And that was after the 2006 portion of the  
 18 drought you have on here. Right?  
 19 **A. Yes.**  
 20 **Q.** And --  
 21 **A. That's correct.**  
 22 **Q.** -- that was after the summer of 2007. Right?  
 23 **A. Yes. But that's also typical of drought**  
 24 **response. It's a ramping-up process.**  
 25 **Q.** Is it typical of drought response to declare a  
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1 drought after the summer peak usage months?  
 2 **A. You know, I wasn't involved in specifically**  
 3 **declaring that drought or what was -- what goes**  
 4 **on. Every drought is a little different; and,**  
 5 **you know, there are a number of factors that go**  
 6 **into a drought declaration.**  
 7 **Q.** You have got no drought on here after 2009.  
 8 Right?  
 9 **A. Correct. Because there was not a declared**  
 10 **drought after that.**  
 11 **Q.** There was no drought in 2011?  
 12 **A. Well, there was a dry period certainly in the**  
 13 **southwest portion of the state; but it was not a**  
 14 **declared drought, particularly in the Metro Water**  
 15 **District.**  
 16 **Q.** And there was -- there's no drought listed in  
 17 2012 either. Correct?  
 18 **A. No.**  
 19 **Q.** Again, you said you were here for Director  
 20 Turner's testimony. Right?  
 21 **A. Yes, I was.**  
 22 **Q.** He testified that there was no question by 2012  
 23 we were in the middle of a severe drought. Do  
 24 you remember that?  
 25 **A. You know, I might not have been here for his**  
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1 **entire testimony; but I'll accept that that's**  
 2 **what he said.**  
 3 **Q.** You think that's true; don't you?  
 4 **A. I have seen that there was definitely a -- what**  
 5 **appeared to be a drought going on in the**  
 6 **southwestern portion of the state. But, again,**  
 7 **there's a number of different factors that go**  
 8 **into a drought declaration. That's not something**  
 9 **that -- I was not involved in any of the decision**  
 10 **making as to whether to declare that drought.**  
 11 **Q.** Have you reviewed any of the other Georgia expert  
 12 testimony in this case?  
 13 **A. I have reviewed some of it.**  
 14 **Q.** And are you familiar with Dr. Panday?  
 15 **A. I am familiar with Dr. Panday.**  
 16 **Q.** Are you aware that he's testified that 2011 was a  
 17 historical drought year?  
 18 **A. I'm not aware of that particular point.**  
 19 **Q.** Are you aware he testified that there were severe  
 20 droughts in 2007, '11, and '12?  
 21 **A. I'm not aware of that specific point that he**  
 22 **made.**  
 23 **Q.** Do you disagree with him?  
 24 **A. No.**  
 25 **Q.** But you didn't include a 2011 or 2012 drought in  
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1 this timeline?  
 2 **A. No. As I stated before, this timeline includes**  
 3 **declared droughts.**  
 4 **Q.** I'm going to shift gears again to outdoor  
 5 watering restrictions. Okay?  
 6 **A. Yes.**  
 7 **Q.** You agree a total ban on outdoor water use is the  
 8 maximum that you can do to curb outdoor water  
 9 use?  
 10 **A. Yes. Banning or eliminating outdoor water use is**  
 11 **the maximum you can do to curb outdoor water use.**  
 12 **Once you have eliminated outdoor water use, I**  
 13 **don't know what more you could do on outdoor**  
 14 **water use.**  
 15 **Q.** And Georgia did that in 2007. Correct?  
 16 **A. Yes. Late 2007 and all the way through 2008.**  
 17 **Q.** And that watering ban in 2008 caused a decrease  
 18 in consumptive use; didn't it?  
 19 **A. Yes. Yes. That was one of the measures that**  
 20 **they imposed. So the reduction in consumptive**  
 21 **use probably reflects that as well as other**  
 22 **measures that were imposed.**  
 23 **Q.** Mr. Mayer, will you turn to tab 5 in your binder.  
 24 **A. Yes.**  
 25 **Q.** It's GX-935. Now, do you recognize this as the  
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1 2015 Drought Management Rule?  
 2 **A. Yes, I do recognize this.**  
 3 **Q.** So this rule changed drought response from four  
 4 levels to three levels. Correct?  
 5 **A. Yes. This changed from four levels to three**  
 6 **levels; but there actually is a three-plus level**  
 7 **also mentioned.**  
 8 **Q.** And the first thing I want to direct your  
 9 attention to are the pre-drought mitigation  
 10 strategies. Those are on page 2.  
 11 The document is not numbered.  
 12 **A. Second page --**  
 13 **Q.** Second page --  
 14 **A. Pre -- yes, I'm there. Pre-drought mitigation**  
 15 **strategies.**  
 16 **Q.** Are you familiar with the exceptions to the  
 17 outdoor watering restrictions in the Water  
 18 Stewardship Act?  
 19 **A. Yes, I am.**  
 20 **Q.** And the restrictions in the pre-drought  
 21 mitigation strategy section, those are the same  
 22 exceptions that you see in the Water Stewardship  
 23 Act. Right?  
 24 **A. Well, I don't see them both side by side, but**  
 25 **I'll take your word that they're the same.**  
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1 **Q.** You were here when Ms. Kirkpatrick testified  
 2 yesterday. Right?  
 3 **A. Yes.**  
 4 **Q.** You remember we went over some of the exceptions  
 5 from the Water Stewardship Act?  
 6 **A. Yes, I do.**  
 7 **Q.** Some of those included commercial agricultural  
 8 operations, drip irrigation, irrigation of  
 9 athletic fields, golf courses, et cetera. Right?  
 10 **A. Correct. And, again, it's fairly typical when**  
 11 **water utilities have a drought response plan,**  
 12 **that they do include exceptions for particularly**  
 13 **high-valued landscapes.**  
 14 **But, again, I would point out that under a**  
 15 **high level of drought, a 3-plus level, even these**  
 16 **measures could be banned in Georgia.**  
 17 **Q.** And we'll talk about a drought level 3 in a  
 18 moment.  
 19 I want to turn your attention first to  
 20 drought level 1.  
 21 And, again, there aren't page numbers; but  
 22 it's the sixth page of this document. It's under  
 23 the category Drought Response Strategies.  
 24 **A. Drought response strategies.**  
 25 **Yes. There I am. Drought response**  
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1 **strategies. Thank you.**

2 **Q.** And you see drought response level 1. Correct?

3 **A. Yes.**

4 **Q.** And it requires a public information campaign.

5 Right?

6 **A. Yes. A public information campaign is a very**

7 **important part of drought response because in**

8 **order -- drought response requires the**

9 **cooperation of the population. And so getting**

10 **the word out through an education and information**

11 **campaign is almost always the very first thing**

12 **that would be done during a drought response.**

13 **Q.** Level 1 does not include any limitations on

14 outdoor watering. Right?

15 **A. No. Level 1 is about getting the word out that,**

16 **hey, we're in a drought. Pay attention.**

17 **Q.** Again, Mr. Mayer, if you can, just answer yes or

18 no.

19 Moving down to subsection 3, drought level

20 response 2, do you see that?

21 It should be just below level 1.

22 **A. Yes. I see that.**

23 **Q.** And then drought level response 2, there are

24 limitations to outdoor lawn watering to two days

25 a week. Correct?

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1 **A. Yes.**

2 **Q.** Just on the next page down.

3 **A. Yes, I see that.**

4 **Q.** Do you see there is a general ban on outdoor

5 watering. Right?

6 **A. Yes. Under drought response level 3 there is a**

7 **ban on outdoor water use except for a few**

8 **specific exceptions.**

9 **Q.** Many of the same exceptions from the Water

10 Stewardship Act still apply; don't they?

11 **A. Yes.**

12 **Q.** You can see in subsection (b) it says, the

13 outdoor water use is listed in rule

14 391-3-30-0.3(1)(b) shall be allowed subject to

15 the following requirements. Correct?

16 **A. Yes, I see that.**

17 **Q.** And you understand that means that commercial,

18 agricultural operations are not limited.

19 Correct?

20 **A. Yes. I understand that. But, again, my focus**

21 **was on municipal and industrial water use.**

22 **Q.** Right. I just want to make sure I have an

23 understanding and the Court has an understanding

24 of what this rule does and doesn't address.

25 **A. Right.**

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1 **A. Correct.**

2 **Q.** There are also some additional restrictions on

3 things like washing your car or driveway. Do you

4 see those?

5 **A. I do.**

6 **Q.** But otherwise, the conditions and the exceptions

7 that we looked at from the Water Stewardship Act,

8 those same exceptions apply. Right?

9 **A. Yes. That's correct, I believe.**

10 **Q.** You're familiar with this drought management

11 rule?

12 You reviewed it. Right?

13 **A. Yes.**

14 **Q.** So you know that to be true. Correct?

15 **A. Correct.**

16 **Q.** That would mean commercial agricultural

17 operations, lawn watering for two days a week,

18 watering of athletic fields, golf courses, all of

19 that continues. Correct?

20 **A. Yes. That could continue.**

21 **Q.** And there's nothing in drought level 2 that

22 restricts the amount someone can water, just the

23 frequency. Right?

24 **A. Correct.**

25 **Q.** Now, turn to drought level response 3.

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1 **Q.** It's also true, isn't it, that outdoor watering

2 of golf courses and athletic fields can still

3 continue, just after 4 p.m. Correct?

4 **A. Yes. That's my understanding.**

5 **Q.** All right. Have you analyzed the effectiveness

6 of these restrictions?

7 **A. Not specifically in Georgia, but certainly I have**

8 **looked at the impact of similar restrictions**

9 **other places in the United States.**

10 **Q.** So, no, you don't know the impact of these

11 restrictions in the ACF Basin. Right?

12 **A. Well, I think we saw the impact of these**

13 **restrictions in 2008 when Georgia did impose a**

14 **full ban on outdoor water use and many of these**

15 **exact same measures.**

16 **Q.** And that was an effective ban; wasn't it?

17 **A. Yes. I believe Georgia has a highly effective**

18 **drought response program.**

19 **Q.** Mr. Mayer, you referenced a 2008 ban. Correct?

20 And you agreed that was effective. Right?

21 **A. I do agree that was effective.**

22 **Q.** That's the maximum you can do. Right?

23 **A. On outdoor water use, banning it is the most you**

24 **can do.**

25 **Q.** Let's talk about the current situation in Georgia

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1 now. There's a drought currently in northern  
 2 Georgia. Correct?  
 3 **A. Correct. It is my understanding that they just**  
 4 **very recently increased it to a level 2 drought**  
 5 **response.**  
 6 **Q.** And you're aware there is actually a drought  
 7 declared throughout much of the state. Right?  
 8 **A. Yes. Yes. I believe level 1 was declared in**  
 9 **September; and then level 2 -- it was escalated**  
 10 **to level 2 just a few days ago.**  
 11 **Q.** Are you aware Governor Deal indicated just last  
 12 week that drought conditions have been in place  
 13 for more than six months?  
 14 **A. I'm not aware of any specific quotation from**  
 15 **Governor Deal.**  
 16 **Q.** Can you turn to tab 7 in your binder. This is  
 17 FX-896. And you see this as an Executive Order  
 18 from Governor Deal. Correct?  
 19 **A. Correct. Dated the 14th of November.**  
 20 **Q.** That's just last week. Right?  
 21 **A. Yes.**  
 22 **Q.** The first sentence indicates that over the  
 23 preceding six months Georgia has experienced  
 24 significant drought conditions. Right?  
 25 **A. Yes, I see that.**

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1 **Q.** And are you aware that at this point in time,  
 2 November 14, drought level 2 had been declared?  
 3 **A. Yes. I'm aware that drought level 2 has been**  
 4 **declared.**  
 5 **Q.** It was declared after this though; wasn't it?  
 6 **A. After the 14th -- I'm not exactly sure what day**  
 7 **the official declaration was made.**  
 8 **Q.** But you know that level 2 was declared just last  
 9 week?  
 10 **A. Yes. Very recently.**  
 11 **Q.** And until then there were no statewide outdoor  
 12 watering restrictions in response to the current  
 13 drought. Correct?  
 14 **A. Correct. But, again, I think it's important to**  
 15 **remember that there are many different factors**  
 16 **that go into the declaration of the drought.**  
 17 **And -- I'll leave it at that.**  
 18 **Q.** Earlier I asked you about whether restrictions  
 19 needed to be in place after peak usage months or  
 20 restrictions needed to be in place during the  
 21 summer months. Do you recall that?  
 22 **A. I do recall that.**  
 23 **Q.** Drought level 2 doesn't limit the watering of  
 24 athletic fields or golf courses. Correct?  
 25 **A. No. But it does limit the watering on all other**

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1 **types of properties, which is a much larger area.**  
 2 **Q.** By all other types of properties you don't mean  
 3 commercial agricultural properties?  
 4 **A. No. I'm talking about urban, municipal,**  
 5 **single-family homes, multifamily homes.**  
 6 **Q.** And those people are allowed to water two days a  
 7 week. Correct?  
 8 **A. Under level 2 they are restricted to two days a**  
 9 **week and a specific two days a week on an**  
 10 **odd/even schedule.**  
 11 **Q.** And they're not restricted in the amount that  
 12 they can water. Right?  
 13 **A. Well, they're restricted to the time of day that**  
 14 **they're allowed to water and then on the days**  
 15 **that they're allowed to water.**  
 16 **Q.** Thank you, Mr. Mayer; but they're not restricted  
 17 on the amount they can water. Right?  
 18 **A. No. There is not a volumetric limitation.**  
 19 **Q.** And the level 2 declaration that was last week,  
 20 it's now November. Right?  
 21 **A. It is now November, yes.**  
 22 **Q.** And you agree that's after the peak water use  
 23 months. Correct?  
 24 **A. Yes. It's after the peak water use months.**  
 25 **Q.** You don't know how much more effective the

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1 declaration would have been if it was declared  
 2 earlier in the year; do you?  
 3 **A. Again, I wasn't involved in the decisions that**  
 4 **went into declaring this drought. I -- so I**  
 5 **can't speculate about that.**  
 6 **Q.** And you can't speculate about how much more  
 7 effective it would be to have an outdoor watering  
 8 ban than a two-day-a-week limitation?  
 9 **A. Certainly banning outdoor water use will -- is**  
 10 **more effective than a two-day watering ban. But**  
 11 **I -- it's -- I was not involved in the decision**  
 12 **to make any of these particular levels enacted.**  
 13 **Q.** Thank you, Mr. Mayer.  
 14 MR. ALLEN: Your Honor, one moment.  
 15 SPECIAL MASTER LANCASTER: Sure.  
 16 MR. ALLEN: Your Honor, we have some  
 17 demonstratives we would like to use for  
 18 Mr. Mayer's redirect, if I might hand them  
 19 out.  
 20 SPECIAL MASTER LANCASTER: Please.  
 21 REDIRECT EXAMINATION  
 22 BY MR. ALLEN:  
 23 **Q.** Mr. Mayer, will you please tell the Court a  
 24 little bit about your background and what it is  
 25 you do.

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1 **A. Sure. So I am a civil engineer, a licensed**  
 2 **registered professional engineer in the State of**  
 3 **Colorado. And for the last 20 years or more I**  
 4 **have been working with water utilities and the**  
 5 **U.S. EPA and other organizations on urban --**  
 6 **municipal and urban water use, water**  
 7 **conservation, demand management, water loss**  
 8 **control, metering, demand forecasting, and a**  
 9 **variety of other topics.**

10 **Q.** All right. And, Mr. Mayer, you have looked at  
 11 water supply in the Metro District in the metro  
 12 Atlanta area. Correct?

13 **A. Yes, I have.**

14 **Q.** Can you generally tell the Court what the sources  
 15 of water supply are for the Metro District?

16 **A. So the Metro District, 99 percent of the water**  
 17 **that is used in the Metro District is surface**  
 18 **water. There really isn't any good reliable**  
 19 **groundwater available. And, again, the most**  
 20 **significant source of water is Lake Lanier.**

21 **Q.** And the Chattahoochee?

22 **A. And the Chattahoochee River.**

23 **Q.** And other than Lake Lanier and the Chattahoochee  
 24 River, are there any other water sources in the  
 25 area that could meet the municipal and industrial

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1 **because once that water is returned, it then**  
 2 **becomes available for other users and also**  
 3 **available to move downstream eventually to the**  
 4 **State of Florida.**

5 **Q.** And is it costless for municipalities to make  
 6 these return flows happen?

7 **A. Absolutely not. It's extremely expensive. And**  
 8 **it's my understanding that the Metro Water**  
 9 **District water utilities have spent billions of**  
 10 **dollars in recent years to return water to the**  
 11 **system.**

12 **Q.** And have you looked at the volume or percentages  
 13 of water that are returned to the system in the  
 14 Metro District?

15 **A. I have.**

16 **Q.** And what does that analysis show?

17 **A. So that analysis shows that on average over the**  
 18 **last 20 years, about 70 percent of the water**  
 19 **withdrawn is returned to the system.**

20 **Q.** And that's in the Metro District?

21 **A. And that's in the Metro District.**

22 **Q.** All right. Mr. Mayer, if you look at tab 2, can  
 23 you explain what's being depicted in tab 2?

24 **A. Yes. So tab 2 shows that -- the combined bars**  
 25 **show the total withdrawals in million gallons per**

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1 needs of the Atlanta area?

2 **A. No.**

3 **Q.** Mr. Mayer, if you will turn to tab 1 of your  
 4 binder. This is a demonstrative; I believe it's  
 5 in your prefiled direct. And can you just  
 6 explain to us what's being shown here?

7 **A. Yes. So this is a drawing that shows Lake Lanier**  
 8 **and the upper Chattahoochee Basin. And it also**  
 9 **shows the intakes for a variety of different**  
 10 **water utilities with the dark blue lines. That's**  
 11 **water that's being withdrawn to be treated and**  
 12 **then used in residences and in businesses for all**  
 13 **the different things that we use water for,**  
 14 **flushing toilets, showering, cooking, the**  
 15 **economy, all those things. Then the lighter blue**  
 16 **return flow arrows show the places where water is**  
 17 **being returned to the system through -- in a**  
 18 **highly treated form after it's being discharged**  
 19 **from a wastewater treatment plan.**

20 **Q.** All right. Mr. Mayer, I want to ask you  
 21 specifically about these return flows. Are those  
 22 flows significant in your view?

23 **A. Yes.**

24 **Q.** Why?

25 **A. Well, return flows are particularly important**

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1 **day from 1994 until 2013. The blue portion of**  
 2 **the line represents the returns. That's the**  
 3 **largest portion. Those -- that's all the water**  
 4 **that's going back into the system. The green**  
 5 **portion represents the consumptive use of water.**  
 6 **That's the water that is not being returned.**

7 **Q.** And what does this data tell you in your  
 8 analysis, if anything?

9 **A. Well, this data shows -- tells me that over this**  
 10 **time period, consumptive use has -- while it's**  
 11 **fluctuated from year to year, has stayed**  
 12 **relatively stable. And, in fact, in 2013**  
 13 **consumptive use was lower than it was in 1994.**  
 14 **This is quite remarkable because over the same**  
 15 **time period, the population in Georgia increased**  
 16 **by about 1.6 million people.**

17 **Q.** All right. Mr. Mayer, I want to ask you some  
 18 questions about what you just talked about just  
 19 to make sure we all fully understand it. Now,  
 20 Florida has alleged in their complaint in this  
 21 case that large and ever-increasing amounts of  
 22 water are consumed upstream for municipal and  
 23 industrial purposes in Georgia. Now, as part of  
 24 your work in this case, did you conduct an  
 25 analysis to determine whether that allegation is

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1 true?

2 **A. Yes, I did.**

3 **Q.** And what analysis did you perform?

4 **A. Well, specifically I looked at the consumptive**

5 **use of water as depicted here and also the change**

6 **in population. And that led me to that**

7 **conclusion.**

8 **Q.** Mr. Mayer, could you turn to tab 3 of your

9 binder. This is another demonstrative that's in

10 your prefiled direct. And can you explain to us

11 what's being depicted in tab 3.

12 **A. Yes. So tab 3 is a -- this is a graph that has**

13 **two lines on it. The blue line is the**

14 **population. And so that -- and, again, the**

15 **timeline we're looking at is from 1994 to 2013.**

16 **So the population in the Georgia ACF increased**

17 **from a little over 3 million to just below 5**

18 **million, it looks like here.**

19 **And then what we're seeing in the other line**

20 **is the -- the dotted line is the total municipal**

21 **and industrial consumptive use in each of those**

22 **years. And then the purple line is a trend line.**

23 **And so that trend line shows that consumptive use**

24 **has basically been flat, slightly declining over**

25 **this time period.**

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1 **Q.** And as you compare population growth and

2 consumptive use, what's significant to you about

3 that?

4 **A. Well, this is significant because it indicates an**

5 **increase in water use efficiency. This indicates**

6 **that the -- a larger population in the ACF is**

7 **being supported by essentially the same level of**

8 **consumptive use.**

9 **Q.** Now, Mr. Mayer, this demonstrative looks at

10 numbers from, I believe, 1994 to 2013. Correct?

11 **A. Correct.**

12 **Q.** Did you conduct the same analysis for any other

13 period of time?

14 **A. Well, I looked specifically at the more recent**

15 **time period from 2000 to 2013.**

16 **Q.** All right. Before we talk about that, let's all

17 turn to tab 4, which I think reflects some of

18 that analysis in tab 4 of your binder, Mr. Mayer.

19 And can you tell us what we're looking at in

20 tab 4?

21 **A. Yes. So tab 4 is a graph that shows -- that's --**

22 **that depicts the time period from 2000 to 2013.**

23 **The blue line, again, shows the population**

24 **increase over that time period. And then the**

25 **purple line shows the municipal and industrial**

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1 **consumptive use over that time period, and then**

2 **the trend line.**

3 **Q.** Mr. Mayer, you talked with counsel for Florida

4 about certain periods of drought in the ACF

5 Basin. And I'll direct your attention to a peak

6 that's around the year 2006 and 2007. Do you see

7 that?

8 **A. I do.**

9 **Q.** And if I might invite your attention to a peak

10 that's around 2011 and 2012, do you see that?

11 **A. Yes, I do.**

12 **Q.** Is there anything significant to you about those

13 two peaks?

14 **A. Yes.**

15 **Q.** Can you explain to us what that is.

16 **A. Yes. So let's start in 2006, and let's just**

17 **remember what was going on at that time. That's**

18 **when this severe drought occurred. And Georgia**

19 **in 2000 -- late 2007 and all of 2008 banned**

20 **outdoor water use and imposed a number of severe**

21 **drought restrictions.**

22 **You can see there the consumptive use dropped**

23 **tremendously to 2009. And in 2009 the drought**

24 **broke; all of the bans were lifted.**

25 **And we see consumptive use rise up again in**

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1 **2011 and 2012. But significantly, it does not**

2 **return to the same level that it was in 2007,**

3 **even though population had increased. To me,**

4 **that's indicative of the impact of Georgia's**

5 **ongoing long-term water conservation that's**

6 **reducing consumption over and above what's --**

7 **what had happened before.**

8 **Q.** All right. And, Mr. Mayer, we'll talk a bit

9 about some of those conservation measures. But

10 before we do that, I want to ask you; have you

11 also calculated per capita water use in the Metro

12 District?

13 **A. Yes, I have.**

14 **Q.** And what is per capita water use?

15 **A. Per capita water use or gallons per capita per**

16 **day is the volume of water used by an individual**

17 **person in an area on a given day. It's an**

18 **average number typically.**

19 **Q.** And is per capita water use an important metric

20 in your field?

21 **A. It's an extremely important metric in my field.**

22 **Q.** Why is that?

23 **A. Well, per capita water use is really a**

24 **measurement of the water use efficiency in an**

25 **area. And if you look at trends in per capita**

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1 **water use, you can get a good idea of the**  
 2 **efficiency moving forward in a water utility.**  
 3 **Q.** All right. Mr. Mayer, if you will turn to tab 5  
 4 for me. And with respect to per capita water  
 5 use, can you tell us what's depicted in tab 5?  
 6 **A. Sure. So tab 5 is a graph that shows per capita**  
 7 **water use in the Metro Water District from 2000**  
 8 **until 2013. And what you can see here is that in**  
 9 **the year 2000 per capita water use was 155**  
 10 **gallons per person per day on average. And then**  
 11 **over the next 14 years, it declined significantly**  
 12 **by about 36.7 percent. And in 2013 it had**  
 13 **dropped below 100 gallons per capita per day to**  
 14 **98 gallons per capita per day.**  
 15 **Q.** Mr. Mayer, in the course of your work working  
 16 with other municipalities around the country,  
 17 have you analyzed or thought about how per capita  
 18 water use for other major systems has changed  
 19 relative to how it's changed in the Metro Water  
 20 District in Georgia?  
 21 **A. Yes, I have.**  
 22 **Q.** And what conclusions do you draw from that  
 23 comparison, if any?  
 24 **A. I think the biggest conclusion that I draw is**  
 25 **that per capita use in Georgia has declined much**

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1 **more rapidly than it has elsewhere. And I**  
 2 **believe that's because of the policies and**  
 3 **programs that Georgia has put in place.**  
 4 **Q.** All right. Mr. Mayer, I want to talk now about  
 5 some of those policies and programs that you  
 6 have looked at. Sir, have you looked at some  
 7 of the -- you said policies and programs that  
 8 Georgia has instituted with respect to municipal  
 9 and industrial water use?  
 10 **A. Yes, I have.**  
 11 **Q.** And, sir, if we turn to tab 6 in your binder, is  
 12 this a slide that you prepared, sir?  
 13 **A. Yes, it is.**  
 14 **Q.** And can you tell us what you're trying to depict  
 15 here?  
 16 **A. Well, these are some measures that have been**  
 17 **adopted since 2003 in Georgia. And these are**  
 18 **particular ones that stood out to me as being**  
 19 **significant.**  
 20 **Q.** Mr. Mayer, in this case, Florida has spent a lot  
 21 of time talking about its proposed reductions in  
 22 municipal outdoor water use. So I want to  
 23 specifically address that, if we might.  
 24 **A. Sure.**  
 25 **Q.** Which of these measures, if any, in your view

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1 would address outdoor water use in the ACF  
 2 Basin -- municipal and industrial outdoor water  
 3 use and make that use more efficient?  
 4 **A. Sure. So I'm going to talk first about the**  
 5 **measures that address municipal and industrial**  
 6 **outdoor water use every single year. So the**  
 7 **first and what I consider really to be probably**  
 8 **the most significant is the increasing block-rate**  
 9 **conservation pricing.**  
 10 **The Metro Water District has among the**  
 11 **highest combined water and sewer rates in the**  
 12 **country. And their water rates are designed to**  
 13 **increase significantly as water use goes up. So**  
 14 **people are getting a strong price signal to**  
 15 **reduce their outdoor water use. That's --**  
 16 **Q.** Let me interrupt you real quick. I'm sorry. I  
 17 don't mean to, but you were asked some questions  
 18 on cross about whether various limitations or  
 19 restrictions would limit the amount of water that  
 20 people use in outdoor water use. Do you remember  
 21 that?  
 22 **A. Yes, I do.**  
 23 **Q.** Does conservation pricing play any role in that?  
 24 **A. Absolutely. Conservation pricing is an effective**  
 25 **method for reducing outdoor water use.**

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1 **Q.** And why is that?  
 2 **A. Because people respond to an increase in price.**  
 3 **Similar -- you know, if the price of gas goes up,**  
 4 **people drive less. So when they pay more for**  
 5 **water, they tend to use less.**  
 6 **Q.** And within the Metro Water District, Mr. Mayer,  
 7 what population is subject to conservation  
 8 pricing?  
 9 **A. 100 percent.**  
 10 **Q.** And within the Georgia portion of the ACF Basin  
 11 as a whole, what percentage of the population is  
 12 subject to conservation pricing?  
 13 **A. 90 percent of the population in the ACF as a**  
 14 **whole -- I believe slightly above 90 percent is**  
 15 **subject to that.**  
 16 **But it's important to note that under the**  
 17 **2015 drought management rules, even that 10**  
 18 **percent that does not have conservation pricing**  
 19 **every year, during a drought they are required to**  
 20 **impose conservation pricing. So during a**  
 21 **drought, 100 percent of all customers in the ACF**  
 22 **would be subject to conservation pricing.**  
 23 **Q.** Now, Mr. Mayer, are there any other measures  
 24 other than conservation pricing that you have  
 25 identified that might have an impact on outdoor

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1 water use?

2 **A. Yes.**

3 **Q.** What are some of those?

4 **A. So Georgia has imposed a ban on outdoor water use**

5 **all the time during the daytime. You're not**

6 **allowed to water your lawn outdoors from 10:00**

7 **a.m. to 4:00 p.m. So that reduces evaporative**

8 **losses from the heat of the day.**

9 **They have also put together an award-winning**

10 **education and outreach program to help their**

11 **customers understand more about outdoor water use**

12 **and to reduce their outdoor water use. An**

13 **education program is really an important aspect**

14 **of a conservation program. And I think the fact**

15 **that Georgia's is award-winning is significant.**

16 **And then they have also put into place**

17 **things like requiring rain sensors on irrigation**

18 **systems so that they would shut off during a**

19 **rainstorm. These are all measures that have been**

20 **put in place specifically to address outdoor**

21 **water use every single year.**

22 **Q.** Mr. Mayer, Florida has also indicated that

23 throughout this case that Georgia should do more

24 when it comes to water loss control and leak

25 abatement. What, if anything, have you seen that

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1 Georgia is already doing with respect to those --

2 to those -- to those items?

3 **A. Well, you know, Georgia is a national leader in**

4 **water loss control and leak abatement. They --**

5 **Georgia has implemented what I consider to be the**

6 **best management practices to address water loss**

7 **control.**

8 **It's going to take time. Water loss control**

9 **is a process. It's not -- you can't -- it's not**

10 **like flipping a switch; and you suddenly get the**

11 **water savings. It takes years and years of**

12 **concerted effort. And Georgia is really an**

13 **exemplary state in this measure -- in this**

14 **respect. They have implemented the AWWA water**

15 **loss audit process; and they have also tied that**

16 **audit -- the annual audit and improvement in that**

17 **audit to the withdrawal permits. So utilities**

18 **really have a very powerful incentive to make**

19 **progress on water loss control.**

20 **Q.** And how does Georgia's efforts with respect to

21 water loss control and leak abatement compare to

22 other states and municipalities?

23 **A. It's among the best, if not the best. And, in**

24 **fact, California recently adopted a water loss**

25 **control law that was based entirely on Georgia's.**

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1 **Q.** All right. Mr. Mayer, I want to turn to tab 7 in

2 your binder, if we might. And I want to talk

3 specifically about the issue of projected future

4 municipal and industrial water use in the Metro

5 District and in the ACF Basin. Florida wrote in

6 their pretrial brief, Mr. Mayer, that Georgia's

7 own projections demonstrate that M & I

8 consumption levels will continue to grow

9 significantly from 369.5 million gallons per day

10 in 2011 to up to 612 mgd by 2015. Sir, do you

11 agree with that statement?

12 **A. No, I do not.**

13 **Q.** Why not?

14 **A. Well, the numbers that they have recited here are**

15 **withdrawals, not consumptive use.**

16 **Q.** Is that significant to you?

17 **A. That's very significant. There is a big**

18 **difference.**

19 **Q.** And would that be regarded as a significant

20 mistake by people in your area of expertise?

21 **A. I'm afraid it would.**

22 **Q.** Mr. Mayer, there's also been some testimony from

23 Florida's expert, Dr. Hornberger, who also

24 incorporates some work done by Dr. Flewelling

25 where they have some calculations that they

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1 assume that future consumptive M & I use will

2 increase by 57 percent. Are you aware of that?

3 **A. I am aware of that.**

4 **Q.** And do you agree with that assumption?

5 **A. No, I do not.**

6 **Q.** Why not?

7 **A. Well, I believe they made a number of mistakes in**

8 **that analysis. First of all, they based the**

9 **increase on withdrawals and not on the forecast**

10 **of future consumptive use. They included a**

11 **double count of IBT's, which initially inflated**

12 **where they started from. And then they assumed**

13 **that IBT's themselves were going to increase by**

14 **57 percent, when in fact IBT's have been**

15 **declining. And there's policies in place to**

16 **ensure that there are not going to be an**

17 **increase in IBT's.**

18 **So all of those different mistakes led them**

19 **to overstate future consumption.**

20 **Q.** Mr. Mayer, are you familiar with some of the

21 conservation measures that have been suggested by

22 an expert for Florida, Dr. Sunding?

23 **A. Yes, I am.**

24 **Q.** All right. Mr. Mayer, if you turn to tab 8, what

25 we have got here is table 4 from Dr. Sunding's

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1 prefiled direct. Are you familiar with this  
 2 table, sir?  
 3 **A. Yes, I am.**  
 4 **Q.** And we have highlighted the first three  
 5 conservation measures that Dr. Sunding has  
 6 identified here that pertain to municipal and  
 7 industrial water use. Now, I want to ask you  
 8 about a few of those since it's your area of  
 9 expertise.  
 10 Let's start with the bottom one, eliminate  
 11 net basin exports. To what does that refer to  
 12 your understanding?  
 13 **A. So that would refer to eliminating the water that**  
 14 **is being withdrawn from one basin, delivered to**  
 15 **customers who happen to live in another basin.**  
 16 **And then because of the gravity nature of sewer**  
 17 **systems, that water is then discharged through a**  
 18 **wastewater plant that is located in another**  
 19 **basin.**  
 20 **Q.** All right. And Ms. Kirkpatrick testified a  
 21 little bit about why those happened, so I won't  
 22 repeat that testimony here. But I will ask you  
 23 to see if you look in the eliminate net basin  
 24 exports column, and you go across, and there is a  
 25 column -- excuse me, a row for eliminate net

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1 basin exports. The column on the far right  
 2 includes incremental fiscal cost per year. Do  
 3 you see that?  
 4 **A. Yes.**  
 5 **Q.** And Dr. Sunding has failed to assign a cost to  
 6 eliminating net basin exports. Do you see that?  
 7 **A. I do.**  
 8 **Q.** Do you believe that eliminating IBT's or net  
 9 basin exports would be costless?  
 10 **A. I view this as somewhat magical thinking on**  
 11 **behalf of Dr. Sunding. I took a look at what it**  
 12 **might take to eliminate net basin exports, and my**  
 13 **very rough engineering estimate is that we're**  
 14 **looking at costs in the hundreds of millions if**  
 15 **not billions of dollars.**  
 16 **Q.** Can you just explain how the cost could be so  
 17 significant?  
 18 **A. Well, to eliminate a net basin export as they**  
 19 **occur in the ACF would require on the one -- one**  
 20 **way you could do it, I suppose, would be to**  
 21 **capture the discharge from the wastewater**  
 22 **treatment plants, a number of them in the basin,**  
 23 **and then to construct a brand new pipeline that**  
 24 **would then -- and then to pump that water through**  
 25 **that new pipeline back to the basin of origin.**

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1 **That's extremely expensive.**  
 2 **Q.** All right. I want to move on and talk about a  
 3 separate of Dr. Sunding's conservation measures.  
 4 The first one you have highlighted is municipal  
 5 leak abatement. Do you see that?  
 6 **A. Yes.**  
 7 **Q.** And do you have an understanding as to where  
 8 Dr. Sunding got his -- what his source was for  
 9 this municipal leak abatement proposal?  
 10 **A. Yes. This comes from, I believe, the 2009 task**  
 11 **force report.**  
 12 **Q.** Okay. Mr. Mayer, I want to show you a portion of  
 13 that task force report and then ask you some  
 14 questions about it.  
 15 **A. Sure.**  
 16 **Q.** I'm showing you JX-40. It is appendix III to the  
 17 water contingency planning task force report.  
 18 Sir, if you will turn with me to page 61.  
 19 **A. Yes. I'm there.**  
 20 **Q.** All right. So first of all, Dr. Sunding assigns  
 21 a savings of 42 cfs for municipal leak abatement.  
 22 I believe you testified that came from a task  
 23 force report. Do you think it's appropriate for  
 24 Dr. Sunding to rely on the savings from a task  
 25 force report in his expert report?

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1 **A. No. The task force report came out in 2009. So**  
 2 **it's quite out of date, particularly as related**  
 3 **to leak abatement and water loss because it**  
 4 **predates all of the Water Stewardship Act and the**  
 5 **best management practices that Georgia has**  
 6 **implemented over the last few years.**  
 7 **Q.** Now, Mr. Mayer, in this table 4 that we were  
 8 looking at in tab 8 of your binder, Dr. Sunding  
 9 does not assign a cost to municipal leak  
 10 abatement. However, elsewhere in his expert  
 11 report he does state, I believe, that municipal  
 12 leak abatement costs would be around 16 or 17  
 13 million. Do you agree with that cost assessment?  
 14 **A. No, I do not.**  
 15 **Q.** Why not?  
 16 **A. Well, if you look here, Dr. Sunding cited what I**  
 17 **believe just to be the 17 million in capital**  
 18 **costs, which I'm not sure what column number that**  
 19 **is; but you can see it's there at 17. But just**  
 20 **one column over you can see the total cost of**  
 21 **this leak abatement proposal is \$262 million.**  
 22 **And then that doesn't even really include the big**  
 23 **ticket item, which would be the replacement of**  
 24 **pipelines and infrastructure. That is cited at**  
 25 **1.2 to \$2.4 billion.**

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1 **Q.** All right. Thank you, Mr. Mayer. You can set  
 2 aside JX-40. Let's go back to tab 8 in your  
 3 binder, back to Dr. Sunding's conservation  
 4 scenarios. We have discussed eliminating net  
 5 basin exports. We have discussed municipal leak  
 6 abatement. Let's now talk about his proposal to  
 7 reduce municipal outdoor use by 50 percent. Do  
 8 you see that?

9 **A. Yes.**

10 **Q.** Have you analyzed Dr. Sunding's calculations and  
 11 methodologies by which he went about trying to  
 12 calculate municipal outdoor water use in the  
 13 Metro District and the ACF Basin?

14 **A. Yes, I have.**

15 **Q.** And what's your opinion of those calculations and  
 16 methodologies by Dr. Sunding?

17 **A. He made some significant errors.**

18 **Q.** Would you explain those to us, please.

19 **A. Well, the most significant error is that**  
 20 **Dr. Sunding used a methodology to calculate**  
 21 **outdoor water use that really includes many other**  
 22 **water uses besides outdoor water use. What he --**  
 23 **what he calls outdoor water use really in my**  
 24 **field is what we would call seasonal water use.**  
 25 **That's the water use that increases in the**

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1 by which you believe Dr. Sunding overstated  
 2 outdoor water use?

3 **A. I have.**

4 **Q.** And what did you find?

5 **A. Well, in his expert reports I estimate that**  
 6 **Dr. Sunding overstated outdoor water use by**  
 7 **between 45 percent and 120 percent depending on**  
 8 **the year. In his testimony, he attempted to**  
 9 **correct for one of his mistakes and -- but he did**  
 10 **not correct for all of them; and he did not**  
 11 **correct for the most important issue of outdoor**  
 12 **versus seasonal water use. It's my estimate that**  
 13 **he's overstated outdoor water use in his**  
 14 **testimony by at least 17 percent.**

15 **Q.** All right. I want to show you another document,  
 16 if I might, Mr. Mayer.

17 I'm going to hand you FX-880, which the Court  
 18 has seen before and some witnesses have been  
 19 asked about.

20 And, Mr. Mayer, if you turn with me to  
 21 page 24, please. And in the second paragraph  
 22 from the bottom, the last sentence, there is a  
 23 sentence that begins with the issue of what is  
 24 practical cost. Do you see that?

25 **A. Yes. I do.**

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1 **summertime. And water use increases in the**  
 2 **summertime for a number of reasons. Outdoor use**  
 3 **is part of it, but it is not the only part of it.**  
 4 **There is water that's used for cooling towers.**  
 5 **There is water that is used in -- as part of**  
 6 **industrial cycles. There is increases in**  
 7 **tourism. There's a lot of reasons that water use**  
 8 **increases in the summertime, not just outdoor**  
 9 **water use. But Dr. Sunding has assumed that all**  
 10 **of that is outdoor water use, and that has led**  
 11 **him to greatly overstate the volume of outdoor**  
 12 **water use in Georgia.**

13 **Q.** Have you quantified maybe to the extent to which  
 14 Dr. Sunding has overstated the volume of outdoor  
 15 water use in Georgia?

16 **A. Yes, I have. But I should also point out that's**  
 17 **just one of the mistakes that Dr. Sunding made.**

18 **Q.** Oh, I'm sorry. What's the other one?

19 **A. He made a number of mathematical errors also.**  
 20 **So the first mistake I described is more of a**  
 21 **methodological error. Then he took that**  
 22 **methodology and made some errors in applying it,**  
 23 **which further led him to overstate outdoor water**  
 24 **use.**

25 **Q.** All right. And have you quantified the magnitude

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1 **Q.** And then the end of that sentence refers to a  
 2 figure of at least 3.5 million for each million  
 3 gallons of water per day. Do you see that?

4 **A. Yes.**

5 **Q.** And, Mr. Mayer, were you in the courtroom when  
 6 counsel for Florida asked Dr. Sunding about this  
 7 specific language?

8 **A. Yes, I was.**

9 **Q.** And so you heard Dr. Sunding testify that the  
 10 cost of the alternatives he had identified are  
 11 less than the value in this report. Do you  
 12 remember that?

13 **A. I do remember that.**

14 **Q.** Do you agree with that?

15 **A. No. I do not.**

16 **Q.** Why not?

17 **A. Well, I made some of my own calculations; and my**  
 18 **assessment is that the measures he's proposed**  
 19 **cost -- would cost significantly more than this**  
 20 **\$3.5 million.**

21 **Q.** Do you have any sense for how much more?

22 **A. Sure. Well, let's just take IBT's, for example.**  
 23 **Let's assume what I would consider a conservative**  
 24 **estimate of what it would take to eliminate**  
 25 **IBT's, \$1 billion. That would put the cost per**

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1 **mgd, based on Dr. Sunding's analysis, at over \$23**  
 2 **million per mgd.**  
 3 **Similarly, if you look at the task force**  
 4 **report, leak abatement, they propose \$262 million**  
 5 **in total costs. That works out to over \$10**  
 6 **million per mgd.**  
 7 **So both of those greatly exceed this \$3.5**  
 8 **million number.**  
 9 **Q.** All right. Mr. Mayer, let's shift to -- stick  
 10 with Dr. Sunding, but shift to a different topic.  
 11 Mr. Mayer, were you here when Dr. Sunding was  
 12 directly asked, would your proposed M & I remedy  
 13 exceed total M & I consumption? Were you here  
 14 for that?  
 15 **A. I was.**  
 16 **Q.** And you heard Dr. Sunding say that in his view,  
 17 his remedies would not exceed total municipal and  
 18 industrial consumption. Do you remember that?  
 19 **A. Yes, I heard him say that in response to a**  
 20 **question from the Special Master.**  
 21 **Q.** Do you agree with that?  
 22 **A. No. I do not.**  
 23 **Q.** Why not?  
 24 **A. Well, I prepared a demonstrative to specifically**  
 25 **address this point.**

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1 **use in the Georgia ACF.**  
 2 **Q.** And, Mr. Mayer, do you -- were you also here when  
 3 Dr. Sunding said that he didn't believe his  
 4 reductions would exceed consumptive use because  
 5 certain M & I groundwater withdrawals were not  
 6 included?  
 7 **A. Yes, I was here.**  
 8 **Q.** And do you agree with that statement from  
 9 Dr. Sunding?  
 10 **A. No. Dr. Sunding suggested groundwater**  
 11 **withdrawals were about 15 percent, I believe.**  
 12 **First of all, I don't -- I think that in itself**  
 13 **is an overstatement. But let's just take him at**  
 14 **his word. If we were to increase consumptive use**  
 15 **by 15 percent, what you would see would be that**  
 16 **the consumptive -- his proposal would still**  
 17 **exceed the available consumptive use in two**  
 18 **months of the year.**  
 19 **Q.** All right. Mr. Mayer, I want to move on to  
 20 another topic you were asked about in your  
 21 cross-examination; and that was the comparison  
 22 you did between flows in the Apalachicola River  
 23 and municipal and industrial water use.  
 24 Can you turn to tab 10, sir.  
 25 **A. Sure.**

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1 **Q.** And is this demonstrative 9?  
 2 **A. Let's see.**  
 3 **Q.** Or tab 9?  
 4 **A. This is demonstrative 9; correct.**  
 5 **Q.** Okay. So if we all look at tab 9, can you tell  
 6 us what you're showing here?  
 7 **A. So this is -- I have put two graphs here on**  
 8 **tab 9. Let's start on the graph on the left.**  
 9 **The graph on the left shows the 2011 municipal**  
 10 **and industrial consumptive use in the Georgia ACF**  
 11 **on a monthly basis. And 2011 is specifically the**  
 12 **year that Dr. Sunding suggests that his**  
 13 **conservation scenarios should be applied against.**  
 14 **Then on the right I have applied**  
 15 **Dr. Sunding's conservation scenarios as he**  
 16 **specified in his testimony to Georgia's 2011**  
 17 **municipal and industrial consumptive use.**  
 18 **Q.** And, Mr. Mayer, what conclusions do you draw, if  
 19 any, from this comparison?  
 20 **A. Well, as you can see in three months of the year,**  
 21 **in February, March, and April, Dr. Sunding's**  
 22 **proposal exceeds the available consumptive use in**  
 23 **Georgia. And in other months of the year, his**  
 24 **proposal reduces dramatically. And I would even**  
 25 **say almost at a draconian level the consumptive**

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1 **Q.** Just so we're all clear, you have in fact done an  
 2 analysis to compare Georgia's municipal and  
 3 industrial consumptive use to flows at the state  
 4 line. Correct?  
 5 **A. Yes, I have.**  
 6 **Q.** And if we're all looking at tab 10, can you tell  
 7 us what you're trying to show here?  
 8 **A. Sure. Tab 10 has two lines again. The blue line**  
 9 **is the flow in the Apalachicola River at the**  
 10 **Chattahoochee Gage just below the Woodruff Dam at**  
 11 **the Georgia and Florida state line. So that's**  
 12 **really the water that's flowing into Florida.**  
 13 **The purple line at the bottom is the Georgia**  
 14 **municipal and industrial consumptive use.**  
 15 **Q.** And what, if anything, does this tell you, sir?  
 16 **A. Well, this tells me that the municipal and**  
 17 **industrial consumptive use in Georgia is a tiny**  
 18 **fraction of the water that is being delivered at**  
 19 **the state line to Florida. Yet, this is the**  
 20 **water that supports 5.1 million people and the**  
 21 **multi-billion dollar economy.**  
 22 **Q.** And, Mr. Mayer, we have talked about some of the  
 23 concerns you have with Dr. Sunding's proposal  
 24 surrounding municipal and industrial water use.  
 25 But have you, in fact, looked at what impact

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1 implementing Dr. Sunding's proposals as they are  
 2 would have on municipal and industrial  
 3 consumptive use?  
 4 **A. Yes, I have.**  
 5 **Q.** And, sir, if we look at tab 11, is that analysis  
 6 reflected here?  
 7 **A. Yes. It is.**  
 8 **Q.** And can you explain to us what you're showing in  
 9 tab 11, which is also demonstrative 11?  
 10 **A. Sure. So this shows just a two-year time period,**  
 11 **2011 and 2012, which were, again, years that**  
 12 **Dr. Sunding chose to focus on. The blue line is,**  
 13 **once again, the flow in the Apalachicola River as**  
 14 **measured at the Chattahoochee Gage at the state**  
 15 **line. The purple line is, again, the Georgia's**  
 16 **municipal and industrial consumptive use in each**  
 17 **of those months of the year. And then to that I**  
 18 **have deducted what I consider to be Dr. Sunding's**  
 19 **erroneous scenarios.**  
 20 **Q.** And what, if anything, does this tell you, sir?  
 21 **A. I think it really shows you the very small impact**  
 22 **that Dr. Sunding's proposals might have on flows**  
 23 **at the state line.**  
 24 **Q.** Mr. Mayer, thank you for your time.  
 25 I have no further questions.  
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1 **A. That's my understanding.**  
 2 **Q.** Okay. And you're not aware of whether  
 3 Dr. Sunding annualized his costs; correct?  
 4 **A. No.**  
 5 **Q.** You're not aware whether 16 million annualized is  
 6 the same as the total cost of 262. Correct?  
 7 **A. No. But I would also point out that that's**  
 8 **still -- even if that were true, it still does**  
 9 **not include the 1.2 to \$2.4 billion cost that**  
 10 **Dr. Sunding ignored.**  
 11 **Q.** And I -- by that I assume you mean the pipeline  
 12 replacement?  
 13 **A. I'm talking about the pipeline replacement.**  
 14 **Q.** You're not aware, are you, that Dr. Sunding  
 15 doesn't actually include pipeline replacement in  
 16 his remedy. Right?  
 17 **A. Well, I would be pretty surprised if you could**  
 18 **achieve the level of savings that Dr. Sunding has**  
 19 **proposed without replacing some pipes.**  
 20 **Q.** Let's just -- let's look at what the task force  
 21 said. Do you see there is a 1 and a 2 on this  
 22 page on the left column. Right?  
 23 **A. Yes.**  
 24 **Q.** And there is a separate yield for leak abatement  
 25 and for pipeline replacement. Right?  
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1 MR. FAWAL: Very briefly, your Honor.  
 2 RE-CROSS-EXAMINATION  
 3 BY MR. FAWAL:  
 4 **Q.** Mr. Mayer, I would like to start with appendix  
 5 III, one of the loose documents.  
 6 **A. From the contingency planning task force?**  
 7 **Q.** Exactly right.  
 8 **A. Okay. What page?**  
 9 **Q.** And you were looking at page 61.  
 10 **A. Thank you.**  
 11 **Q.** And again for the record, this is JX-40. I  
 12 believe you testified that Dr. Sunding had  
 13 assessed a cost of 16 to \$17 million. Correct?  
 14 **A. I believe -- I didn't testify to that. That was**  
 15 **something that Mr. Allen had noted.**  
 16 **Q.** Okay. You're not aware if that's in your  
 17 prefiled testimony?  
 18 **A. I believe -- I think he did state something like**  
 19 **that in his report. In the table he suggested**  
 20 **there's no incremental cost.**  
 21 **Q.** In your prefiled testimony you said he assigned  
 22 17 million; isn't that right?  
 23 **A. Yes, I did.**  
 24 **Q.** So you believe that he has identified the total  
 25 cost as 17 million; is that right?  
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1 **A. Yes, there is a separate yield.**  
 2 **Q.** And you haven't analyzed Dr. Sunding's remedy  
 3 enough to know that he's just referencing the  
 4 leak abatement yield and remedy. Correct?  
 5 **A. No. I have -- well, I know that he did -- he may**  
 6 **have just been focusing on the leak abatement**  
 7 **remedy. But pipeline replacement will certainly**  
 8 **have to be part of a long-term water loss**  
 9 **control. So whether he considered that or not,**  
 10 **I'm not sure.**  
 11 **Q.** Your remedy is pipeline replacement, but his  
 12 remedy is not; isn't that right?  
 13 **A. No. My remedy would include both. And I believe**  
 14 **that ultimately there will be pipes that have to**  
 15 **be replaced.**  
 16 **Q.** You also testified about outdoor watering.  
 17 Correct?  
 18 **A. Yes.**  
 19 **Q.** And, again, you did a comparison with  
 20 Dr. Sunding. Right?  
 21 **A. Yes.**  
 22 **Q.** And I just want to make sure I understand your  
 23 present testimony correctly. The difference  
 24 between your calculation of the effect of the  
 25 remedy on outdoor watering use and Dr. Sunding's  
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1 calculation of water use is approximately 17  
 2 percent. That's the difference you have. Right?  
 3 **A. The -- well, first of all, Dr. Sunding didn't**  
 4 **actually report a number for outdoor water use**  
 5 **exactly in his testimony. He said around 130,000**  
 6 **acre-feet. So I used 130,000 acre-feet. And**  
 7 **then when I compared that to the correct -- when**  
 8 **you correctly apply his methodology, he's**  
 9 **overstated by about 17 percent.**  
 10 **But it's also important to remember that**  
 11 **that's -- that still includes that -- his**  
 12 **estimate of outdoor water use still includes all**  
 13 **of these other water uses; so it's still even**  
 14 **overstated beyond that. The 17 percent error is**  
 15 **just the mathematical error.**  
 16 **Q.** Mr. Mayer, I appreciate that; but if you can  
 17 answer just yes or no.  
 18 **A. I'm sorry. It wasn't a yes or no question in my**  
 19 **mind.**  
 20 **Q.** In your prefiled testimony you identified the  
 21 difference as at least 17 percent?  
 22 **A. At least, yes.**  
 23 **Q.** And you said the same thing here to your counsel.  
 24 Correct?  
 25 **A. At least 17 percent, yes.**

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1 **Q.** If you will turn to tab 10 in your binder.  
 2 **A. Yes.**  
 3 MR. FAWAL: Mr. Walton?  
 4 BY MR. FAWAL:  
 5 **Q.** Sir, in tab 10 you discuss the streamflow  
 6 relative to M & I consumptive use. Correct?  
 7 **A. Correct.**  
 8 **Q.** And you agree that your demonstrative depicts wet  
 9 and dry years. Correct?  
 10 **A. Yes. It depicts the years from 1994 to 2013,**  
 11 **which includes a wide variety of climates.**  
 12 **Q.** And it also depicts a wide variety of flows;  
 13 doesn't it?  
 14 **A. Absolutely.**  
 15 **Q.** And you can see that in generally dry years, the  
 16 flows decrease. Correct?  
 17 **A. Sure. But also, you know, those are -- this**  
 18 **whole thing is a regulated system. Yes.**  
 19 **But, sure. Yes.**  
 20 **Q.** You agree in dry years the flows are generally  
 21 decreasing in this chart. Correct?  
 22 **A. I'm sorry. What do you mean when you say**  
 23 **generally?**  
 24 **Do you mean over a trend line or --**  
 25 **Q.** No, no. I'm just looking at where you're showing

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1 the streamflows of the Apalachicola River in  
 2 years that you know to be particularly dry. For  
 3 example, 2007 to 2008 or 2012?  
 4 **A. Yes. It's -- yes. The flows are lower in those**  
 5 **years than in other years; that's true.**  
 6 **Q.** And you're aware, aren't you, that consumptive  
 7 use and M & I consumptive use is generally higher  
 8 in drier years. Correct?  
 9 **A. Sometimes. But that really depends on whether**  
 10 **demand is being restricted. So, you know -- so,**  
 11 **yes, it was higher -- consumptive use was higher**  
 12 **in 2007; but then it was much lower in 2008**  
 13 **because demand -- because drought restrictions**  
 14 **had been put in place.**  
 15 **Q.** Your counsel showed you earlier a chart that had  
 16 a peak in 2007 and then another spike in 2012.  
 17 You remember that; right?  
 18 **A. Yes, I do.**  
 19 **Q.** And that was consumptive use?  
 20 **A. That was consumptive use.**  
 21 **Q.** And so you would agree then if consumptive use is  
 22 increasing and streamflows are decreasing in dry  
 23 years, that M & I consumptive use in those years  
 24 is a much larger percentage than in general on  
 25 this demonstrative. Correct?

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1 **A. No. I think that mischaracterizes the**  
 2 **demonstrative.**  
 3 **Q.** I want you to turn back to tab 2 in your  
 4 binder -- still in the binder your counsel gave  
 5 you.  
 6 **A. Yes, thank you.**  
 7 **Q.** And I just want to be clear on what this is  
 8 depicting.  
 9 **A. Sure.**  
 10 **Q.** This shows withdrawals, presumably returns, and  
 11 the consumptive use is the difference. Correct?  
 12 **A. So the combined -- the combination of the green**  
 13 **and the blue bar together is the withdrawals.**  
 14 **Q.** Correct.  
 15 **A. The blue bar itself represents the returns. And**  
 16 **the green portion represents the consumptive use.**  
 17 **Q.** And you agree a large portion of M & I  
 18 consumptive use is a result of outdoor watering.  
 19 Right?  
 20 **A. You know, my understanding is in Georgia, outdoor**  
 21 **water use in the urban sector constitutes about**  
 22 **20 percent of metered demand. So I would not**  
 23 **agree with that statement.**  
 24 **Q.** But you understand that indoor water use does not  
 25 have a meaningful impact on consumptive use.

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1 Right?

2 **A. Indoor -- I'm not -- please restate that**

3 **question.**

4 **Q.** Sure. I'm just asking you things like -- and you

5 were here when Ms. Kirkpatrick testified

6 yesterday?

7 I believe she testified the same thing,

8 showerheads, faucets --

9 **A. Yes. Those are largely nonconsumptive.**

10 **Q.** Right.

11 **A. Yes. Outdoor use is a portion of consumptive**

12 **use. Cooling is a portion of consumptive use.**

13 **Water loss is a portion of consumptive use.**

14 **Those are things that are part of consumptive**

15 **use.**

16 **Q.** Water loss can be remedied by leak abatement.

17 Right?

18 **A. Yes.**

19 **Q.** And outdoor watering can be remedied by outdoor

20 watering restrictions. Right?

21 **A. Outdoor water use can be limited through**

22 **restrictions, yes.**

23 **Q.** And then this also -- the same demonstrative

24 we're on has annual data. Correct?

25 **A. Correct.**

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1 **Q.** And this doesn't reflect when peak consumptive

2 use is occurring within any year. Correct?

3 **A. No. This is annual data.**

4 **Q.** Can you turn to tab 5 for a moment.

5 **A. Sure.**

6 **Q.** And I just had a couple questions about per

7 capita usage. So I assume you're aware that

8 per capita usage has decreased nationally.

9 Correct?

10 **A. Oh, yes.**

11 **Q.** And that's true, especially in urban cities

12 that have had increasing populations. Correct?

13 **A. Yes. Overall, per capita use has decreased**

14 **nationally. I conducted a study of residential**

15 **water use that documented about a 15 percent**

16 **reduction in indoor per capita use over the past**

17 **15 years. What's significant about this is that**

18 **Georgia has accomplished more than a 36.7 percent**

19 **reduction.**

20 **Q.** Mr. Mayer, I can see that here; and I appreciate

21 your testimony. But it's correct, isn't it, that

22 per capita usage decreases as population

23 increases generally speaking. Correct?

24 **A. You know, that's only true very recently.**

25 **Q.** And Atlanta has grown very recently; hasn't

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1 it?

2 **A. Well, it's important -- I think it's important**

3 **for me to allow me to answer this question.**

4 **Q.** Mr. Mayer, just a yes or no. Atlanta has grown

5 very recently; hasn't it?

6 **A. Oh, Atlanta is a growing city; and it has grown**

7 **recently, certainly.**

8 **Q.** Will you turn to tab 6 for a moment. Here your

9 counsel walked you through several conservation

10 measures in Georgia. Right?

11 **A. Yes.**

12 **Q.** And you testified earlier that you didn't

13 quantify results from any one of these measures.

14 Right?

15 **A. No, I didn't quantify the results of any one of**

16 **these measures.**

17 **Q.** Are you aware of recent conditions on the Upper

18 Flint River?

19 **A. A little bit.**

20 **Q.** Okay. You didn't look at impacts of Georgia's

21 water use on that; did you?

22 **A. Not recently.**

23 **Q.** You didn't look at that --

24 **A. You asked me about flows recently on the Flint**

25 **River. I presume you mean in the last few**

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1 **months?**

2 **Q.** Did you look at any flows on the Upper Flint

3 River?

4 **A. I have looked at flows on the Upper Flint River.**

5 **I know it's about 100 cfs.**

6 **Q.** And you didn't include any analysis of the

7 impacts on Georgia's water use on those flows.

8 Right?

9 **A. Georgia withdraws a very small amount of water is**

10 **my understanding from the Upper Flint.**

11 **Q.** You didn't look at the impacts of any of

12 Georgia's M & I water use on downstream users or

13 ecosystems. Right?

14 **A. No. That's not something I was asked to look at.**

15 **Q.** And so you don't know if any of the measures

16 listed in tab 6 have had impacts on downstream

17 users or ecosystems. Right?

18 **A. No. That's not something I did.**

19 MR. FAWAL: No further questions.

20 MR. ALLEN: Very briefly, your Honor.

21 REDIRECT EXAMINATION

22 BY MR. ALLEN:

23 **Q.** Mr. Mayer, I think there is something you wanted

24 to explain about per capita water use. Can you

25 explain that for us, please.

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1 **A. It was suggested that because the population was**  
 2 **increasing, that per capita water use would go**  
 3 **down. And, you know, historically that was not**  
 4 **true at all. You know, we used to assume that as**  
 5 **population increased, water use would increase**  
 6 **proportionally with population. It's only**  
 7 **through the implementation of water conservation**  
 8 **measures over the last 20 years that we have**  
 9 **really been able to change that equation and**  
 10 **actually -- and accomplish things like we have**  
 11 **seen in Georgia where the population has**  
 12 **increased significantly; but the consumptive use**  
 13 **has really remained stable.**  
 14 **Q.** Thank you, Mr. Mayer.  
 15 SPECIAL MASTER LANCASTER: Further  
 16 cross?  
 17 MR. FAWAL: Nothing further.  
 18 SPECIAL MASTER LANCASTER: Mr. Mayer, do  
 19 I correctly understand that you're a civil  
 20 engineer?  
 21 THE WITNESS: Yes, I'm a civil  
 22 engineer -- a water resources engineer. It's  
 23 a division of civil engineering.  
 24 SPECIAL MASTER LANCASTER: And that you  
 25 are testifying today on M & I use?  
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1 THE WITNESS: Yes.  
 2 SPECIAL MASTER LANCASTER: There is no  
 3 reason then that you should know anything  
 4 about Battle Bend?  
 5 THE WITNESS: No. But I -- I was in  
 6 court yesterday when you mentioned Battle  
 7 Bend. I had never heard of it before, so I  
 8 did go and look it up.  
 9 SPECIAL MASTER LANCASTER: Okay. Do you  
 10 then have an opinion as to the effect that  
 11 rerouting the Apalachicola River through  
 12 Battle Bend would have?  
 13 THE WITNESS: You know, I don't have an  
 14 opinion. I'm not a hydrologist. But I do  
 15 believe there are experts who could answer  
 16 that question for you.  
 17 SPECIAL MASTER LANCASTER: Thank you.  
 18 MR. ALLEN: Nothing further, your Honor.  
 19 MR. FAWAL: Nothing further, your Honor.  
 20 THE WITNESS: Thank you. Have a good  
 21 Thanksgiving.  
 22 SPECIAL MASTER LANCASTER: Thank you.  
 23 You, too.  
 24 MR. ALLEN: Your Honor, I would suggest  
 25 that we take a morning break for about 10  
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1 minutes; and we can return with Mr. Masters.  
 2 SPECIAL MASTER LANCASTER: Thank you.  
 3 (Time Noted: 10:22 a.m.)  
 4 (Recess Called)  
 5 (Time Noted: 10:32 a.m.)  
 6 MR. ALLEN: Your Honor, before we get  
 7 started with Mr. Masters, I have one  
 8 housekeeping item, if I might. The copy of  
 9 FX-880 that we handed out inadvertently had  
 10 some notes from Mr. Primis who had been  
 11 writing on them; and we just copied that. So  
 12 we would like to exchange it with a clean  
 13 copy that does not have Mr. Primis's  
 14 handwritten notes, if that's all right.  
 15 SPECIAL MASTER LANCASTER: Sure.  
 16 MR. ALLEN: Your Honor, Georgia calls  
 17 Mark Masters to the stand.  
 18 THE CLERK: Please raise your right  
 19 hand.  
 20 Do you solemnly swear that the testimony  
 21 you shall give in the cause now in hearing  
 22 shall be the truth, the whole truth, and  
 23 nothing but the truth, so help you God?  
 24 THE WITNESS: I do.  
 25 THE CLERK: Please be seated.  
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1 Pull yourself right up to the microphone  
 2 and please state your name and spell your  
 3 last name.  
 4 THE WITNESS: My name is Mark Masters,  
 5 M A R K, M A S T E R S.  
 6 MR. ALLEN: Your Honor, Georgia calls  
 7 Mark Masters, director of the Georgia Water  
 8 Planning and Policy Center in Albany State  
 9 University which is located in the ACF Basin.  
 10 May I approach the witness and provide  
 11 him with his testimony?  
 12 SPECIAL MASTER LANCASTER: You may.  
 13 DIRECT EXAMINATION  
 14 BY MR. ALLEN:  
 15 **Q.** Mr. Masters, do you recognize this as a true and  
 16 accurate copy of the testimony you provided in  
 17 this case?  
 18 **A. Yes, I do.**  
 19 **Q.** And do you adopt it as your own?  
 20 **A. Yes, sir, I do.**  
 21 MR. ALLEN: Tender the witness.  
 22 CROSS-EXAMINATION  
 23 BY MS. WINE:  
 24 **Q.** Good afternoon -- good morning, Mr. Masters. My  
 25 name is Jamie Wine, and I'm counsel for Florida  
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1 in this case.

2 **A. Good morning, Ms. Wine.**

3 MS. WINE: Your Honor, we have a binder

4 of documents we might use if we could

5 approach and pass them out.

6 SPECIAL MASTER LANCASTER: Certainly.

7 MS. WINE: And I'm going to give you a

8 warning, your Honor. I know everybody is

9 trying to get out of here for Thanksgiving.

10 It's a large binder; I don't intend to go

11 through every one of the documents. And I do

12 intend to hold us to our promise to get out

13 of here at a reasonable hour today.

14 SPECIAL MASTER LANCASTER: Thank you.

15 BY MS. WINE:

16 **Q.** Mr. Masters, you're here today to testify about

17 Georgia's management of agricultural resources;

18 is that correct?

19 **A. I believe that could be part of my testimony**

20 **today, yes.**

21 **Q.** And just to be clear, you're not testifying today

22 as an expert witness for the State of Georgia;

23 correct?

24 **A. That's my understanding.**

25 **Q.** And you understand that the State of Georgia has

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1 **A. That's correct.**

2 **Q.** And that's a center that receives a majority of

3 its funding from the State of Georgia. Correct?

4 **A. I would not say it receives the majority of**

5 **its funding from the State of Georgia at all**

6 **times. The Water Policy Center receives a**

7 **certain amount of money through the Board of**

8 **Regents appropriations. Over time, the full**

9 **amount of Water Policy Center funding depends**

10 **on contracts, grants that we receive from the**

11 **State of Georgia, other nonprofit entities, as**

12 **well as the federal government. So the**

13 **percentage of our total budget that comes from**

14 **state funding can, you know, increase or decrease**

15 **depending on the year.**

16 **Q.** Certainly over the last year, the majority of the

17 funding has come from the State of Georgia.

18 Correct?

19 **A. I believe over the last year, the majority of the**

20 **funding, roughly half of it has come from the**

21 **State of Georgia.**

22 **Q.** And prior to that the State of Georgia has

23 provided substantial funding to the center via

24 contract and direct funding. Correct?

25 **A. Again, that number changes over time. The last**

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1 disclosed an expert report for an individual

2 named Dr. Irmak; is that correct?

3 **A. That is my understanding.**

4 **Q.** And that Dr. Irmak has offered various expert

5 opinions about Georgia's management of

6 agricultural resources; correct?

7 **A. I recall that Dr. Irmak included some discussion**

8 **of Georgia's management in his expert report,**

9 **yes.**

10 **Q.** And also, he included a discussion of Georgia's

11 agricultural water conservation efforts in his

12 report. Correct?

13 **A. I seem to recall that, yes.**

14 **Q.** And you have reviewed his report. Correct?

15 **A. I have looked at Dr. Irmak's report, yes.**

16 **Q.** And you, yourself, you're not a Ph.D. Correct?

17 **A. That's correct.**

18 **Q.** Okay. And as we just heard, you're currently

19 employed at Albany State University in Georgia?

20 **A. Yes, ma'am.**

21 **Q.** And that's a public university in Georgia?

22 **A. Yes, ma'am.**

23 **Q.** And your job at Albany State is to serve as

24 director of the university Water Policy Center.

25 Correct?

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1 **two to three years we have performed a lot of**

2 **work in support of the statewide water planning**

3 **effort. And so those contracts have increased in**

4 **the last two to three years. If you go back five**

5 **or six years, there was very little in the way of**

6 **state contract support for the center.**

7 **Q.** Okay. Thank you.

8 You're also a farmer yourself?

9 **A. I am.**

10 **Q.** You and your family hold multiple agricultural

11 withdrawal permits in the ACF Basin. Correct?

12 **A. My family does hold permits for withdrawal in the**

13 **ACF Basin, yes.**

14 **Q.** Okay. So if the Supreme Court imposes limits on

15 agricultural irrigation in the ACF Basin, it

16 could potential impact your family. Correct?

17 **A. Potentially.**

18 **Q.** Okay. Your prefled direct testimony contains an

19 extensive discussion of the work you have done on

20 behalf of the State of Georgia over the years.

21 Correct?

22 **A. I believe it contains a summary of some work I**

23 **have done on behalf of the state, certainly.**

24 **Q.** And it includes your work on the 2009 Lower

25 Flint-Ochlockonee Regional Water Plan. Correct?

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1 **A. I believe that plan was adopted in 2011. I**  
 2 **believe the process began in 2009. And I believe**  
 3 **that is mentioned in my prefile direct, yes.**  
 4 **Q.** And thank you for that clarification.  
 5 And you have done work with various regional  
 6 water plans in Georgia since about 2004.  
 7 Correct?  
 8 **A. Yes, that's correct.**  
 9 **Q.** Okay. You were also involved in the ACF  
 10 Stakeholders Group. Correct?  
 11 **A. Yes, ma'am. That's correct.**  
 12 **Q.** But you don't mention that anywhere in your  
 13 prefiled direct testimony. Correct?  
 14 **A. I don't believe that is in my prefiled direct.**  
 15 **Q.** And not only were you involved in the ACF  
 16 Stakeholders, you were a founding member of that  
 17 organization. Correct?  
 18 **A. I was.**  
 19 **Q.** And then you served as its executive manager.  
 20 Correct?  
 21 **A. Yes, ma'am.**  
 22 **Q.** For several years since 2010?  
 23 **A. I believe that's accurate, yes.**  
 24 **Q.** And are you still in that role?  
 25 **A. I am not under contract to the ACF Stakeholders**  
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1 **at this time, no.**  
 2 **Q.** Does that -- that means you're not still in the  
 3 role?  
 4 **A. I am providing some support on an ad hoc basis**  
 5 **that would be administrative in nature; but as I**  
 6 **mentioned, I'm not under contract to ACF at**  
 7 **this -- the ACF Stakeholders at this time.**  
 8 **Q.** And how long were you under contract with the ACF  
 9 Stakeholders? From 2010 to when?  
 10 **A. I believe the actual contract started in 2011.**  
 11 **I'm taxing a little bit of my memory. I was**  
 12 **providing some administrative and managerial**  
 13 **support since, as you mentioned, 2010. I believe**  
 14 **that the first formal contract was in 2011.**  
 15 **Q.** Okay. And when did it go up through, your  
 16 position as executive manager?  
 17 **A. Up through earlier this year.**  
 18 **Q.** Okay. So sometime in 2016?  
 19 **A. Yes.**  
 20 **Q.** Okay. And through your work with the ACF  
 21 Stakeholders Group, you were involved in the  
 22 development of the Sustainable Water Management  
 23 Plan produced by that group. Correct?  
 24 **A. Yes.**  
 25 **Q.** Okay. If you could, sir, you will find that plan  
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1 at tab 1 of your binder. It's Exhibit FX-883.  
 2 And that's the Sustainable Water Management Plan.  
 3 Correct?  
 4 **A. It appears to be, yes.**  
 5 MS. WINE: And, Mr. Walton, if we turn  
 6 to pdf pages 2 and 3, the second and third  
 7 pages of the document. They don't otherwise  
 8 have page numbers on them. If you put both  
 9 of those pages up side by side.  
 10 BY MS. WINE:  
 11 **Q.** And, Mr. Masters, under the acknowledgments  
 12 section in the top of the first page that we have  
 13 on the screen, you will see there's special  
 14 thanks to you at the bottom of that. Do you see  
 15 that, sir?  
 16 **A. I do.**  
 17 **Q.** And then you're also listed on the next page as  
 18 one of the contributors. Correct?  
 19 **A. Yes, ma'am. That's correct.**  
 20 **Q.** And in your role as executive manager of the  
 21 ACFS, you acted as a conduit between technical  
 22 contractors and the ACF Stakeholders themselves.  
 23 Correct?  
 24 **A. As part of my role as executive manager, I did.**  
 25 **As part of that role, I was responsible for**  
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1 **working with the contractors in terms of ensuring**  
 2 **the delivery of materials that stakeholders had**  
 3 **contracted for. I was called upon at certain**  
 4 **times to support the technical oversight**  
 5 **committee with certain questions that they may**  
 6 **have had, particularly related to agriculture.**  
 7 **But in general, I was in an administrative**  
 8 **support role of making sure deliverables were**  
 9 **provided to the stakeholders on a timely basis**  
 10 **and just being the main interface with the**  
 11 **technical contractors.**  
 12 **Q.** Sure. You were a conduit between the contractors  
 13 and the stakeholders?  
 14 **A. Yes.**  
 15 **Q.** And, sir, if you look at the bottom of the second  
 16 page that's on the screen here under Facilitation  
 17 and Technical Team, I just want to talk a little  
 18 bit about these contractors -- technical  
 19 contractors. The main contractor was an entity  
 20 called Black & Veatch; is that correct?  
 21 **A. Yes. Black & Veatch Corporation was engaged to**  
 22 **develop the Sustainable Water Management Plan.**  
 23 **Q.** And, sir, you had worked with Black & Veatch  
 24 prior to this project on some of the other water  
 25 planning efforts that you were involved with for  
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1 the State of Georgia going back to roughly 2008?

2 **A. Yes, ma'am; that's correct. The Water Policy**

3 **Center served as a subcontractor to Black &**

4 **Veatch who was engaged by the State of Georgia as**

5 **the prime contractor to develop the Lower**

6 **Flint-Ochlockonee, Upper Flint, and Middle**

7 **Chattahoochee Regional Water Plans.**

8 **Q.** And, sir, the technical oversight committee of

9 the ACFS Group was primarily responsible for

10 working with these contractors. Correct?

11 **A. Yes, ma'am.**

12 **Q.** And if we --

13 **A. That's correct.**

14 **Q.** If we look -- I'm sorry. I didn't mean to talk

15 over you.

16 If we look back on the first page that's up

17 on this screen, we'll see the technical

18 committee. It's right there in the middle. It

19 says TOCWG.

20 Sir, this is the technical oversight

21 committee. Correct?

22 **A. Yes, ma'am. That's correct.**

23 **Q.** And it comprised stakeholders representing these

24 four groups that we see here, Apalachicola,

25 Flint, Middle Chattahoochee, and Upper

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1 Chattahoochee?

2 **A. That's correct. The stakeholders early on broke**

3 **the entire ACF Basin into four sub-basins for**

4 **their purposes of the Apalachicola, the Flint,**

5 **the Upper Chattahoochee from the headwaters of**

6 **the Chattahoochee down to roughly West Point**

7 **Lake, and then the Lower and Middle Chattahoochee**

8 **from West Point Lake down to Lake Seminole.**

9 **Q.** And three of these four stakeholder groups

10 represent stakeholder interests in Georgia.

11 Correct?

12 **A. Georgia as well as Alabama; that's correct.**

13 **Q.** Okay. And the Apalachicola is the Florida

14 stakeholders; correct?

15 **A. Generally speaking, I would say that's correct.**

16 **The Apalachicola Basin itself is fully contained**

17 **within the State of Florida. So those**

18 **representatives were necessarily Florida**

19 **residents.**

20 **Q.** Okay. And if we just look above this, we'll see

21 there is a listing for executive -- the executive

22 committee members as well. Do you see that, sir?

23 **A. Yes, ma'am; I do.**

24 **Q.** And that's the same breakdown in terms of the

25 stakeholder groups. Correct?

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1 **A. Yes, ma'am; it is. It's broken down by sub-basin**

2 **the way the stakeholders defined them. And there**

3 **are two representatives that are elected from**

4 **each of those sub-basin caucuses to represent**

5 **their group on the executive committee.**

6 **Q.** Okay. Thank you.

7 MS. WINE: Now, if we go back to the

8 second page again, Mr. Walton.

9 And I don't think you have the very

10 bottom of that page up on your screen,

11 Mr. Walton.

12 Can we get the stuff that appears

13 under -- no, no. It's not on that page.

14 That's not -- it's not there.

15 BY MS. WINE:

16 **Q.** Sir, in the copy in your binder do you see that

17 there's some additional contractors listed

18 under -- at the bottom of that page?

19 **A. Yes, ma'am; I do see that.**

20 **Q.** And one of them is the Georgia Water Resources

21 Institute or GWRI; is that right?

22 **A. I do see that, yeah.**

23 **Q.** And they're affiliated with Georgia Tech, which

24 is a public university of Georgia?

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

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1 **Q.** Is that -- and you understand that GWRI served as

2 a subcontractor to Black & Veatch for this work?

3 **A. That is my understanding.**

4 **Q.** And you also understand that GWRI more generally

5 serves as the State of Georgia's National Water

6 Research Institute. Correct?

7 **A. I believe that GWRI at Georgia Tech is the**

8 **state's Water Resource Institute, which I believe**

9 **is somehow connected to the U.S. Geological**

10 **Survey and some other federal entities perhaps.**

11 **But that is my understanding, yes.**

12 **Q.** And GWRI is run by a fellow named Dr. Aris

13 Georgakakos. Correct?

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

15 **Q.** Okay. Now, one of Georgia Tech's

16 responsibilities in the ACF -- ACFS process was

17 to review the Army Corps of Engineers' UIF's.

18 Correct?

19 **A. As I recall, the stakeholders engaged**

20 **Dr. Georgakakos and his team to perform a review**

21 **of what became known as the UIF, or the**

22 **unimpaired flows dataset, yes.**

23 **Q.** All right. And Georgia Tech prepared a report

24 called the Unimpaired Flow Assessment Report in

25 late 2012. Correct?

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- 1 **A. I believe that is correct. I believe that was**
- 2 **the title of the report.**
- 3 **Q.** Yes. Sir, if you just want to turn to tab 2 in
- 4 your binder, I believe the report is there. I
- 5 just want to make sure that we're talking about
- 6 the same report.
- 7 **A. I see that, yes. I believe this was the -- what**
- 8 **became known as the UIF report, yes.**
- 9 **Q.** Great. Or sometimes referred to as the UIF
- 10 assessment report?
- 11 **A. That's possible.**
- 12 **Q.** Okay. Do you want to just call it UIF report for
- 13 today's purposes?
- 14 **A. I'll call it whatever you want to call it.**
- 15 **Q.** Okay. Great. I'll try to be consistent.
- 16 Are you aware that the UIF report was
- 17 reviewed by multiple federal and state agencies?
- 18 **A. That is my recollection, yes.**
- 19 **Q.** Including U.S. Fish and Wildlife Service?
- 20 **A. I recall that the UIF report was reviewed by a**
- 21 **number of entities. I believe the U.S. Fish and**
- 22 **Wildlife Service was one of those entities. I**
- 23 **can't remember specifically.**
- 24 **Q.** Okay. Do you recall whether the EPA looked at
- 25 it?

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- 1 **technical oversight and coordination work group.**
- 2 **I don't believe Brad Moore was the chair of the**
- 3 **ACFS.**
- 4 **Q.** Okay. And thank you for that clarification.
- 5 Do you recall that Mr. Moore found the UIF
- 6 report to be very rigorous and well supported?
- 7 **A. Again, I don't remember the specific comments**
- 8 **from various members of the Stakeholders Group.**
- 9 **Q.** You do recall that the UIF report contained
- 10 detailed critiques of the Army Corps UIF dataset.
- 11 Correct?
- 12 **A. That's generally my understanding.**
- 13 **Q.** And if you could, sir, staying in tab 2, the UIF
- 14 report, the numbering is a little funny. It
- 15 changes from Roman numerals to Arabic numerals.
- 16 But if you could go to the executive summary at
- 17 page 4(i)(b). Do you see that, sir?
- 18 **A. Yes, ma'am; I see it.**
- 19 **Q.** And, sir, if you could just read to yourself the
- 20 fourth paragraph that begins the assessment
- 21 demonstrates. Do you see that?
- 22 **A. I do.**
- 23 **Q.** If you could just read that to yourself, and then
- 24 I'll have some questions.
- 25 **A. I have read it.**

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- 1 **A. I don't recall.**
- 2 **Q.** How about NOAA?
- 3 **A. I don't recall.**
- 4 **Q.** Okay. Do you recall that the UIF report was
- 5 widely praised for its scientific validity?
- 6 **A. I am aware of certain reviews of the UIF report**
- 7 **that, you know, were thought that the report was**
- 8 **a valid scientific undertaking. Yes, I am.**
- 9 **Q.** And do you recall that a gentleman named Woody
- 10 Hicks, who is a Georgia hydrologist at the Jones
- 11 Center and a member of the ACFS executive
- 12 committee, was among these people who thought it
- 13 was a valid scientific report?
- 14 **A. I recall that Mr. Hicks served on the technical**
- 15 **oversight work group. I know that Mr. Hicks is a**
- 16 **retired geologist from USGS, and I believe at the**
- 17 **time was in fact working at the Jones Center.**
- 18 **I'm -- I'm aware and remember Mr. Hicks**
- 19 **reviewing the report. I don't remember all of**
- 20 **the details of his comments.**
- 21 **Q.** Okay. We might look at some of those later.
- 22 **A. Okay.**
- 23 **Q.** And how about Brad Moore; do you recall that he
- 24 was the chair of the ACFS?
- 25 **A. I believe Brad Moore was the chair of the**

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- 1 **Q.** Okay. And, sir, you recall that the -- that
- 2 Georgia Tech found that the Corps' UIF's
- 3 contained both random and systematic errors.
- 4 Correct?
- 5 **A. I see that written in the executive summary.**
- 6 **Q.** And do you recall that from reading the report at
- 7 the time?
- 8 **A. I don't specifically recall this statement being**
- 9 **in the report. It's been a number of years since**
- 10 **I have, frankly, even looked at the report. But**
- 11 **I do see that in the executive summary, yes.**
- 12 **Q.** And do you recall that Georgia Tech was concerned
- 13 that the UIF's would create false assurances on
- 14 the amount of water available during droughts?
- 15 **A. Again, I see that written in the executive**
- 16 **summary of the UIF report.**
- 17 **Q.** Okay. Do you recall that there was a concern on
- 18 the part of Georgia Tech that the UIF would
- 19 present an unrealistic representation of
- 20 environmental flow regimes?
- 21 **A. Again, I see that written in the executive**
- 22 **summary.**
- 23 **Q.** Sir, do you recall that one of the principal
- 24 sources of the uncertainties and errors with the
- 25 Army Corps UIF was the agricultural water --

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1 agricultural withdrawal data?

2 **A. I don't specifically recall that, no.**

3 **Q.** Sir, if you could please turn to page 10 of the

4 document. If you look in the box, the legend at

5 the bottom of the document in gray on the left

6 side of those boxes, there are some page numbers.

7 Are you following me?

8 **A. Yes, ma'am; I am.**

9 **Q.** I'm on page 10.

10 **A. 10, okay. At the top, 2.4.2?**

11 **Q.** Correct. And, sir, this is a section that deals

12 with the uncertainties and potential error

13 sources that arise during the estimation of the

14 agricultural withdrawals. Do you recall this

15 section, sir?

16 **A. Not specifically, no, ma'am.**

17 **Q.** Sir, since your time -- since the time that

18 this report came out, have you had any

19 conversations with anybody in Georgia about

20 the errors and uncertainties that are in the

21 Army Corps UIF's?

22 **A. I don't recall any specific discussions with**

23 **representatives from the State of Georgia**

24 **regarding uncertainties in the UIF.**

25 **Q.** And, sir, do you know that the Army Corps relied

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1 on consumptive use data supplied by Georgia in

2 order to come up with the UIF's?

3 **A. That is generally my understanding, yes.**

4 **Q.** And I don't recall; were you in the courtroom

5 yesterday when Dr. Zeng testified?

6 **A. No, ma'am; I was not.**

7 **Q.** Have you spoken with Dr. Zeng about the Army

8 Corps UIF's?

9 **A. I don't recall speaking with Dr. Zeng**

10 **specifically about the UIF's, no.**

11 **Let me clarify. The Corps' UIF dataset.**

12 **Q.** Do you recall speaking with Dr. Zeng about this

13 UIF assessment report that Georgia Tech prepared?

14 **A. Not specifically, no.**

15 **Q.** Sir, you will see later in that section 2.4.2

16 that Georgia Tech concluded that the associated

17 error related to crop demands to be up to 70

18 percent of the actual crop water requirement. Do

19 you recall ever speaking with anybody from the

20 State of Georgia about that conclusion?

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

22 **Q.** Sir, later in the report -- you don't necessarily

23 have to turn to it; it's at page 191 -- Georgia

24 Tech concluded that the impact of the errors from

25 the Ag withdrawals resulted in an overestimate of

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1 consumptive use in wet years and an underestimate

2 of consumptive use in dry years. Do you recall

3 that conclusion by Georgia Tech?

4 **A. No, ma'am; I do not.**

5 **Q.** And have you ever talked with anybody in Georgia

6 about the potential for underestimation of

7 consumptive use in dry years due to the error in

8 the UIF's?

9 **A. No, ma'am; I have not.**

10 **Q.** Sir, the UIF report also discusses the impacts of

11 reservoirs on national streamflows. Do you

12 recall reading that section of the UIF report?

13 **A. I reviewed the report when it was completed. I'm**

14 **sure I would have, you know, read that section.**

15 **I don't specifically remember the details of that**

16 **section.**

17 **Q.** Okay. And, sir, if you're still on page 10 of

18 the UIF report, you will see section 2.5,

19 reservoir effects. Do you see that, sir?

20 **A. Yes, ma'am; I see it.**

21 **Q.** And in that section Georgia Tech finds that while

22 the Corps' UIF dataset considers net evaporation

23 from major federal reservoirs, it does not

24 consider evaporation loss from any other

25 reservoir or impoundment, including farm ponds.

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1 Do you recall ever talking about that with

2 anybody from Georgia?

3 **A. I recall there was a discussion about the farm**

4 **ponds and the evaporative -- potential**

5 **evaporative losses from reservoirs other than the**

6 **Corps impoundments. I don't specifically**

7 **remember discussing, you know, any particular**

8 **amounts or what that number might be with anyone**

9 **from the State of Georgia.**

10 **Q.** Have you ever heard a quantification of what that

11 amount might be?

12 **A. I recall that there was a quantification,**

13 **either as part of this report or others, that was**

14 **discussed during the stakeholders process. I**

15 **don't recall exactly what that number is.**

16 **Q.** Okay. Sir, if you could now turn to page 191 of

17 this report. It's much further in the back of

18 the document.

19 Are you there, sir?

20 **A. Yes, ma'am; I'm there.**

21 **Q.** And if you could, do you see the section at the

22 bottom titled Net Evaporation Losses From Other

23 Basin Impoundments?

24 **A. I see that. Yes.**

25 **Q.** And if you could just read the first two

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1 sentences to yourself, sir.

2 **A. I have read the first two sentences.**

3 **Q.** And, sir, do you see that there is an estimate

4 there that about half of the total -- sorry --

5 that these impoundments are estimated to be about

6 half of the total surface area of the main river

7 stem reservoirs, including all federal and

8 Georgia power projects?

9 **A. I see that sentence.**

10 **Q.** And, sir, is that consistent with your

11 understanding of the extent of farm ponds and

12 other impoundments in the Georgia portion of the

13 ACF Basin?

14 **A. I don't have any knowledge as to the extent of**

15 **surface area of farm ponds or other reservoirs in**

16 **the ACF Basin. That's -- that's not an area of**

17 **which I have done any work.**

18 **Q.** Sir, in the mapping work that you have done of

19 the ACF Basin, which we'll get into a little bit

20 later, did that at all map or estimate the size

21 of farm ponds and other impoundments on farms in

22 the ACF Basin?

23 **A. As part of our detailed and field verification**

24 **mapping work, we would capture withdrawals that**

25 **may be from farm ponds. But our field**

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1 **Q.** And, sir, if you could turn to tab 4 of your

2 binder. Sir, you will see there there is an

3 e-mail from Mr. Hicks that cc's you dated

4 March 29, 2013? Do you see that, sir?

5 **A. I see that, yes.**

6 **Q.** And, sir, could you just take a moment just to

7 read this e-mail to yourself.

8 **A. I have read the e-mail.**

9 **Q.** And, sir, do you recall receiving this e-mail?

10 **A. I do now.**

11 **Q.** And do you recall that Mr. Hicks was referencing

12 the criticisms of the UIF dataset as reflected in

13 the work that Georgia Tech did?

14 **A. I'm not sure that Mr. Hicks was referring**

15 **specifically to the UIF report. He may very well**

16 **be.**

17 **And I may need to read it again. I don't**

18 **recall seeing that in the e-mail.**

19 **Q.** Do you read this as he is expressing concerns

20 about the UIF dataset that's being used by the

21 Corps?

22 **A. I see Mr. Hicks mentioning his concern. And I**

23 **believe this to be Mr. Hicks's individual**

24 **personal concerns about modeling linkages and**

25 **perhaps information on demand.**

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1 **verification work as part of the mapping that we**

2 **completed did not account for surface area or**

3 **anything of that kind.**

4 **Q.** Okay. Thank you.

5 And, sir, if you could just look at the

6 bottom of the paragraph that you were just

7 reading. Do you see that Georgia Tech, at least

8 in this report, estimates that the net

9 evaporation from these impoundments could be up

10 to 1200 cfs net loss?

11 **A. So I'm reading the last full sentence in that --**

12 **that's on my screen. I see that number, yes.**

13 **Q.** Okay. And, sir, do you recall having discussions

14 with anybody in the State of Georgia about the

15 potential for an additional 1200 cfs in

16 consumptive use based on these impoundments?

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

18 **Q.** Sir, we talked earlier about Mr. Woody Hicks.

19 Again, you're familiar with him?

20 He's at the Jones Center in Atlanta -- or

21 Georgia; I'm sorry?

22 **A. I believe -- I am familiar with Mr. Hicks. I**

23 **believe he is retired now from the Jones**

24 **Ecological Research Center which is in Newton,**

25 **Georgia.**

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1 **I'm still not seeing reference to the UIF**

2 **report or the UIF's in general.**

3 **Q.** Okay. When he talked about the linkages, he does

4 mention EPD efforts. Correct?

5 **A. Yes. He mentions in the parens there USGS and**

6 **EPD efforts.**

7 **Q.** Okay. As we said before, the Corps gets its

8 consumptive use numbers from the EPD. Correct?

9 **A. I believe EPD provides use estimates, demand**

10 **estimates to the Corps, yes.**

11 **Q.** Okay. And just stepping back from this e-mail,

12 since it's not clear what it's referencing, do

13 you recall discussions with Mr. Hicks more

14 generally about the UIF dataset?

15 **A. I don't specifically remember discussing the UIF**

16 **dataset with Mr. Hicks. I was involved, as you**

17 **have pointed out, in the stakeholders process;**

18 **and I know the stakeholders discussed the UIF's.**

19 **So it's certainly reasonable to think that**

20 **Mr. Hicks had discussed it as part of his work**

21 **with the stakeholders. But I don't specifically**

22 **remember discussing it individually with**

23 **Mr. Hicks.**

24 **Q.** Okay. Now, Georgia Tech concluded in the UIF

25 report that the UIF's needed to be improved

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1 before they can support valid water management  
 2 assessments. Correct?  
 3 **A. Would you repeat the first part of that question?**  
 4 **Q.** Sure. I'm just wondering if Georgia Tech  
 5 concluded after it looked at the UIF's that the  
 6 UIF's needed to be improved before they could  
 7 support valid water management assessments?  
 8 **A. I don't specifically remember that. It's**  
 9 **possible that that statement was made as part of**  
 10 **the report; but I don't specifically remember it**  
 11 **myself.**  
 12 **Q.** Okay. Do you recall that Georgia Tech  
 13 recommended that further work be done to improve  
 14 the UIF's?  
 15 **A. I recall that as a general recommendation from**  
 16 **Georgia Tech, yes.**  
 17 **Q.** And, sir, just briefly, if you would turn back to  
 18 tab 2, which is the -- which is Georgia Tech's  
 19 UIF report. And if you could, sir, there is a  
 20 paragraph that starts out -- towards the bottom  
 21 it starts out, the overarching study. Do you see  
 22 that, sir?  
 23 **A. May I have a page number?**  
 24 **Q.** Yes. I'm sorry. It's little 4 in the executive  
 25 summary, about three pages into the document. Do

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1 you see that, sir?  
 2 And I'm at the second to last paragraph on  
 3 the page that begins the overarching study.  
 4 **A. Okay. I see the paragraph.**  
 5 **Q.** And, sir, if you could just read that paragraph  
 6 and the next.  
 7 **A. I have read the two paragraphs.**  
 8 **Q.** So there, sir, you will see that Georgia Tech is  
 9 recommending that the UIF's be improved before  
 10 they're used. Correct?  
 11 **A. I see that, yes.**  
 12 **Q.** And on the top of the next page they then  
 13 recommend that a panel of experts be formed from  
 14 a bunch of agencies, including federal agencies,  
 15 to help in that effort of improving the UIF's.  
 16 Correct?  
 17 **A. I see that as well, yes.**  
 18 **Q.** But the UIF's were, nevertheless, used by the  
 19 ACFS Group in the modeling for the Sustainable  
 20 Water Management Plan. Correct?  
 21 **A. The stakeholders made a decision to use the**  
 22 **existing unimpaired flows dataset that the Corps**  
 23 **of Engineers used. And I think that was based on**  
 24 **two, I think, important reasons. One, as I**  
 25 **recall, the proposal to modify the UIF's was**

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1 **going to be somewhat lengthy and somewhat**  
 2 **expensive in terms of the stakeholders'**  
 3 **perspective. But more importantly, I think the**  
 4 **stakeholders realized that operations of the**  
 5 **Corps of Engineers were going to be very central**  
 6 **to their Sustainable Water Management Plan. And**  
 7 **so having and using the same dataset that the**  
 8 **Corps was using in their operations was going to**  
 9 **be really important.**  
 10 **Q.** Okay. Sir, thank you. And we'll get to the cost  
 11 of -- and time involved in updating those sets in  
 12 a moment.  
 13 Just give me one second, sir. I want to  
 14 direct your attention to some language.  
 15 Sir, if you could in your binder go to tab 1,  
 16 which is the Sustainable Water Management Plan  
 17 document. And if you could, sir, turn to page 15  
 18 of that document.  
 19 Sir, do you see the section that says review  
 20 of unimpaired flow datasets?  
 21 **A. Yes, I do.**  
 22 **Q.** And if you look at the third paragraph that  
 23 begins after reviewing this analysis, the second  
 24 sentence there, that's the reference to the time  
 25 and monetary commitment that would be involved in

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1 the effort of updating the UIF dataset. Is that  
 2 correct?  
 3 **A. It appears to be.**  
 4 **Q.** And, sir, are you aware that after the completion  
 5 of the UIF report, Georgia Tech did prepare and  
 6 submit a detailed grant proposal for the work to  
 7 update the UIF dataset?  
 8 **A. I don't specifically remember that grant**  
 9 **proposal. It certainly is possible that they**  
 10 **did.**  
 11 **Q.** Do you recall that they actually received funding  
 12 from USGS to do this work?  
 13 **A. I don't recall that, no.**  
 14 **Q.** Do you recall seeing any estimates from Black &  
 15 Veatch or Georgia Tech about how much it would  
 16 cost to fix the UIF dataset?  
 17 **A. I recall numbers were discussed as part of the**  
 18 **stakeholders' decisions regarding, as you have**  
 19 **put it, fixing the UIF. I don't remember what**  
 20 **those numbers specifically were. I know numbers**  
 21 **were thrown around.**  
 22 **Q.** Do you recall seeing ranges thrown around that  
 23 varied between 20,000 and \$225,000?  
 24 **A. I don't specifically remember a range, no.**  
 25 **Q.** Do you remember Black & Veatch estimating that it

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1 would take about six months to complete the work  
 2 necessary to update and fix the errors in the  
 3 UIF's?  
 4 **A. I don't specifically remember that, no.**  
 5 **Q.** Okay. Sir, if you could just continue reading on  
 6 the rest of that paragraph on page 15 of the  
 7 Sustainable Water Management Plan, FX-883. And I  
 8 want to direct your attention to a sentence in  
 9 the middle of the paragraph.  
 10 Actually, it's a continuation of what we were  
 11 just looking at. So after saying that about the  
 12 time and monetary commitment, do you see the line  
 13 that says, ACFS decided to proceed with the  
 14 modeling runs using existing UIF's in any event?  
 15 **A. I do see that, yes.**  
 16 **Q.** Do you see that they say that they're going to  
 17 use the UIF's and the modeling of the UIF's for  
 18 trends and relative comparison rather than for  
 19 absolute numbers?  
 20 **A. I do see that, yes.**  
 21 **Q.** And, sir, do you recall having a discussion  
 22 with anybody about what that -- what that  
 23 sentence means, using these for trends and  
 24 relative comparisons rather than for absolute  
 25 numbers?

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1 **A. I believe that's a reference to the stakeholders'**  
 2 **general, I guess programmatic, if you will,**  
 3 **way in which they were developing their plan.**  
 4 **In other words, the stakeholders were**  
 5 **looking at different suites of water management**  
 6 **packages to see how those different management**  
 7 **practices would impact their suite of performance**  
 8 **metrics; that is, are those performance metrics**  
 9 **getter better or getting worse? That is looking**  
 10 **at trends of different water management**  
 11 **practices.**  
 12 **Q.** Okay. And if I am to understand you correctly,  
 13 is the idea that if you're just comparing  
 14 different alternatives and looking at trends, to  
 15 the extent there's error and uncertainty in what  
 16 you're looking at, it's going to be constant in  
 17 comparing those different alternatives?  
 18 **A. I don't know depending -- I think that would be,**  
 19 **you know, item specific. I'm not sure that we**  
 20 **could make that statement on every single**  
 21 **scenario that the stakeholders investigated.**  
 22 **I think this sentence, again, is a throw-back**  
 23 **to, you know, we want to see how a suite of**  
 24 **management practices either improves or harms our**  
 25 **suite of performance metrics and identify those**

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1 **trends rather than focusing on individual**  
 2 **numbers.**  
 3 **Q.** Okay. So there was still a concern about using  
 4 the UIF dataset if you were trying to look at an  
 5 absolute number or a particular flow number?  
 6 **A. I think there were some concerns expressed by**  
 7 **certain stakeholders that the UIF's may not allow**  
 8 **for that precise a comparison.**  
 9 **What I would just remind you of is that the**  
 10 **consensus of the stakeholders was, in fact, to**  
 11 **utilize the existing Corps of Engineers UIF**  
 12 **dataset in order to -- and I recall this being**  
 13 **discussed a lot in the technical committee --**  
 14 **being able to speak the same language as the**  
 15 **Corps of Engineers.**  
 16 **Q.** And do you recall, in addition to some of the  
 17 stakeholders being concerned about the UIF -- the  
 18 use of the UIF's, the U.S. Fish and Wildlife  
 19 Service also expressed serious concerns with the  
 20 use of the UIF's. Correct?  
 21 **A. You mentioned in an earlier question concern**  
 22 **expressed by the U.S. Fish and Wildlife Service.**  
 23 **I seem to recall them reviewing this. I don't**  
 24 **remember the details of their review.**  
 25 **Q.** Sir, if you could please turn to tab 5 in your

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1 binder. Sir, this is a letter from the U.S. Fish  
 2 and Wildlife Service dated February 5, 2013. And  
 3 it's addressed to the ACF Stakeholders. Do you  
 4 see that, sir?  
 5 **A. Yes, ma'am; I see that.**  
 6 **Q.** And in the introduction they say they have got  
 7 serious concerns regarding the flow  
 8 recommendations. And if you look under the next  
 9 section in the middle of that paragraph, can you  
 10 read the sentence that begins, in this case it is  
 11 inappropriate. Do you see where I'm reading?  
 12 **A. Yes, ma'am; I see that.**  
 13 **Q.** And you can just read that to yourself, sir.  
 14 **A. I see that.**  
 15 **Q.** And, sir, do you recall having discussions with  
 16 anyone from the State of Georgia regarding the  
 17 U.S. Fish and Wildlife Service's concerns about  
 18 using the unimpaired flow dataset to set  
 19 environmental flow targets?  
 20 **A. I don't specifically remember discussions with**  
 21 **anyone within the State of Georgia about setting**  
 22 **environmental flow targets based on the**  
 23 **unimpaired flows datasets or the Fish and**  
 24 **Wildlife Service's concern with that. I'm not**  
 25 **sure that I recall the degree to which any of the**

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1 **stakeholders' metrics were set by the unimpaired**  
 2 **flows dataset.**  
 3 **Q.** Okay. Now, some of the members of the ACFS Group  
 4 did not like the UIF assessment report. Correct?  
 5 **A. I recall concerns expressed from a number of**  
 6 **stakeholders concerning the -- what we're calling**  
 7 **the UIF report.**  
 8 **Q.** And are you familiar with the Atlanta Regional  
 9 Commission?  
 10 **A. Generally speaking I know what the Atlanta**  
 11 **Regional Commission is, yes.**  
 12 **Q.** They are known as the ARC for short?  
 13 **A. Yes.**  
 14 **Q.** And they were one of the members of the ACF  
 15 Stakeholders Group?  
 16 **A. ARC was a member -- is a member of the**  
 17 **Stakeholders Group, yes.**  
 18 **Q.** And ARC represents the interests of metro Atlanta  
 19 and surrounding counties. Correct?  
 20 **A. Generally speaking, yes.**  
 21 **Q.** And do you recall that Katherine Zitsch was one  
 22 of the ARC representatives who participated in  
 23 the ACF Stakeholders Group?  
 24 **A. I recall Katherine Zitsch representing ARC on the**  
 25 **governing board of ACF Stakeholders, yes.**

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1 **I recall that the UIF report was, in fact, one of**  
 2 **those documents, yes.**  
 3 **Q.** Right. And under the policy for restricted  
 4 materials, the only way a technical report could  
 5 be disseminated outside of the ACFS Stakeholder  
 6 Group is if all the members agreed that it could  
 7 be shared more broadly. Correct?  
 8 **A. Correct. The restricted materials policy stated**  
 9 **that if the stakeholders agreed by consensus to a**  
 10 **public release of a document, then that document**  
 11 **could in fact be released.**  
 12 **Q.** And if one stakeholder objected to the release of  
 13 that document, that could be sufficient to  
 14 prevent the dissemination of that technical  
 15 report. Correct?  
 16 **A. It could. The stakeholders operated in terms of**  
 17 **restricted materials as well as the substantive**  
 18 **issues of their plan by consensus. So one**  
 19 **stakeholder in that sense could prevent a**  
 20 **recommendation from going into the SWMP or a**  
 21 **document being released, yes.**  
 22 **Q.** And, sir, the ARC put in this objection to the  
 23 dissemination of the UIF report about two years  
 24 after it was published -- published. Correct?  
 25 **A. The memo is dated September 2014. I believe the**

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1 **Q.** Okay. If you could please, sir, turn to tab 7 in  
 2 your binder. Sir, this is a September 5, 2014,  
 3 memo from Katherine Zitsch to you. Do you see  
 4 that, sir?  
 5 **A. I see that it was -- the memo was sent to me as**  
 6 **well as Gail Bingham, the ACFS facilitator.**  
 7 **Q.** That's correct. And do you recall receiving this  
 8 memo?  
 9 **A. I do.**  
 10 **Q.** And do you recall that in this memo the ARC was  
 11 objecting to the citation or dissemination of  
 12 Georgia Tech's UIF assessment report?  
 13 **A. I don't remember all of the contents of the memo.**  
 14 **Q.** But you remember in general they were lodging an  
 15 objection to the dissemination of this report?  
 16 **A. I recall ARC expressing concerns about some of**  
 17 **the aspects of the UIF report, yes.**  
 18 **Q.** And they didn't want it cited or disseminated by  
 19 the ACFS Stakeholders Group. Correct?  
 20 **A. As I recall, the UIF report, as well as other**  
 21 **technical materials that were being developed as**  
 22 **part of the ACF Stakeholders process, were in**  
 23 **fact considered what stakeholders ended up**  
 24 **calling restrictive materials that were not to be**  
 25 **disseminated out of the ACF Stakeholders process.**

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1 **UIF report was dated November -- October,**  
 2 **November, of 2012, I believe, yes.**  
 3 **Q.** That's correct. So about two years later?  
 4 **A. Give or take.**  
 5 **Q.** And, sir, you recall that Dr. Georgakakos of  
 6 Georgia Tech was not happy about ARC's belated  
 7 criticisms of the UIF assessment report.  
 8 Correct?  
 9 **A. I'm not sure to the degree that Dr. Georgakakos**  
 10 **was happy or unhappy. I recall Dr. Georgakakos**  
 11 **drafting a memo to certain members of the ACF**  
 12 **Stakeholders regarding certain criticisms of the**  
 13 **UIF report.**  
 14 **Q.** Yes. And, sir, if you could turn to tab 8 in  
 15 your binder. Sir, this is an e-mail from  
 16 Dr. Georgakakos dated September 17, 2014. The  
 17 Re: line is ARC comments on UIF report. And it  
 18 appears in the original version to have attached  
 19 a memo.  
 20 And I believe we have redacted the e-mail  
 21 addresses so that personal e-mails were not shown  
 22 in this proceeding. But if you will look at the  
 23 Dear line at the top of that e-mail, one of the  
 24 people is Mark. And I believe that's you, sir,  
 25 having seen the e-mail address.

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1 Do you recall having received this e-mail

2 from Dr. Georgakakos?

3 **A. I recall seeing this now -- in front of me today,**

4 **I recall receiving this e-mail, yes.**

5 **Q.** And, sir, if you could just take a moment to read

6 the e-mail.

7 **A. I read the e-mail.**

8 **Q.** Okay. And, sir, do you recall that

9 Dr. Georgakakos felt that ARC's critiques of the

10 UIF report were general and technically

11 unsubstantiated. Correct?

12 **A. I see that in this e-mail.**

13 **Q.** And one of the things he was concerned about was

14 that ARC was not revealing the identity of its

15 experts or their work to Dr. Georgakakos.

16 Correct?

17 **A. I'm not sure if that was one of Dr. Georgakakos's**

18 **concerns or not.**

19 **Q.** Sir, do you see references in this e-mail to

20 claims by experts unseen, and then later in the

21 next paragraph to the unnamed ARC experts?

22 **A. I do see that, yes.**

23 **Q.** All right. He even offers to debate the issues

24 in public with some of these unnamed ARC experts.

25 Correct?

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1 **A. I see that sentence in the e-mail.**

2 **Q.** And he questions the purposes and motivations

3 behind the late-stage ARC criticisms of the UIF

4 report. Correct?

5 **A. I'm not sure if Dr. Georgakakos was questioning**

6 **the motivations of the critiques.**

7 **Q.** Sir, do you see at the end of the e-mail where he

8 says that he believes the ACFS would be well

9 served to keep the technical facts free of

10 internal politics?

11 **A. I see that sentence.**

12 **Q.** And, sir, after receiving this e-mail, did you

13 have any discussions with Dr. Georgakakos about

14 his reactions to the ARC criticisms that came two

15 years after the publication of his report?

16 **A. I know I had a lot of discussions with**

17 **Dr. Georgakakos over the time and period that we**

18 **developed the Sustainable Water Management Plan.**

19 **I don't specifically remember discussing this**

20 **exact issue. It is possible that we did.**

21 **Q.** Sir, do you recall that Mr. Woody Hicks agreed

22 with Dr. Georgakakos's assessments of the ARC

23 criticisms of the UIF report?

24 **A. I don't recall if Mr. Hicks agreed or disagreed**

25 **with Dr. Georgakakos's characterization.**

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1 **Q.** Sir, do you recall receiving an e-mail from

2 Mr. Hicks where he called the entire ARC

3 challenge pure BS?

4 **A. I don't specifically remember that e-mail, no.**

5 **Q.** Now, sir, even though the ARC did not want the

6 UIF assessment report disseminated, it

7 nonetheless acknowledged that the unimpaired flow

8 dataset needed to be improved and refined.

9 Correct?

10 **A. Did ARC make that statement individually?**

11 **Q.** Correct.

12 **A. To the degree that the sentence we reviewed in**

13 **the Sustainable Water Management Plan**

14 **acknowledges that there were stakeholders that**

15 **expressed concerns about the unimpaired flows**

16 **dataset and the fact that the Sustainable Water**

17 **Management Plan was approved by a consensus of**

18 **the stakeholders, one might draw that inference.**

19 **Q.** Well, sir, if we just very quickly flip back to

20 tab 7, which is the memo from Katherine Zitsch of

21 the ARC. And if you turn to the second page of

22 that memo, you will see that the origin of that

23 language that we looked at in the Sustainable

24 Water Management Plan actually was a proposal

25 from Ms. Zitsch at ARC. Correct?

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1 That's the last two paragraphs on this page

2 of the memo.

3 **A. I haven't read the last part of this memo.**

4 **Q.** Sure. Why don't you take a look at the part that

5 starts, we propose to follow the path --

6 **A. Okay.**

7 **Q.** -- and read to the end of that memo.

8 **A. I have read the two paragraphs.**

9 **Q.** And, sir, do you see that this tracks relatively

10 closely to the language that we see in the

11 Sustainable Water Management Plan. Correct?

12 **A. I think this tracks with what the stakeholders**

13 **reached consensus on was that the Corps should**

14 **investigate the possibility of refinements to the**

15 **UIF.**

16 **Q.** Sir, do you know if the refinements to the UIF

17 dataset have ever been made?

18 **A. I'm not sure to the degree that the Corps of**

19 **Engineers may be looking at that. I don't know**

20 **exactly what all the Army Corps of Engineers is**

21 **doing. I'm not aware of a formal update to the**

22 **unimpaired flows dataset from the Corps of**

23 **Engineers.**

24 **Q.** Are you aware of any work by the State of Georgia

25 to improve and refine the UIF dataset or its own

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1 consumptive use data that feeds into that UIF  
 2 dataset?  
 3 **A. And, again, I'm not sure to the degree that the**  
 4 **State of Georgia through efforts that I'm not**  
 5 **aware of could be investigating that. I'm not**  
 6 **aware of any formal updates from the State of**  
 7 **Georgia to the unimpaired flows dataset.**  
 8 **Q.** Okay, sir. Just one more topic regarding the  
 9 Sustainable Water Management Plan. As you said,  
 10 the goal was for the ACFS Group to reach  
 11 consensus agreement. Correct?  
 12 **A. The ultimate goal of the ACF Stakeholders was to**  
 13 **reach a consensus agreement on a plan for**  
 14 **sustainably managing the waters of the ACF Basin,**  
 15 **yes.**  
 16 **Q.** And part of the consensus that this group reached  
 17 was to explicitly recommend that Florida receive  
 18 additional water into the Apalachicola River.  
 19 Correct?  
 20 **A. So I think it's important to understand, and as I**  
 21 **mentioned briefly before, the stakeholders**  
 22 **recommended a suite of water management**  
 23 **practices, specifically not a menu of options by**  
 24 **which to pick and choose.**  
 25 **If you look at the recommendations that were**  
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1 **approved by consensus of the ACF Stakeholders,**  
 2 **you will find that the majority and a lot of**  
 3 **recommendations involve operations of the Corps**  
 4 **of Engineers. As part of that package -- and not**  
 5 **to get too much into the detail -- essentially**  
 6 **what the stakeholders were suggesting is that**  
 7 **more water be stored in times when the water is**  
 8 **available in the basin in the Corps reservoirs,**  
 9 **and changing the way the Corps of Engineers**  
 10 **manages that water and makes releases.**  
 11 **One of the recommendations that is in the**  
 12 **Sustainable Water Management Plan is to use all**  
 13 **of that additional water that is stored by**  
 14 **changing operations to allow for two pulse flows**  
 15 **into the Apalachicola River during two periods of**  
 16 **the year.**  
 17 **Q.** So, sir, the answer to my question was, yes, that  
 18 the consensus of this group was to explicitly  
 19 recommend that Florida receive additional water  
 20 into the Apalachicola River?  
 21 **A. Understanding that that is one of a suite of**  
 22 **packages that is contingent on the entire suite**  
 23 **being adopted.**  
 24 **Q.** Thank you.  
 25 Now, I want to switch topics, sir, and talk  
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1 about some of the agriculture methods and  
 2 conservation measures that you talk about in your  
 3 prefiled direct.  
 4 First, sir, you're familiar with center-pivot  
 5 irrigation. Correct?  
 6 **A. Yes, ma'am; I am.**  
 7 **Q.** And center-pivots frequently have end-guns on  
 8 them that extend the range of an irrigation  
 9 system approximately 100 feet?  
 10 **A. That's correct.**  
 11 **Q.** Okay. And in your prefiled direct on pages 28  
 12 through 30 -- you know, you have it in front of  
 13 you -- we included a couple of pictures of  
 14 end-guns on center-pivots spraying water on roads  
 15 in Florida. Correct?  
 16 **A. Yes, that is correct.**  
 17 **Q.** Now, you have seen this phenomenon in Georgia,  
 18 too; haven't you?  
 19 **A. I have.**  
 20 **Q.** And if you turn to tab 10 in your binder, just  
 21 take a look at the picture that's included there.  
 22 That appears to be a center-pivot irrigation  
 23 system spraying water on the road. Correct?  
 24 **A. It does.**  
 25 **Q.** Okay. And, sir, you know that you testified in  
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1 your prefiled direct that you don't believe  
 2 pictures like that, even if taken in Georgia,  
 3 show that Georgia farmers are inefficiently or  
 4 inappropriately using water on a large-scale  
 5 basis. Correct?  
 6 **A. It's my testimony that a picture or a handful of**  
 7 **pictures of water going onto noncropped areas is**  
 8 **not indicative of the overall management of water**  
 9 **by Georgia farmers; that's correct.**  
 10 **Q.** And you don't think that we can draw broader  
 11 conclusions about the practices of farmers in the  
 12 ACF Basin as a whole based on a picture like  
 13 that. Correct?  
 14 **A. I think drawing broad conclusions from individual**  
 15 **pictures about any practice, and in this case**  
 16 **farmers in the entirety of ACF Georgia, would not**  
 17 **necessarily be appropriate.**  
 18 **Q.** And, sir, you're aware, aren't you, that this  
 19 practice of watering roads through irrigation  
 20 systems occurs so frequently in south Georgia  
 21 that there's been a nickname developed for it?  
 22 **A. I'm dying to hear what that is.**  
 23 **Q.** Have you heard of the nickname "going through a  
 24 south Georgia car wash"?  
 25 **A. I have heard that on occasion, yes.**  
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1 **Q.** Okay. And do you know who Mr. Calvin Perry is?

2 **A. I do.**

3 **Q.** He's a well-respected agricultural researcher at

4 University of Georgia?

5 **A. Calvin Perry is the superintendent at the**

6 **Stripling Irrigation Farm, I believe.**

7 **Q.** Okay. Well-respected guy?

8 **A. I have known Calvin a long time. I think he's a**

9 **good guy, yes.**

10 **Q.** Have you ever heard him say that this phenomenon

11 happens often and used the term "south Georgia

12 car wash"?

13 **A. I don't specifically remember Mr. Perry saying**

14 **that, but it's possible.**

15 **Q.** Okay. Now, the practice of watering roads is so

16 prevalent in Georgia that it's gone to the

17 trouble of making special road signs to warn

18 drivers of slippery roads due to irrigation

19 hazard?

20 If you want to see what I'm talking about,

21 sir, you can flip to tab 13 in your book.

22 **A. I see the picture.**

23 **Q.** Do you recall ever seeing signs like this in

24 south Georgia?

25 **A. I do not.**

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1 **Q.** Okay. I can represent that this is a picture

2 taken in south Georgia; and it's a sign that was

3 still up this summer and has been up for a number

4 of years, sir.

5 Sir, are you familiar with the fact that the

6 practice of watering roads in Georgia is so

7 prevalent that a number of counties in Georgia

8 have had to enact ordinances to try to curb the

9 practice?

10 **A. I'm not aware of that, no.**

11 **Q.** You're not aware of any of these ordinances?

12 **A. I have heard of certain ordinances. I'm not**

13 **aware of specific counties necessarily that have**

14 **adopted such ordinances.**

15 **Q.** But you have heard that some of these ordinances

16 might exist?

17 **A. I have.**

18 **Q.** Okay. Sir, if you could turn, please, to tab 15

19 in your binder. Sir, tab 15 is Florida

20 Exhibit 128. It's minutes from a meeting dated

21 March 17, 2015. Do you see that, sir?

22 **A. I do see that.**

23 **Q.** And I believe these are from Sumter County, sir.

24 Do you know where Sumter County is?

25 **A. I do.**

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1 **Q.** And that's in Georgia's portion of the ACF Basin?

2 **A. It is.**

3 **Q.** About 26 or 27 miles from where you live?

4 **A. Give or take.**

5 **Q.** Okay. Were you aware that Sumter County passed

6 an ordinance to ban the watering of roads from

7 irrigation systems?

8 **A. I am not aware of that.**

9 **Q.** Okay. Sir, if you turn about -- these pages

10 are not numbered -- I don't think they are --

11 they're not numbered sequentially; so it's about

12 13 pages into the document, sir. You will see a

13 page that has the heading section Roman numeral

14 XV.

15 MS. WINE: The next page, Mr. Walton.

16 BY MS. WINE:

17 **Q.** Sir, are you there?

18 **A. Yes, ma'am; I'm there.**

19 **Q.** And do you see the heading there says, Approval

20 of an ordinance of the Sumter County Board of

21 Commissioners governing agricultural irrigation

22 systems for other lawful purposes?

23 **A. I see it.**

24 **Q.** Okay. Sir, if you look down -- I know the print

25 is small; we'll try to blow it up on the screen

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1 as well. There's a few whereas clauses. The

2 third one establishes what we're talking about,

3 irrigation systems that are diverting water onto

4 the roads. And if you could look at the last two

5 whereas clauses on that page and just read those

6 to yourself, sir.

7 **A. I see that.**

8 **Q.** And, sir, do you see that Sumter enacted an

9 ordinance regarding the diversion of water onto

10 roadways from agricultural irrigation systems

11 because they needed to protect the public health,

12 safety, and welfare of its citizens?

13 **A. I see that sentence.**

14 **Q.** And they also cited this practice as a waste of

15 valuable water resources?

16 **A. I see that sentence as well.**

17 **Q.** And, sir, if you just look on the next page,

18 section 161, that's where they actually ban the

19 watering of roads from irrigation systems.

20 Correct?

21 **A. I'm reading it.**

22 **Q.** Okay.

23 **A. One second.**

24 **Q.** Take your time, sir.

25 **A. I have read section 161.**

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1 Q. And that's where they're saying that basically  
 2 this practice needs to stop?  
 3 A. **I see where Sumter has adopted a prohibition  
 4 against the incidental throw of irrigation  
 5 water onto county right-of-ways, whether paved or  
 6 dirt.**  
 7 Q. Now, one of the ways to prevent the throw of  
 8 water onto roads would be to have end-gun  
 9 shutoffs on all these center-pivot systems.  
 10 Correct?  
 11 A. **An end-gun shutoff is a device that can be  
 12 installed on center-pivot irrigation systems to  
 13 switch off the end-gun to prevent the wetting or  
 14 irrigation of noncropped areas.**  
 15 Q. Okay. Now, sir, if you could, please, now turn  
 16 to tab 17 in your binder. This is FX-129.  
 17 And, sir, these are meetings, again, from  
 18 Sumter County Board of Commissioners meeting  
 19 dated April 1, 2015. So this is just about two  
 20 weeks later after we saw the ordinance get  
 21 passed. Correct?  
 22 A. **It appears to be, yes.**  
 23 Q. And, sir, if you could look at section 5 right in  
 24 that front page which is titled Ordinance of the  
 25 Sumter County Board of Commissioners governing

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1 agricultural irrigation systems and for other  
 2 lawful purposes. Do you see that, sir?  
 3 A. **I see that.**  
 4 Q. And, sir, feel free to read that whole paragraph;  
 5 but I want to focus your attention on a sentence  
 6 towards the bottom that begins, the ordinance was  
 7 not an intentional direct hit, and just ask you  
 8 to read that sentence and the following two  
 9 sentences.  
 10 A. **I have read the two sentences that are  
 11 highlighted towards the bottom of section V.**  
 12 Q. Okay.  
 13 MS. WINE: And let's highlight one more  
 14 sentence there, Mr. Walton.  
 15 BY MS. WINE:  
 16 Q. Just read that to yourself, Mr. Masters.  
 17 A. **I have read the third sentence.**  
 18 Q. Now, sir, do you believe that an ordinance  
 19 banning the watering of roads is a direct hit on  
 20 farmers?  
 21 A. **I'm not sure if it would be considered a direct  
 22 hit or not. It is possible that a farmer would  
 23 necessarily -- you know, in the event that there  
 24 was incidental spray of irrigation water to a  
 25 noncropped area, in this case a road, in order to**

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1 **prevent that from happening to be in compliance  
 2 with an ordinance it's possible that the farmer  
 3 may need to spend some money in terms of  
 4 installing a device or some other -- some other  
 5 remedy.**  
 6 Q. Do you think requiring end-guns on center-pivot  
 7 systems is a direct hit to farmers?  
 8 A. **I think most center-pivots have end-guns on them.**  
 9 Q. And, in fact, for new permittees in Georgia,  
 10 they're required to have end-guns on their  
 11 center-pivot systems. Correct?  
 12 A. **I'm not sure that there is a requirement that  
 13 farmers have end-guns on center pivots. Perhaps  
 14 you're referring to end-gun shutoffs.**  
 15 Q. I'm sorry. I misspoke. I am referring to  
 16 end-gun shutoffs. Thank you.  
 17 A. **It's my understanding that permits issued in  
 18 recent years, since 2006, in the Lower Flint  
 19 River Basin are required to have end-gun  
 20 shutoffs, yes.**  
 21 Q. And, sir, do you consider repeals of ordinances  
 22 like this one to be examples of a strong  
 23 commitment to agricultural water conservation?  
 24 A. **So, I'm sorry, Ms. Wine; help me -- in terms of  
 25 repeal of the ordinance?**

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1 **I don't --**  
 2 Q. Yes. So, sorry if I didn't --  
 3 A. **I'm confused.**  
 4 Q. In these minutes at tab 17, the effect of them  
 5 was actually to repeal the ordinance that we  
 6 looked at that had just been passed two weeks  
 7 prior?  
 8 And if you want to flip back to tab 15, which  
 9 is FX-128, you will actually see a box on the  
 10 upper left-hand corner that said, item 15, which  
 11 was the item we were looking at, was repealed by  
 12 the Board at a special-called meeting on April 1,  
 13 2015. Do you see that?  
 14 A. **No, ma'am. And I apologize.**  
 15 **So you referenced me back to tab 15?**  
 16 Q. Yes.  
 17 A. **And --**  
 18 Q. Upper left-hand corner of the cover page.  
 19 A. **Okay. So I see -- I see that. Okay. Thank you.**  
 20 Q. Yes. Sorry. I was just trying to speed along.  
 21 A. **Yes. So when you mentioned repeal, I wasn't sure  
 22 where we were going.**  
 23 Q. Sure.  
 24 A. **So thank you.**  
 25 Q. So let me just ask you this. Do you view

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1 repealing an ordinance that was aimed at  
 2 eliminating the watering of roadways in Georgia  
 3 as an example of a strong commitment to  
 4 agricultural water conservation?  
 5 **A. I'm not sure I can speak to that directly. I**  
 6 **understand that the county commissioners of**  
 7 **Sumter felt like the repeal of that particular**  
 8 **ordinance was in the best interests of the**  
 9 **citizens of their county just based on what I see**  
 10 **in these meeting minutes. But beyond that, I**  
 11 **have no way to speculate.**  
 12 **Q.** Okay.  
 13 MS. WINE: Your Honor, I'm at a good  
 14 breaking point. I don't know what was  
 15 decided about lunch. I can keep going. We  
 16 can take a shorter lunch break, whatever  
 17 suits the Court. But I still have probably  
 18 about 45 minutes to an hour.  
 19 SPECIAL MASTER LANCASTER: Why don't we  
 20 take a break.  
 21 MS. WINE: Okay. Would you like it to  
 22 be shorter than usual, or shall we take the  
 23 usual hour?  
 24 SPECIAL MASTER LANCASTER: Let's make it  
 25 half an hour.

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1 MS. WINE: Perfect. Thank you, your  
 2 Honor.  
 3 MR. ALLEN: Thank you, your Honor.  
 4 (Time Noted: 11:42 a.m.)  
 5 (Recess Called)  
 6 (Time Noted: 12:15 p.m.)  
 7 MS. WINE: Your Honor, before we resume,  
 8 I would like just to acknowledge my  
 9 colleague, Mr. Andrew Prins, who has been  
 10 assisting me today.  
 11 MR. PRINS: Good afternoon, your Honor.  
 12 SPECIAL MASTER LANCASTER: Good  
 13 afternoon.  
 14 BY MS. WINE:  
 15 **Q.** Good afternoon, Mr. Masters.  
 16 **A. Good afternoon.**  
 17 **Q.** Mr. Masters, I want to talk for a bit about the  
 18 growth of agricultural irrigation in the Georgia  
 19 ACF Basin. You state in your prefiled direct  
 20 testimony at paragraph 20 that the development of  
 21 irrigation has been critical to the continued  
 22 survival and productivity of agriculture in  
 23 southwest Georgia. Correct?  
 24 **A. Correct.**  
 25 **Q.** But you're aware that a very significant

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1 percentage of farms in the Georgia portion of the  
 2 ACF currently do not use any irrigation at all;  
 3 is that right?  
 4 **A. I'm aware of acreage in the ACF Basin that is**  
 5 **produced under dry-land and nonirrigated**  
 6 **conditions, yes.**  
 7 **Q.** And that's about more than half of the acres do  
 8 not use irrigation?  
 9 **A. I'm not sure of that number exactly. I am aware,**  
 10 **as you mention, of acreage that is produced under**  
 11 **dry-land conditions. I think that number can**  
 12 **change a great deal depending on where in the**  
 13 **basin you're referring to.**  
 14 **Q.** Have you ever consulted the USDA census data for  
 15 Georgia?  
 16 **A. I have looked at some USDA census data for the**  
 17 **State of Georgia; yes, ma'am.**  
 18 **Q.** And are you aware that the census data for  
 19 Georgia, at least as of 2012, says that 74  
 20 percent of farms in the Georgia portion of the  
 21 ACF Basin use no irrigation and that less than  
 22 half of the acres in the Georgia portion of the  
 23 ACF Basin are irrigated?  
 24 **A. So you have asked me, I think, kind of a two-part**  
 25 **question.**

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1 **Q.** Sure.  
 2 **A. In terms of the number of farms -- and USDA has**  
 3 **certain definitions of farms. They can reflect**  
 4 **something as small as, you know, 5 or 10 acres**  
 5 **that produces anything more than a thousand**  
 6 **dollars. That's their definition of farm.**  
 7 **So it doesn't surprise me that a relatively**  
 8 **high percentage of the total farms, as defined by**  
 9 **USDA, would not have irrigation.**  
 10 **In terms of acreage, again, depending on**  
 11 **where you are in the Flint River Basin, there is,**  
 12 **in fact, acreage that is grown under dry-land**  
 13 **conditions. I don't know exactly about the**  
 14 **percent. You're quoting me some numbers from**  
 15 **USDA, and I have heard that number used before.**  
 16 **But the thing I think that is important to**  
 17 **understand is that you can't necessarily decouple**  
 18 **that irrigated acreage from dry-land acreage.**  
 19 **Often it is part of a singer farmer's portfolio**  
 20 **of production.**  
 21 **Q.** Sir, you know that irrigation was not introduced  
 22 into Georgia's portion of the ACF Basin to any  
 23 significant degree until the 1970's. Correct?  
 24 **A. That is correct. Largely in the late 1970's,**  
 25 **early 1980's is when center-pivot irrigation**

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1 **became somewhat commonplace in the Flint River**  
 2 **Basin in Georgia.**  
 3 **Q.** And, sir, when you reviewed Dr. Irmak's report,  
 4 do you recall reviewing charts that he included  
 5 in his report that showed that prior to the  
 6 advent of widespread irrigation in the Georgia  
 7 portion of the ACF Basin, Georgia farmers were  
 8 able to harvest very significant crops without  
 9 irrigation?  
 10 **A.** I can't say I specifically remember those charts;  
 11 **no, ma'am.**  
 12 **Q.** You don't recall that he had charts showing corn  
 13 crops and peanut crops and the extent of  
 14 productivity from those crops prior to the  
 15 1970's?  
 16 **A.** I recall Dr. Irmak had a significant amount of  
 17 **information in his report. I cannot say I**  
 18 **specifically remember that chart, no.**  
 19 **Q.** Okay. Now, sir, you previously worked at a  
 20 United States Department of Agriculture facility  
 21 known as Shellman Farm; is that right?  
 22 **A.** Well, so to be clear, I worked at the U.S.  
 23 **Department of Agriculture's National Peanut**  
 24 **Research Laboratory.**  
 25 **Q.** Okay.

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1 **Q.** Are you aware of the term limited irrigation?  
 2 **A.** I have heard that term as well. And I believe  
 3 **the same thing applies. I think that means**  
 4 **different things to different people.**  
 5 **Q.** Do you understand those terms to refer to the  
 6 practice of applying less than the optimal amount  
 7 of irrigation necessary to achieve the maximum  
 8 possible yield on a crop?  
 9 **A.** That is one definition of deficit or limited  
 10 **irrigation that I'm familiar with and I believe**  
 11 **is reasonable.**  
 12 **Q.** And the Shellman Farm has conducted a long-term  
 13 study regarding yield loss associated with  
 14 deficit irrigation on its farm. Correct?  
 15 **A.** So I think we should be very clear about what the  
 16 **Shellman Farm sort of does and doesn't do.**  
 17 **Q.** Sure.  
 18 **A.** The Shellman Farm -- and without getting too in  
 19 **the weeds about it, I would not say that the**  
 20 **Shellman Farm specifically looks at deficit**  
 21 **irrigation; that is, targeting some specific**  
 22 **reduced amount of water. What it does through**  
 23 **the equipment that's installed there, it applies**  
 24 **specific reductions that are uniform across all**  
 25 **of the crops.**

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1 **A.** Of which the Shellman Irrigation Farm was one of  
 2 **our research locations, yes.**  
 3 **Q.** Okay. And the Shellman Farm conducts research  
 4 and experiments on the impacts of different  
 5 irrigation and agricultural management practices  
 6 on crop yield; is that correct?  
 7 **A.** The Shellman Irrigation Research Farm was set up  
 8 **and developed to look at different water regimes**  
 9 **on the impact of not just yield, but also crop**  
 10 **quality and overall crop development across a**  
 11 **number of crop rotations and things like that.**  
 12 **So I think it's a little bit more in-depth than**  
 13 **just investigations of yield.**  
 14 **Q.** But certainly, as you state in your prefiled  
 15 direct, it does include the impact of different  
 16 irrigation and agricultural management practices  
 17 on crop yields. Correct?  
 18 **A.** Yield is one of the items that the researchers do  
 19 **investigate; yes, ma'am.**  
 20 **Q.** Okay. And are you familiar with the term deficit  
 21 irrigation?  
 22 **A.** I am familiar with the term deficit irrigation.  
 23 **I have heard that term. I'm aware that that**  
 24 **term can mean different things to different**  
 25 **people.**

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1 **So if I might sort of try to elaborate on**  
 2 **that a little bit, the researchers have specific**  
 3 **guidelines in terms of what they feel is the best**  
 4 **amount or the appropriate amount of water for a**  
 5 **crop. Then the hardware that's at Shellman just**  
 6 **reduces that amount by a set rate, 30 percent,**  
 7 **then 60 percent, and then dry-land.**  
 8 **And so I think it -- I think we need to be**  
 9 **very careful that the researchers are not trying**  
 10 **to tweak some specific reduction, like you might**  
 11 **under a targeted deficit irrigation regime.**  
 12 **Rather, they're looking to see what happens if**  
 13 **water reducing is taken out by some specific set**  
 14 **amount.**  
 15 **Q.** Okay. That's helpful. And you know a lot about  
 16 that because you were involved in that study at  
 17 Shellman Farm. Correct?  
 18 **A.** I put the first plow in the ground at Shellman,  
 19 **yes.**  
 20 **Q.** You had a lead role in that study?  
 21 **A.** I was a research associate, so I would not say I  
 22 **had a lead role. But I helped develop the**  
 23 **Shellman Farm, yes.**  
 24 **Q.** Okay. And you understand that the study looked  
 25 at the impact on yield from irrigating at these

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1 various levels that you just described. I think  
 2 they did 100 percent watering rate, 66 percent  
 3 rate, 33 percent rate, and then looked at no  
 4 irrigation at all. Correct?  
 5 **A. That is correct.**  
 6 **Q.** And it looked at yield on impacts of various  
 7 crops such as peanuts and cotton and corn.  
 8 Correct?  
 9 **A. Again, it looked at the yield as well as the crop**  
 10 **quality and other growth characteristics of crop.**  
 11 **Q.** Okay. And, sir, if you could please turn to  
 12 tab 24 in your binder. Tab 24 is from JX-169.  
 13 And, sir, do you see at the top of the page it  
 14 says Shellman Farm peanut yield?  
 15 **A. I see that, yes.**  
 16 **Q.** Okay. And this table appears to contain yearly  
 17 yield data. Correct?  
 18 **A. I believe this is yield data. It's -- the**  
 19 **numbers -- the chart doesn't say. But the**  
 20 **numbers in the table generally reflect amounts**  
 21 **consistent with peanut yield. I believe they are**  
 22 **likely expressed in pounds per acre.**  
 23 **Q.** Okay. And then you'll see that the column  
 24 headings show the sprinkler rate levels that we  
 25 just discussed?

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1 **irrigation or 100 percent to dry-land.**  
 2 **Q.** And, sir, if you could please turn the page. And  
 3 you will see this is that same chart which we  
 4 have modified slightly to add some bolded entries  
 5 at the bottom right. Do you see that?  
 6 We have highlighted them on the screen.  
 7 **A. I see that.**  
 8 **Q.** And, sir, what we did -- and I didn't bring a  
 9 calculator; so, hopefully, you will trust me --  
 10 is we took the 100 percent yield number, and we  
 11 computed what percentage of that 100 percent  
 12 yield would remain if irrigation were applied at  
 13 the 66 percent rate irrigation level and the 33  
 14 percent irrigation level. Do you -- are you  
 15 following me on that?  
 16 **A. I'm following you on that, yes.**  
 17 **Q.** Okay. And then do you see here -- and I  
 18 understand you're taking my word on the math --  
 19 that the data shows that if irrigation is applied  
 20 at a 66 percent rate, the peanut yield would  
 21 still be 96.1 percent of what it would have been  
 22 at 100 percent irrigation?  
 23 **A. So I think we're -- I agree with -- and I will**  
 24 **accept your representation that the math is**  
 25 **correct. The -- what we're looking at is an**

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1 **A. I believe that is what the columns reflect, yes.**  
 2 **Q.** And on the bottom row, there appear to be an  
 3 average of the data that's above from the various  
 4 years; is that correct?  
 5 **A. I have no way to confirm that that is the average**  
 6 **without, you know, a calculator.**  
 7 **Q.** Okay.  
 8 **A. I'm not -- I don't know that I could do that**  
 9 **average in my head on the stand.**  
 10 **I believe that that is reflective of the**  
 11 **average of the years shown, yes.**  
 12 **Q.** And, sir, in general the table seems to show that  
 13 yield decreases somewhat as less irrigation is  
 14 applied. Correct?  
 15 **A. The table seems to show that across all years,**  
 16 **2001 to 2014, yields were reflective of certain**  
 17 **dry years, certain wet years across the range of**  
 18 **those years as well as across all of the**  
 19 **different rotations that the researchers are**  
 20 **looking at at Shellman, which is not necessarily**  
 21 **broken out here. This appears to be an aggregate**  
 22 **of all of the peanut data. And so understanding**  
 23 **that there's, you know, a lot more nuance to this**  
 24 **data, generally speaking the yields decrease as**  
 25 **you move down the irrigation treatments from full**

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1 **average of some averages at a research farm**  
 2 **operated by the USDA. And so I think it's**  
 3 **important to keep in mind that how the logistics**  
 4 **of making irrigation management decisions and the**  
 5 **ability to really target those irrigation**  
 6 **management decisions at a few acres on a research**  
 7 **farm is likely not the same, and I can testify**  
 8 **that it is not the same as the challenges that**  
 9 **farmers face in the real world making irrigation**  
 10 **decisions.**  
 11 **But I do see the numbers at the bottom of the**  
 12 **page.**  
 13 **Q.** And -- thank you. And I'm just asking about this  
 14 study right now.  
 15 You will also see that we computed that even  
 16 at 33 percent irrigation rate, you would still  
 17 get 84.9 percent of the yield that you would get  
 18 under 100 percent irrigation rate. Correct?  
 19 **A. Again, under the conditions at the research farm,**  
 20 **that appears to be correct.**  
 21 **Q.** Okay. And, sir, we have done the same in the  
 22 following pages for cotton crop. And I won't  
 23 belabor that now, but that's just what you will  
 24 find in the rest of that tab.  
 25 Sir, I want to switch topics for a moment and

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1 talk about the issuance of agricultural permits.  
 2 Okay?  
 3 **A. Yes, ma'am.**  
 4 **Q.** Now, sir, you're familiar with the Flint River  
 5 Regional Water Development Conservation Plan.  
 6 Correct?  
 7 **A. Yes, ma'am; I am.**  
 8 **Q.** I think folks have referred to that in this trial  
 9 as the 2006 plan. Is that a term you're familiar  
 10 with?  
 11 **A. That would be fine with me.**  
 12 **Q.** Okay, sir. For the record, the plan is found  
 13 on -- the 2006 plan is found behind tab 14 in  
 14 your binder. It's JX-21 for the record.  
 15 You were an adviser on the 2006 plan.  
 16 Correct?  
 17 **A. I was a member of the Technical Advisory**  
 18 **Committee for this plan, yes.**  
 19 **Q.** And the 2006 plan divided the Lower Flint River  
 20 Basin into three differ use zones. Correct?  
 21 **A. Yes, ma'am; it did.**  
 22 **Q.** And, sir, if we could turn to page 25 in this  
 23 document, you will see there that there is a map  
 24 that I believe is depicting the three use zones;  
 25 is that correct?

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1 **A. It appears to be, yes, ma'am.**  
 2 **Q.** And the three categories are capacity use areas  
 3 which are denoted in red. I know the legend is  
 4 difficult to see. Is that correct?  
 5 **A. Yes, ma'am. I believe the red watersheds on this**  
 6 **map are reflective of what were deemed capacity**  
 7 **use areas.**  
 8 **Q.** And the restricted use areas are denoted in  
 9 yellow. Is that correct?  
 10 **A. Yes, ma'am. I believe that's correct.**  
 11 **Q.** And then there are conservation use areas denoted  
 12 in green. Correct?  
 13 **A. Yes, ma'am. That's correct.**  
 14 **Q.** And a big consideration in determining where  
 15 those zones are drawn was impact on streamflow.  
 16 Correct?  
 17 **A. That was my understanding, yes.**  
 18 **Q.** And this 2006 plan imposed some conservation  
 19 measures on future agricultural permits issued in  
 20 all three use zones. Correct?  
 21 **A. I believe that's correct. Yes.**  
 22 **Q.** Now, the plan, while imposing those restrictions,  
 23 at the same time lifted an earlier moratorium on  
 24 new permits that had been in place prior to this  
 25 point; is that correct?

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1 **A. As I recall following adoption of the 2006 plan,**  
 2 **the permits that were submitted to Georgia EPD**  
 3 **prior to December of 1999 -- or I believe you**  
 4 **have termed them the backlogged permits -- were**  
 5 **issued following adoption of this plan, yes.**  
 6 **Q.** Right. But prior to that, there had been a  
 7 moratorium on the issuance of new permits.  
 8 Correct?  
 9 **A. Yes, ma'am.**  
 10 **Q.** Okay.  
 11 **A. There was a moratorium put in place, I believe it**  
 12 **was in December of 1999.**  
 13 **Q.** Okay. Now, sir, if you could turn to your  
 14 prefiled direct testimony, page 18, paragraph 55.  
 15 **A. Yes, ma'am.**  
 16 **Q.** Are you there?  
 17 **A. Yes, ma'am; I'm there.**  
 18 **Q.** Okay. I was just giving you a moment.  
 19 You will see in the second sentence there you  
 20 say that permits issued for new irrigation  
 21 withdrawals since the adoption of the 2006 plan  
 22 have been almost entirely for groundwater  
 23 withdrawals from aquifers other than the Floridan  
 24 Aquifer or in areas where the Sound Science Study  
 25 showed that groundwater withdrawals had little to

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1 no impact on streamflow.  
 2 Do you see that, sir?  
 3 **A. Yes, ma'am; I do see that.**  
 4 **Q.** And do you stand by that testimony today?  
 5 **A. Yes, ma'am; I do.**  
 6 **Q.** Sir, I would like you to turn to tab 27 in your  
 7 binder.  
 8 And, sir, you're familiar with Georgia's  
 9 agricultural permitting database; is that  
 10 correct?  
 11 **A. Generally speaking, I am.**  
 12 **Q.** Okay. And I'll represent that this is  
 13 information that we have compiled from JX-132,  
 14 which is the agricultural permitting database.  
 15 Now, you're aware that that database contains  
 16 records of permits issued by Georgia EPD for  
 17 agricultural water withdrawals?  
 18 **A. That is my understanding of what is contained in**  
 19 **the Ag permitting database, yes.**  
 20 **Q.** And you're aware that for most permits the  
 21 database contains the permit issue date?  
 22 **A. That is my understanding, yes.**  
 23 **Q.** And what we have done here is we have compiled  
 24 data from the database, and we identified all  
 25 permits issued in the Flint River Basin

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1 conservation zones after 2006. Okay?

2 **A. Okay.**

3 **Q.** And we limited that data to surface water

4 withdrawals and groundwater withdrawals tied to

5 the Floridan Aquifer. Okay?

6 **A. Okay.**

7 **Q.** And do you see here where it says that after

8 2006, 569 permits were issued in the conservation

9 use zone?

10 **A. I see the number on this paper, yes.**

11 **Q.** And do you see here it says that after 2006, 144

12 permits were issued in the restricted and

13 capacity use zones. Correct?

14 **A. I see the number on this paper, yes.**

15 **Q.** Okay. Do you have any reason to disagree with

16 the numbers that are on this paper?

17 **A. I'm not entirely sure that the numbers on this**

18 **paper are accurate, no.**

19 **Q.** Sir, have you looked at the agricultural

20 permitting database for this information?

21 **A. I have.**

22 **Q.** You have?

23 **A. Yes, ma'am.**

24 **Q.** And have you done an analysis that would tell you

25 that the numbers are different for permits issued

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1 since 2006?

2 **A. I don't remember the exact numbers off the top of**

3 **my head.**

4 **So we have these classified as conservation**

5 **and restricted and capacity. I don't remember**

6 **the exact numbers that I have in my analysis.**

7 **I don't -- I'm not certain that these numbers**

8 **reflect the active permits that are in, for**

9 **example, the capacity use area issued since**

10 **2006.**

11 **Q.** Do you remember if your numbers were something

12 close to this?

13 **A. They -- I remember that the numbers for the**

14 **capacity use areas certainly are significantly**

15 **less than the number on this paper. And I**

16 **understand that you have combined these, so I**

17 **want to make sure I'm clear in my testimony.**

18 **But in terms of the capacity use areas, I**

19 **believe the number is much less.**

20 **Q.** And what about for the restricted use and

21 conservation use numbers?

22 **A. I don't remember those specifically.**

23 **Q.** And, sir, is your work product somewhere in your

24 prefiled direct?

25 **A. I do not believe the work product for that**

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1 **analysis is in my prefiled direct.**

2 **Q.** Do you know if that's been produced to Florida?

3 **A. I'm not sure.**

4 **Q.** Okay. Sir, could you now turn to tab 26, please.

5 Sir, tab 26 was also compiled from JX-132, which

6 is the agricultural permitting database.

7 Sir, what we have done here is we have just

8 looked at 2006 to the presence -- to the present

9 and tallied up the number of permits. And I'll

10 represent to you that it equals 1387 permits

11 issued since 2006. Does that number sound right

12 to you, sir?

13 **A. So I see the numbers on this -- on this table**

14 **that you have as your demonstrative. I haven't**

15 **added up the numbers in the 2006 to 2015 rows.**

16 **If you represent to me that it's roughly 1300,**

17 **I believe you said, I have no reason to doubt**

18 **that.**

19 **Q.** Okay. And, sir, if we look at the number of

20 permits shown on the prior demonstrative behind

21 tab 27 and compare that to the total number of

22 permits issued since 2006, it's about half of the

23 permits that have been issued since 2006 which

24 are in conservation zones. Do you have any

25 reason to dispute that, sir?

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1 **A. I believe the majority of the acreage that has**

2 **been permitted, the vast majority that's been**

3 **permitted are in areas outside of the capacity**

4 **use areas which I was referring to in my prefiled**

5 **direct in paragraph 55.**

6 **I see the total number of permits in this**

7 **demonstrative. I would just offer that it makes**

8 **a really big difference where these permits are**

9 **in terms of their impact.**

10 **Q.** So, sir, in paragraph 55 you were just referring

11 to the capacity use zones and not the other

12 conservation zones?

13 **A. I think generally I was referring to the capacity**

14 **use areas. As I recall from the Sound Science**

15 **Study and the 2006 plan, it was those capacity**

16 **use areas where the vast majority of the**

17 **streamflow impact from groundwater pumping out of**

18 **the Floridan Aquifer were realized.**

19 **Q.** Now, sir, you're aware that Georgia EPD

20 instituted a new moratorium on Ag permits in

21 2012. Correct?

22 **A. That is my understanding, yes.**

23 **Q.** And, sir, do you recall that the 2012 moratorium,

24 the zone that was outlined in that overlapped in

25 very significant part with all of the

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1 conservation zones defined by the 2006 plan?

2 **A. As I recall, the 2012 permit moratorium was for**

3 **Upper Floridan Aquifer withdrawals in what has**

4 **commonly become known as sub-area 4, which is**

5 **essentially the Upper Floridan Aquifer region of**

6 **southwest Georgia as well as surface water**

7 **withdrawals in, I believe, four of the sub-basins**

8 **in southwest Georgia.**

9 **Q.** And, sir, if you turn back to tab 14 briefly,

10 JX-21, which is the 2006 plan, and go to page 25,

11 it's a map we were looking at.

12 **A. Yes, ma'am.**

13 **Q.** Am I correct that sub-area 4 that you just

14 mentioned is outlined by this red line that is

15 drawn -- this red circle that is drawn over a

16 substantial portion of the basin here?

17 **A. I believe sub-area 4 is generally reflected by**

18 **the red outline on the map on page 25 of the '06**

19 **plan.**

20 **Q.** And, sir, that overlaps rather substantially with

21 all of the -- with the -- certainly all of the

22 red and yellow conservation zones, as well as a

23 substantial portion of the green conservation

24 zone. Correct?

25 **A. It's my understanding that the red boundary on**

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1 **page 25 of the '06 plan, again, representing what**

2 **has commonly become known as sub-area 4, is the**

3 **modeling extent of the groundwater impact model**

4 **that the Georgia U.S. -- pardon me, the USGS**

5 **completed as part of their work supporting this**

6 **plan. And it was through that modeling that they**

7 **determined that of that entire region, just the**

8 **groundwater pumping from what became known as**

9 **capacity restricted use areas had a demonstrable**

10 **impact on streamflow.**

11 **Q.** And the moratorium says that no more Ag permits

12 can be issued in this area that's outlined by the

13 red circle on this map. Correct?

14 **A. That is consistent with the 2012 moratorium, yes.**

15 **Q.** Okay. Thank you.

16 Sir, I would like to talk now about the

17 wetted acreage database that you put together.

18 Okay?

19 **A. Yes, ma'am.**

20 **Q.** You spearheaded the development of that database;

21 is that correct?

22 **A. I did.**

23 **Q.** And that database was completed in 2016?

24 **A. It was.**

25 **Q.** And it contains extensive information about the

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1 mapped irrigated fields in the State of Georgia.

2 Correct?

3 **A. It certainly contains information about the**

4 **mapped wetted acreage in the State of Georgia,**

5 **yes.**

6 **Q.** And it lists the permit number of a field, the

7 type of irrigation system used, and the number of

8 acres irrigated. Correct?

9 **A. I believe five of the columns in that database**

10 **were populated with permit numbers to one degree**

11 **or another through our mapping efforts and in**

12 **consultation with EPD, essentially in an attempt**

13 **to link those -- particularly for groundwater,**

14 **link those back to aquifer sources. So that**

15 **information is in fact contained in the wetted**

16 **acreage database.**

17 **Q.** And you compiled the information in the wetted

18 acreage database through a combination of

19 on-the-ground field mapping as well as some

20 aerial imagery. Correct?

21 **A. That is correct.**

22 **Q.** And you believe that the 2016 wetted acreage

23 database is currently the most accurate

24 reflection of irrigation occurring in Georgia's

25 portion of the ACF Basin. Correct?

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1 **A. I believe the acreage in the wetted acreage**

2 **database is the most accurate estimate of actual**

3 **wetted acreage in the ACF Basin, yes.**

4 **Q.** Okay. Sir, now, if you could, could you please

5 turn to tab 30 in your binder.

6 Sir, tab 30 is a compilation that we put

7 together based on JX-129, which is your wetted

8 acreage database. And tab 30 has actually been

9 marked as an exhibit itself.

10 MS. WINE: For the record it's Florida

11 Exhibit 708.

12 BY MS. WINE:

13 **Q.** Now, as the data compilation here shows -- it

14 might require just a little bit of math -- there

15 are up to 90,000 acres of unpermitted illegal

16 acreage in Georgia. Correct?

17 **A. I don't know that that's correct.**

18 **Q.** Have you done a tally of how many unpermitted,

19 illegal acres there are potentially in Georgia

20 based on your wetted acreage database?

21 **A. Well, so, first of all, I'm -- I don't know that**

22 **I can speak to the legality of any acreage in the**

23 **state. Is it -- are you representing to me that**

24 **a comparison was made between wetted acreage from**

25 **our database and permitted acreage from Georgia**

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1 **EPD? Is that what --**

2 **Q.** I am.

3 **A.** -- **I'm looking at?**

4 **Q.** Yes, sir.

5 **A.** **Okay.**

6 **Q.** Have you been able to do that analysis yourself,

7 sir?

8 **A.** **I have looked at certain areas. I have performed**

9 **a similar analysis where I'm comparing one**

10 **electronic database to another electronic**

11 **database. And depending on how you perform that**

12 **analysis, I think one could get dramatically**

13 **different results.**

14 **Q.** Okay. Have you heard the 90,000 acre number

15 associated with unpermitted acreage?

16 **A.** **I have heard the 90,000 acre number. I recall --**

17 **I believe I was here for a portion of Dr. Cowie's**

18 **testimony in this court. And I believe that**

19 **number came up. I recall Dr. Cowie mentioning**

20 **that Georgia EPD was, in fact, aware of this**

21 **analysis and that the State of Georgia has**

22 **compiled a task force to look into it further.**

23 **Q.** And Georgia became aware of this analysis because

24 Florida informed them of it. Correct?

25 **A.** **I'm not entirely sure exactly how the State of**

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1 **Georgia became aware of this.**

2 **Q.** Sir, could you turn to tab 31 in your binder.

3 This is FX-708. And it's a listing of all the

4 potentially unpermitted irrigated acres from your

5 wetted acreage database. Have you had a chance

6 to review this prior to today?

7 **A.** **I would not say that I have reviewed this in any**

8 **detail. I see that apparently by permit number,**

9 **perhaps -- I'm not sure of the exact linkage that**

10 **your team may have used to compare these**

11 **databases.**

12 **But assuming it's permit number, it appears**

13 **that there was a comparison made between a number**

14 **in Georgia EPD's electronic permit database and**

15 **the number -- and I'm not sure if this is**

16 **reflective of our wetted acreage in our database**

17 **that has end-gun throw included or hardware**

18 **included.**

19 **As you mentioned, there is a wealth of**

20 **information in our database. The point being I**

21 **think it's very important how this analysis was**

22 **done and could dramatically impact the numbers**

23 **that you get from such an analysis.**

24 **Q.** Sir, you mentioned that the Governor just

25 recently set up a task force to look into the

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1 issue of unpermitted wetted acres in Georgia.

2 Correct?

3 **A.** **That's my understanding.**

4 **Q.** Are you a member of that task force?

5 **A.** **No, ma'am; I'm not.**

6 **Q.** Do you know any of the members on that task

7 force?

8 **A.** **I'm not aware of a comprehensive list. I have**

9 **seen the list. I know a list of members exists.**

10 **I recognized some of the names, but I don't**

11 **remember all of the names.**

12 **Q.** Who do you recall is on that task force?

13 **A.** **As I recall -- and you brought up Mr. Calvin**

14 **Perry earlier during my cross-examination. I**

15 **recall he is on the list. I recall Lucius Atkins**

16 **is on the list. I'm not sure beyond that.**

17 **Q.** And who is Mr. Atkins?

18 **A.** **Mr. Atkins is a farmer in Baker County, I**

19 **believe. I recall Mr. Atkins serving on the**

20 **Stakeholder Advisory Committee of the 2006 plan**

21 **that we have spent a lot of time discussing**

22 **today.**

23 **Q.** Are you aware that on October 21 Georgia EPD

24 issued 30 notices of violation to permit holders

25 suspected of irrigating acreage that is not

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1 properly permitted?

2 **A.** **It's my understanding that notices have been**

3 **distributed by the compliance department at EPD.**

4 **I'm not sure of the exact number.**

5 **Q.** Have you had a chance to -- and I don't want any

6 names. I just want to know if you have had a

7 chance to scan the list of permittees in Georgia

8 who are potentially irrigating additional acres

9 that exceed their permits. And I'm just

10 wondering if you recognize any of the names,

11 family, friends, neighbors?

12 **A.** **I have not done that, no.**

13 **Q.** You haven't scanned the list to check out who is

14 on there?

15 **A.** **No.**

16 **Q.** Okay, sir. I would like to shift topics and talk

17 a little bit about Georgia's agricultural

18 conservation efforts. Okay?

19 **A.** **Okay.**

20 **Q.** And to do so, I would like to turn to tab 32 to

21 start with, which is GX-1247. It's the Upper

22 Flint Regional Water Plan.

23 Sir, do you recognize this document?

24 **A.** **Yes, ma'am; I do.**

25 **Q.** And what is this?

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1 **A. This appears to be the final version of the Upper**  
 2 **Flint Regional Water Council's Regional Water**  
 3 **Plan adopted in September of 2011.**  
 4 **Q.** And your Water Planning and Policy Center  
 5 provided technical assistance in the development  
 6 of this plan. Correct?  
 7 **A. We did. The Water Policy Center provided that**  
 8 **assistance under a subcontract to Black & Veatch.**  
 9 **Q.** And the purpose of this plan was to manage water  
 10 resources in a sustainable manner through 2050.  
 11 Correct?  
 12 **A. I believe that is a fair assessment of the**  
 13 **overall goal of the plan. I seem to recall the**  
 14 **specific vision statement that was adopted by the**  
 15 **council that may -- you may have been reading**  
 16 **from it; I'm not sure. I don't remember what the**  
 17 **exact vision statement was.**  
 18 **Q.** Okay. And we have looked at this document a lot  
 19 during the course of this trial. So I don't want  
 20 to belabor it. But do you recall that this  
 21 document identifies some shortfalls in meeting  
 22 EPD's stainability criteria for surface water  
 23 flows in the Flint River Basin at Bainbridge?  
 24 **A. I do recall that, yes.**  
 25 **Q.** Okay. And do you also recall that as part of the  

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1 development of this plan, there were some  
 2 suggestions put in place to address those  
 3 sustainability gaps?  
 4 **A. I recall that the plan was -- that the plan**  
 5 **ultimately put forth a set of demand management**  
 6 **practices as well as supply management practices**  
 7 **and also I believe water quality practices, yes.**  
 8 **Q.** And a lot of these -- they're set forth in  
 9 section 6. I don't intend to walk through them  
 10 now; but a lot of them are management -- manned  
 11 management methods and conservation measures that  
 12 you agree with in a general sense. They're  
 13 things that you advocated in the past. Correct?  
 14 **A. Well, so to the degree that I haven't looked at**  
 15 **all of them, I'm not sure that I can speak to**  
 16 **anything that I may or may not have advocated for**  
 17 **in the past. I generally recall the demand**  
 18 **management practices and supply management**  
 19 **practices being adopted by a majority or perhaps**  
 20 **even a consensus of the overall group.**  
 21 **Q.** Okay. And we could do a comparison later, but  
 22 let's just stick with some things that you have  
 23 prepared yourself. So let's turn to tab 20 in  
 24 your binder, if you would.  
 25 Sir, tab 20 is a -- appears to a PowerPoint  

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1 from a presentation that you gave at the Southern  
 2 Legislative Conference annual meeting in July of  
 3 2013. Is that correct?  
 4 **A. It appears to be so, yes.**  
 5 **Q.** And, sir, feel free to flip through this; but do  
 6 you recall this presentation?  
 7 **A. In general, yes, I recall this presentation.**  
 8 **Q.** Okay. And the title is Agricultural or Ag Water  
 9 Management in Georgia: Past, Present and Future.  
 10 Correct?  
 11 **A. That's what the title says; yes, ma'am.**  
 12 **Q.** Thanks. And these pages, I'll represent to you  
 13 the slides were not numbered. Just for ease of  
 14 everybody following along, we manually applied  
 15 our own page numbers so everybody would know what  
 16 slide we're on.  
 17 And if you would, sir, turn to slide 2.  
 18 That's just a chart that you put together that  
 19 shows growth in irrigation that's consistent with  
 20 what we talked about earlier that irrigation  
 21 really started to increase and become prevalent  
 22 beginning in 1970. Correct?  
 23 **A. I believe that's an accurate representation of**  
 24 **the chart, yes.**  
 25 **Q.** Okay, sir. Now, if you would, please, turn to  

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1 slide 4 in this presentation. It should be  
 2 titled EPD Issues and Manages Agricultural  
 3 Withdrawal Permits. Do you see that?  
 4 **A. Yes, ma'am; I do.**  
 5 **Q.** Okay. And if you look at the bottom of the page  
 6 on the left-hand side, it says, withdrawal  
 7 quantity not specified.  
 8 Do you see that?  
 9 **A. Yes, ma'am; I do.**  
 10 **Q.** And then it says below that, maximum pumping rate  
 11 listed. Correct?  
 12 **A. Yes, ma'am; that's correct.**  
 13 **Q.** And it's your understanding, is it not, that  
 14 Georgia's agricultural permits do not limit the  
 15 total amount that any farmer can irrigate?  
 16 **A. I believe Georgia's agricultural water withdrawal**  
 17 **permits for the majority of them have an acreage**  
 18 **assigned to them, as we have talked about already**  
 19 **today. It's my understanding that those permits**  
 20 **do not have a withdrawal limit in terms of a**  
 21 **volumetric number.**  
 22 **Q.** And, sir, are you aware that in Florida's portion  
 23 of the ACF Basin permits contain caps on the  
 24 total amount of water that permit holders may  
 25 pump?  

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1 **A. I'm not fully aware of all of the requirements of**  
 2 **Florida's agricultural water withdrawal**  
 3 **permitting system or in the Northwest Florida**  
 4 **Water Management District. I have been told that**  
 5 **certain agricultural water withdrawal permits**  
 6 **have some volumetric cap, yes.**  
 7 **Q.** And, sir, were you in the courtroom when  
 8 Mr. Brett Cyphers testified?  
 9 **A. No, ma'am; I was not.**  
 10 **Q.** And have you read Mr. Cyphers's prefiled direct  
 11 testimony in this case?  
 12 **A. Yes, ma'am; I have.**  
 13 **Q.** And do you recall seeing a reference in his  
 14 prefiled direct testimony on such a cap?  
 15 **A. I recall -- I recall language in Mr. Cyphers's**  
 16 **prefiled direct testimony regarding certain**  
 17 **modeled amounts for anticipated water use by**  
 18 **certain crops under certain conditions. It's my**  
 19 **understanding that that in some way informs how**  
 20 **the Northwest Florida Management District permits**  
 21 **their Ag users.**  
 22 **Q.** Are you aware that Florida requires the farmers  
 23 in its portion of the ACF Basin to employ deficit  
 24 irrigation techniques?  
 25 **A. I don't recall that being a requirement. I**  

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1 **recall language concerning some modeled amount of**  
 2 **water that may reflect some reduction over**  
 3 **another modeled amount that informs their**  
 4 **permitting requirements. But I'm not sure to the**  
 5 **degree that that is necessarily deficit**  
 6 **irrigation.**  
 7 **Q.** Okay. Well, are you aware that, in fact, Florida  
 8 farmers are only allowed to use water they need  
 9 for optimal growth of crops 80 percent of the  
 10 time?  
 11 **A. I'm not aware of all of the permit requirements**  
 12 **in Florida.**  
 13 **Q.** You don't recall reading that in Mr. Cyphers'  
 14 prefiled direct testimony?  
 15 **A. Not specifically. I remember the number 80**  
 16 **percent, but I don't remember the exact context.**  
 17 **Q.** Okay. Now, sir, going back to your slide  
 18 presentation that's found behind tab 20, which is  
 19 FX-908, could you please turn to the next slide,  
 20 which is slide 5. And it's titled Milestones in  
 21 Management.  
 22 **A. Okay.**  
 23 **Q.** Do you see, sir, that in the third bullet point  
 24 there there is a reference to the Flint River  
 25 Drought Protection Act of 2000?  

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1 **A. I do see that, yes.**  
 2 **Q.** And you understand that the Flint River Drought  
 3 Protection Act established an auction process in  
 4 which Georgia can buy out farmers' rights to  
 5 irrigate in times of drought. Correct?  
 6 **A. That's correct.**  
 7 **Q.** And you agree that the Flint River Drought  
 8 Protection Act was a milestone in agricultural  
 9 water management. Correct?  
 10 **A. I think in terms of the development of Georgia's**  
 11 **agricultural management and the policies that**  
 12 **govern agricultural water management, the passage**  
 13 **of the Flint River Drought Protection Act was in**  
 14 **fact a milestone, yes.**  
 15 **Q.** And you have called it a central management  
 16 practice of Georgia. Correct?  
 17 **A. As I recall, the Flint River Drought Protection**  
 18 **Act was referenced in the 2006 water plan to --**  
 19 **excuse me, 2006 plan, I believe, is the term we**  
 20 **agreed to use. And it's referenced I believe in**  
 21 **other plans including the regional water plans of**  
 22 **the Upper and Lower Flint Councils. I believe**  
 23 **that it is certainly a management tool that the**  
 24 **State has at its disposal.**  
 25 **Q.** And, sir, parts of Georgia's portion of the ACF  

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1 region are currently experiencing a drought.  
 2 Correct?  
 3 **A. I am aware of certain regions in the State of**  
 4 **Georgia that are experiencing a drought. And as**  
 5 **I recall, certain regions of southwest Georgia**  
 6 **are in drought conditions as defined by NOAA,**  
 7 **yes.**  
 8 **Q.** And were you in the courtroom when former EPD  
 9 Director Judson Turner testified last week?  
 10 **A. No, ma'am; I don't believe I was.**  
 11 **Q.** Have you read his testimony about the possibility  
 12 of the Flint River Drought Protection Act being  
 13 utilized in 2017 if the drought continues?  
 14 **A. No, ma'am; I am not.**  
 15 **Q.** Sir, in the event that the drought continues into  
 16 2017, would you expect that the Georgia EPD  
 17 should invoke the Flint River Drought Protection  
 18 Act as one of its managements tools?  
 19 **A. I'm not sure what I would expect some six months**  
 20 **down the road. I'm not sure. I don't want to**  
 21 **speculate.**  
 22 **Q.** Okay, sir. If you could, going back to your  
 23 presentation behind tab 20 of FX-908. And, sir,  
 24 please turn to slide 15. And, sir, you will see  
 25 on this slide under conservation it says  

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1 irrigation scheduling as the first item. Do you  
 2 see that?  
 3 **A. Yes, ma'am; I do.**  
 4 **Q.** And you agree that irrigation scheduling is an  
 5 agricultural management option for the Flint  
 6 River Basin. Correct?  
 7 **A. Yes, I would agree with that.**  
 8 **Q.** And you testified about it in your prefiled  
 9 direct testimony. Correct?  
 10 **A. I believe that was mentioned in my prefiled**  
 11 **direct, yes.**  
 12 **Q.** You believe it's beneficial?  
 13 **A. I believe improving information on when and how**  
 14 **much to irrigate crops, which is essentially what**  
 15 **irrigation scheduling is, is beneficial overall,**  
 16 **certainly.**  
 17 **Q.** Do you agree that irrigation scheduling can  
 18 reduce water use by up to 15 percent?  
 19 **A. I don't know if I agree necessarily with 15**  
 20 **percent. It would necessarily depend on how**  
 21 **farmers -- an individual farmer, for example, is**  
 22 **managing and scheduling their irrigation at some**  
 23 **baseline before you could estimate what potential**  
 24 **savings would be gained. I think that is largely**  
 25 **a farmer-by-farmer type of analysis.**

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1 Georgia. Correct?  
 2 **A. I'm not able to give you a quantum -- a specific**  
 3 **quantified number of farmers using irrigation**  
 4 **scheduling. In my experience with working with**  
 5 **these farmers over the years on all the various**  
 6 **outreach projects that we perform at the Water**  
 7 **Center and through our partners, I know**  
 8 **anecdotally, as I testified in my prefiled**  
 9 **direct, that more farmers are in fact using this**  
 10 **technology.**  
 11 **Q.** And you don't know of a study and haven't done  
 12 one yourself to put a percentage on that in terms  
 13 of number of farmers in Georgia who are currently  
 14 using irrigation scheduling. Correct?  
 15 **A. No, ma'am; I am not.**  
 16 **Q.** Okay. Is soil moisture monitoring important to  
 17 irrigation scheduling?  
 18 **A. It is.**  
 19 **Q.** And are you aware of how many farmers in Georgia  
 20 are using soil moisture monitoring right now?  
 21 **A. Well, so, again, I think that's -- I would ask**  
 22 **you to be more specific. Soil moisture**  
 23 **monitoring can be as simple as taking a shovel**  
 24 **and digging up the dirt to see how wet it is, or**  
 25 **it could be as advanced as having a Smart Phone**

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1 **Q.** Sir, are you familiar with the Stripling  
 2 Irrigation Research Park?  
 3 **A. I am.**  
 4 **Q.** And what is that, sir?  
 5 **A. The Stripling Irrigation Research Park is a**  
 6 **research and demonstration farm in Mitchell**  
 7 **County, Georgia, operated by the University of**  
 8 **Georgia.**  
 9 **Q.** And have you ever reviewed any of their  
 10 materials?  
 11 **A. I believe I have seen some of their materials**  
 12 **over the years, yes.**  
 13 **Q.** And are you familiar with the fact that they have  
 14 associated an up to 15 percent water savings  
 15 number with advanced irrigation scheduling?  
 16 **A. I don't specifically recall that being in some of**  
 17 **their materials. I have no reason to doubt that**  
 18 **that is the case.**  
 19 **I'm not sure what you mean by advanced**  
 20 **irrigation scheduling. There are a number of**  
 21 **irrigation scheduling tools and methods. Some**  
 22 **may be classifieds as very advanced; some are in**  
 23 **fact very rudimentary.**  
 24 **Q.** And, sir, you're not able today to tell us how  
 25 many farmers are using irrigation scheduling in

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1 **app that measures soil moisture at varying depths**  
 2 **throughout your field. So I don't know what you**  
 3 **mean.**  
 4 **Q.** Do you have any numbers on how many farmers in  
 5 Georgia are using any of those soil moisture  
 6 monitoring techniques?  
 7 **A. I think all farmers are going to monitor the soil**  
 8 **moisture in their fields to, you know, manage**  
 9 **their irrigation and decide when it's appropriate**  
 10 **to irrigate. I think that's commonsense**  
 11 **management.**  
 12 **If you're asking how many farmers are using**  
 13 **these very, very new or relatively new Smart**  
 14 **Phone apps and things of that nature, I don't**  
 15 **have the number on that.**  
 16 **Q.** Are you familiar with the Flint River Soil and  
 17 Water Conservation District?  
 18 **A. I am.**  
 19 **Q.** And are you aware of their estimate that less  
 20 than 5 percent of farmers in Georgia are using  
 21 some form of soil moisture monitoring?  
 22 **A. I'm not aware of that, no.**  
 23 **Q.** Sir, could you turn to tab 39 for me, please.  
 24 Sir, tab 39, which is FX-663, is titled  
 25 Irrigation Management Technology For Water

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1 Conservation in Georgia. Do you see that?

2 **A. Yes, ma'am; I do.**

3 **Q.** And the first paragraph describes a project

4 that's referred to as IrrigatorPro. Do you see

5 that?

6 **A. Yes, ma'am; I do.**

7 **Q.** And, sir, you're familiar with that project.

8 Correct?

9 **A. Yes, ma'am; I am.**

10 **Q.** And how were you involved in that project?

11 **A. If this is the same proposal that is in my mind,**

12 **this was a joint project that I co-authored**

13 **along with folks at the USDA National Peanut**

14 **Research Lab and the Georgia Soil and Water**

15 **Conservation Commission. And it was a proposal**

16 **to the U.S. Department of Agriculture and their**

17 **conservation innovation grants. And it was, as**

18 **I recall, a proposal to secure funding to**

19 **incentivize the use of IrrigatorPro irrigation**

20 **scheduling software.**

21 **Q.** Okay. And, sir, if you turn to the page ending

22 in 847 -- those are the small numbers at the

23 bottom right of the page -- you will see a

24 reference to you in the last bullet. Correct?

25 **A. Yes, ma'am.**

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1 **A. I believe that in terms of overall reductions to**

2 **the degree that they benefit certain regions**

3 **or -- let me rephrase.**

4 **I agree that it's possible that reductions**

5 **could benefit some segments of the entire basin,**

6 **yes.**

7 **Q.** You actually say they will benefit in this

8 document. Correct?

9 **A. I believe that is what the sentence says, yes.**

10 **Q.** Thank you, sir.

11 Could you go back to page -- sorry, tab 20,

12 which is your presentation again, Exhibit FX-908.

13 And I would to return to slide 15 which we

14 were looking at before. Let me know when you're

15 there, sir.

16 **A. I'm there.**

17 **Q.** Okay. We spoke about -- under conservation, we

18 spoke about irrigation scheduling. The next item

19 is precision application strategies. Do you see

20 that, sir?

21 **A. I do.**

22 **Q.** And, sir, you agree that something called

23 variable rate irrigation can be an example of a

24 precision application strategy. Correct?

25 **A. I believe it could, yes.**

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1 **Q.** And, sir, did you say that you had a role in

2 actually drafting this document?

3 **A. I recall seeing this document in its draft form,**

4 **yes.**

5 **Q.** You saw it in a draft form. Were you actually

6 one of the drafters or editors of the document?

7 **A. I believe I was, yes.**

8 **Q.** Okay, sir. If you look to the next page, the

9 page ending in 848, do you see there is a section

10 entitled Project Benefits and Transferability?

11 **A. I see that, yes.**

12 **Q.** And, sir, if you look three-quarters of the way

13 down the paragraph, there is a sentence that

14 starts upstream communities. Do you see that?

15 **A. I do.**

16 **Q.** And, sir, could you just read that sentence to

17 yourself.

18 **A. I see that.**

19 **Q.** So, sir, in this document you were recognizing

20 that downstream communities, including the

21 Apalachicola estuary and oyster fisheries, would

22 also benefit from improved water resource

23 management upstream in Georgia. Correct?

24 **A. I do see that sentence in the proposal, yes.**

25 **Q.** And you agree with that sentence. Correct?

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1 **Q.** And variable rate irrigation is sometimes

2 referred to as VRI?

3 **A. It is.**

4 **Q.** And VRI systems can vary the amount of water

5 applied by cycling sprinklers on and off,

6 controlling the end-gun, and varying the

7 center-pivot travel speed; is that correct?

8 **A. That's generally correct, yes.**

9 **Q.** And that was all described by Dr. Irmak in his

10 expert report. Correct?

11 **A. It may have. I believe he -- Dr. Irmak did, in**

12 **fact, discuss VRI, yes.**

13 **Q.** And, sir, do you agree that VRI could increase

14 agricultural water efficiency in Georgia by

15 approximately 15 percent?

16 **A. I don't know that I agree necessarily that VRI**

17 **across the board could increase -- could decrease**

18 **overall consumption by 15 percent or increase**

19 **efficiency. I, again, very much like your**

20 **irrigation schedule question, believe that is**

21 **a farm-to-farm, farmer-to-farmer type of**

22 **analysis.**

23 **Q.** Do you recall reading in Dr. Irmak's report that

24 he said that VRI on average can reduce water use

25 by more than 15 percent?

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1 **A. I don't remember that specific statement in his**  
 2 **report, no.**  
 3 **Q.** Do you recall reading anything from the Stripling  
 4 Irrigation Research Farm that also says that VRI  
 5 systems can result in water savings of up to 15  
 6 percent?  
 7 **A. I recall the Stripling Irrigation Park putting**  
 8 **together -- seems like a one-or-two-page summary**  
 9 **of various conservation measures that had certain**  
 10 **percentages attached to them. I can't say that I**  
 11 **specifically remember the one about VRI.**  
 12 **Q.** Okay. But you have no reason to dispute here  
 13 today that they associated 15 percent reduction  
 14 in water use to VRI?  
 15 **A. I have no reason to dispute their association.**  
 16 **Q.** Okay, sir. If we could go back one more time to  
 17 tab 20 and to slide 37.  
 18 I'm sorry. Before I go there, I just want to  
 19 make clear that Georgia doesn't currently mandate  
 20 the use of VRI systems. Correct?  
 21 **A. No, ma'am, Georgia does not mandate the use of**  
 22 **VRI systems.**  
 23 **Q.** Okay. Now, if you could turn to slide 37, which  
 24 is titled Pivot System Conservation Methods. Are  
 25 you there, sir?

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1 mapping of irrigation in Georgia. Correct?  
 2 **A. We have completed field verification on a**  
 3 **significant portion of the acreage in the Flint**  
 4 **River Basin; and we have mapped all of the**  
 5 **acreage in the state, yes.**  
 6 **Q.** And are you aware that your field mapping shows  
 7 that now there are only 10 farmers using VRI  
 8 systems in Georgia?  
 9 **A. I don't -- I honestly don't remember exactly the**  
 10 **numbers in that full mapping database.**  
 11 **Q.** You have no reason to dispute that number though.  
 12 Correct?  
 13 **A. Not sitting here right now, no.**  
 14 **Q.** Okay. And the VRI systems, they are indicated on  
 15 your database of the mapped information.  
 16 Correct?  
 17 If there is one, it's demoted by VRI equals Y  
 18 in your code; is that correct?  
 19 **A. I don't know exactly what the code says. I do**  
 20 **recall that whether or not a system was shown to**  
 21 **have VRI technology was captured as part of our**  
 22 **mapping work -- excuse me, field verification**  
 23 **work, yes.**  
 24 **Q.** Okay, sir. If you would, for a moment, would  
 25 you turn to your prefiled direct testimony at

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1 **A. Yes, ma'am. I'm on page 37.**  
 2 **Q.** I just wanted to make sure.  
 3 **A. Yes.**  
 4 **Q.** And if you will look, the second big bullet about  
 5 two-thirds of the way down the page says Variable  
 6 Rate Irrigation, VRI. Do you see that?  
 7 **A. Yes, ma'am; I do.**  
 8 **Q.** And it identifies five systems for 1,064 acres.  
 9 Correct?  
 10 **A. That is what is on this PowerPoint slide.**  
 11 **Q.** Right.  
 12 **A. I believe --**  
 13 **Q.** I'm sorry.  
 14 **A. Well, no. I just want to be clear as to the**  
 15 **context. This was a summary of a very specific**  
 16 **mapping project in a very specific small**  
 17 **watershed.**  
 18 **Q.** Okay. And based on that mapping project, you  
 19 were able to identify as of that time in 2013  
 20 only five parcels that were using a VRI system.  
 21 Correct?  
 22 **A. Of the region mapped and from the data reflected**  
 23 **from that mapping for that small watershed, that**  
 24 **is correct.**  
 25 **Q.** And you have since done your more advanced

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1 page 21. And you will see there's a demo there  
 2 that's labeled Masters demo 6. Do you see that,  
 3 sir?  
 4 **A. Yes, ma'am; I do.**  
 5 **Q.** And this is a table summarizing the breakdown of  
 6 the types of irrigation systems in the Lower  
 7 Flint-Ochlockonee water planning region.  
 8 Correct?  
 9 **A. I want to be very careful and make sure that I'm**  
 10 **answering you correctly. So there were a number**  
 11 **of tables. I just want to read that real**  
 12 **quick --**  
 13 **Q.** Sure thing.  
 14 **A. -- if you don't mind.**  
 15 **Yes. I believe Masters demo 6 reflects the**  
 16 **change in irrigation systems and type as well as**  
 17 **acreage in the Lower Flint-Ochlockonee water**  
 18 **planning region.**  
 19 **Q.** Okay. And just adding up the number column under  
 20 2015 -- do you see that right in the middle of  
 21 your chart?  
 22 It looks like you're reporting on a total of,  
 23 you know -- I think it's 11,370 systems. Does  
 24 that math sound right?  
 25 **A. That appears to be close.**

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1 **Q.** And almost 1900 of those systems are traveler  
 2 irrigation systems. Correct?  
 3 **A.** **In the Lower Flint-Ochlockonee planning region,**  
 4 **correct.**  
 5 **Q.** Correct. And that's about 17 percent of those  
 6 systems?  
 7 **A.** **I haven't done the math on the percentage.**  
 8 **Q.** Okay. And in your prefiled direct you say that  
 9 the traveler irrigation systems are less  
 10 efficient than the center-pivot and drip  
 11 irrigation systems. Correct?  
 12 **A.** **Overall that is correct.**  
 13 **Q.** Okay. And so there's some room for efficiency  
 14 improvement here if we convert at least some of  
 15 those traveler systems to center-pivot or drip  
 16 systems?  
 17 **A.** **I believe that traveler irrigation systems are**  
 18 **largely used on smaller acreage where they are**  
 19 **most -- that's what they were designed to do is**  
 20 **irrigate relatively small tracts of land. So I**  
 21 **would say that conversion of certain traveler**  
 22 **fields to center-pivot fields is not necessarily**  
 23 **achievable.**  
 24 **What I also think this shows is that overall,**  
 25 **there is a trend away from irrigating fields with**

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1 **A.** **I believe in my prefiled direct I make mention of**  
 2 **the Mobile Irrigation Lab that has been in large**  
 3 **part funded through the Soil and Water**  
 4 **Conservation Commission that has assisted farmers**  
 5 **in capturing information about the uniformity of**  
 6 **their systems as well as supporting certain**  
 7 **retrofit programs administered by the State and**  
 8 **USDA.**  
 9 **Q.** And what do you mean by the uniformity of their  
 10 systems?  
 11 **A.** **So in general, the Mobile Irrigation Lab goes out**  
 12 **and tests farmers' uniformity of application, the**  
 13 **uniformity in terms of water delivery of the**  
 14 **irrigation system to the field, and then can make**  
 15 **recommendations on ways to improve that**  
 16 **uniformity.**  
 17 **Q.** And, sir, you're aware that Dr. Irmak reports  
 18 that the Mobile Irrigation Lab inspections result  
 19 in an improvement in average uniformity from 73.5  
 20 percent to an average of 85 percent. Correct?  
 21 **A.** **I don't remember the specific numbers. I believe**  
 22 **you're representing that to me as part of his**  
 23 **report. I have no reason to doubt that.**  
 24 **Q.** Do you recall that in his report he says that  
 25 this Mobile Irrigation Lab program has helped

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1 **less efficient travelers to more efficient**  
 2 **irrigation systems.**  
 3 **The other thing I think I would point out, if**  
 4 **you don't mind --**  
 5 **Q.** No, not at all.  
 6 **A.** **-- is in the Lower Flint-Ochlockonee planning**  
 7 **region -- and I don't have the numbers exactly**  
 8 **off the top of my head -- I believe what you find**  
 9 **is that a significant portion of these traveler**  
 10 **systems are actually in the Ochlockonee watershed**  
 11 **as opposed to the Flint watershed.**  
 12 **Q.** Sir, you're not saying that there is no room for  
 13 further efficiency here by converting some of the  
 14 traveler systems. Correct?  
 15 **A.** **No, ma'am; I'm not.**  
 16 **Q.** Okay. And you also speak -- and I'm not going to  
 17 belabor it here. You and Dr. Irmak speak about  
 18 different pressures, sprinklers, and nozzle heads  
 19 and some at least modest room for improvement  
 20 that still exists there. Correct?  
 21 **A.** **I believe that I mentioned that in my prefiled**  
 22 **direct, yes.**  
 23 **Q.** And, sir, you also talk in your prefiled direct  
 24 about the Mobile Irrigation Lab as a conservation  
 25 action that Georgia has taken. Correct?

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1 Georgia save approximately 965 million gallons of  
 2 water per growing season?  
 3 **A.** **I recall some type of chart along those lines in**  
 4 **his report, yes.**  
 5 **Q.** Okay. And the Mobile Irrigation Lab program also  
 6 will sometimes go out and install end-gun  
 7 shutoffs on farmers' center-pivots. Correct?  
 8 **A.** **I believe that has been one of the functions of**  
 9 **the Mobile Irrigation Lab, yes.**  
 10 **Q.** And do you recall that Dr. Irmak reported that an  
 11 additional 232 million gallons of savings  
 12 resulted in the growing season as a result of the  
 13 installation of end-gun shutoffs by the Mobile  
 14 Irrigation Lab?  
 15 **A.** **Again, I don't remember the specific numbers in**  
 16 **Dr. Irmak's report.**  
 17 **Q.** Okay. Now, based on your mapping work, you know  
 18 that almost all of the center-pivots in the Lower  
 19 Flint River Basin now have end-guns. Correct?  
 20 **A.** **The majority of center-pivots in the Flint River**  
 21 **Basin do have end-guns, yes.**  
 22 **Q.** I think it's something like 99 percent; does that  
 23 sound right?  
 24 **A.** **I -- that would not surprise me. I believe**  
 25 **that's -- that's accurate, yes.**

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- 1 **Q.** And the Mobile Irrigation Lab only visits farmers
- 2 at the request of a farmer; is that correct?
- 3 **A.** **I believe the Mobile Irrigation Lab does, in**
- 4 **fact, make visits at the request of farmers. I'm**
- 5 **also aware that the Mobile Irrigation Lab over**
- 6 **time, dating back to the early 2000's, supported**
- 7 **a number of incentive programs administered by**
- 8 **the USDA as well as the State of Georgia. And so**
- 9 **those visits to those particular farmers would**
- 10 **have been made in conjunction with those**
- 11 **incentive programs, not necessarily just at the**
- 12 **request of the farmer.**
- 13 **Q.** Do you recall that Dr. Irmak reported that only
- 14 about 560 center-pivots in all of Georgia had
- 15 been serviced or retrofitted by the Mobile
- 16 Irrigation Lab?
- 17 **A.** **I don't remember that number, no.**
- 18 **Q.** And do you know that less than half of those that
- 19 were visited were actually in the sensitive areas
- 20 of the Lower Flint River Basin?
- 21 **A.** **I don't have any recollection of exactly where**
- 22 **the Mobile Irrigation Lab has completed farm**
- 23 **visits.**
- 24 **Q.** Are you aware that there's about 10,000
- 25 center-pivots in the State of Georgia?

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- 1 **A.** **I was not aware of the percentage of those total**
- 2 **systems. I recall some number in Dr. Cyphers's**
- 3 **prefiled direct, but I don't remember exactly**
- 4 **what it was.**
- 5 **Q.** And do you recall reading that Florida has, in
- 6 fact, serviced most of those twice?
- 7 **A.** **I recall something to that effect, yes.**
- 8 **Q.** Do you know how many physical Mobile Irrigation
- 9 Labs Georgia has?
- 10 **A.** **No, ma'am; I don't.**
- 11 **Q.** Does two sound about right?
- 12 **A.** **I know that there's one stationed at the Hooks**
- 13 **Hanner Environmental Resource Center that is**
- 14 **located in Terrell County, Georgia. I know there**
- 15 **is a team stationed there. Beyond that, I'm not**
- 16 **altogether sure.**
- 17 **Q.** Did you know that Florida has 17 Mobile
- 18 Irrigation Labs?
- 19 **A.** **I don't know what all Florida has.**
- 20 **Q.** Hold on one moment, sir.
- 21 Sir, if you would for a moment, turn back to
- 22 slide 20 in your presentation. That's behind
- 23 tab 20. It's the one that we have been looking
- 24 at through the course of this portion of the
- 25 testimony. And, sir, this is just an expansion

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- 1 **A.** **I believe so, yes.**
- 2 **Q.** And about 9,000 of those center-pivots are in the
- 3 Lower Flint River Basin. Correct?
- 4 **A.** **I believe there are slightly less than 9,000**
- 5 **center-pivots in the entire ACF Basin.**
- 6 **Q.** Okay. And only 560 of those were visited by the
- 7 Mobile Irrigation Lab?
- 8 **A.** **Well, again, I'm not sure of the data that**
- 9 **Dr. Irmak was referencing. You have represented**
- 10 **to me that that was in his report. I don't know**
- 11 **the timing of that data. I don't know anything**
- 12 **about that data.**
- 13 **Q.** Do you know how many center-pivots there are in
- 14 Florida?
- 15 **A.** **Approximately, yes.**
- 16 **Q.** And what's that number?
- 17 **A.** **As I recall from Dr. Cyphers's prefiled direct,**
- 18 **there are approximately 450 or 500 pivots.**
- 19 **Q.** And you know that Florida also has a Mobile
- 20 Irrigation Lab program; don't you?
- 21 **A.** **I am aware of that, yes.**
- 22 **Q.** Do you know that in Florida's portion of the ACF
- 23 Basin the Mobile Irrigation Lab program has
- 24 inspected about 80 percent of the irrigation
- 25 systems in Florida?

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- 1 of your slide pulling up additional options under
- 2 Ag management. Okay, sir?
- 3 And you will see that the first bolded bullet
- 4 now on this slide says Emergency Powers. Do you
- 5 see that?
- 6 **A.** **I do.**
- 7 **Q.** And, sir, could you tell me what you're referring
- 8 to in that bullet?
- 9 **A.** **It's my understanding that there are certain**
- 10 **emergency powers that the State may have**
- 11 **regarding suspension of any type of water use**
- 12 **during extreme drought conditions.**
- 13 **Q.** Okay. And you were citing that as an
- 14 agricultural management option available to the
- 15 State of Georgia?
- 16 **A.** **I think what I was attempting to do in this**
- 17 **slide -- and, honestly, this presentation is --**
- 18 **actually tells a very good story about how**
- 19 **Georgia's agricultural water management has**
- 20 **evolved since 1999 or 2000.**
- 21 **The point of this slide was to say that that**
- 22 **is one potential option that is in -- within**
- 23 **Georgia's statute as a possible tool, yes.**
- 24 **Q.** And a couple bullets down you also cite statute
- 25 changes. Correct?

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1 **A. I do see that, yes.**  
 2 **Q.** And what did you mean by that?  
 3 **A. So statute changes, I believe, is something that**  
 4 **is always on the table for management of really**  
 5 **anything, not just Ag water use.**  
 6 **Q.** Okay. And, sir, the last bullet point you say,  
 7 demand management equals exposure to individuals,  
 8 dot, dot, dot, to what end?  
 9 Sir, what did you mean by that bullet?  
 10 **A. What I meant by that is agricultural water use is**  
 11 **somewhat unique. And so when there are**  
 12 **discussions of management or caps or reductions**  
 13 **to water use or anything like that, particularly**  
 14 **when it's the product of some modeling**  
 15 **assumptions or whatever, I think there's a real**  
 16 **danger in not understanding what the true impact**  
 17 **of that could be. When we talk about reducing**  
 18 **water use to agriculture, you're talking about**  
 19 **reducing water use to folks like me and my**  
 20 **neighbors. And so that impact is directly felt**  
 21 **by an individual, by a person. It's not spread**  
 22 **out over some larger entity. And so that would**  
 23 **have to be absorbed by individuals, individual**  
 24 **farmers.**  
 25 **And the point about to what end I think is**  
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1 **are abundantly good stewards of the water**  
 2 **resources within the State of Georgia. And I**  
 3 **think as we talk about some of the potential**  
 4 **strategies that could come down on Georgia**  
 5 **agriculture, I think it's just important to**  
 6 **remember that, you know, you're talking about**  
 7 **exposure to individuals.**  
 8 **Q.** And, sir, you talk about those individuals in  
 9 your prefiled direct testimony. And you say that  
 10 they are able to actually provide stability to  
 11 themselves because they can irrigate. Correct?  
 12 That's in paragraph 20 of your prefiled  
 13 direct testimony. You say, irrigation helps  
 14 provide farmers stability in yield and crop  
 15 quality. Correct?  
 16 **A. That's correct.**  
 17 **Q.** And your position is that that stability is  
 18 important to farmers. Correct?  
 19 **A. I think stability in any business is important.**  
 20 **Q.** And, sir, the oystermen in the oyster industry in  
 21 Apalachicola Bay, they don't have any ability to  
 22 stabilize their crops by pulling fresh water out  
 23 of some system. Correct?  
 24 **A. I'm not sure to the degree that fresh water is**  
 25 **impacting the stability of their -- of the**  
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1 **important. I think Georgia had -- Georgia**  
 2 **farmers have done an extraordinary job of coming**  
 3 **to the table in terms of developing Ag water**  
 4 **management strategies and practices. But I**  
 5 **think -- and not speaking for all the farmers,**  
 6 **but since I'm here in this court to at least**  
 7 **speak on my behalf, I think they want to see to**  
 8 **what degree all of this is going to benefit**  
 9 **someone else. If they're going to be exposed to,**  
 10 **you know, a much increased risk of decreased**  
 11 **yields or decreased quality or going out of**  
 12 **business, they want to see to what end.**  
 13 **Q.** And, sir, the impact that you just described to  
 14 farmers in your community, that's not much  
 15 different than the impact, for example, that can  
 16 be felt by the oystermen in Apalachicola Bay.  
 17 Correct?  
 18 **A. I don't know to the extent about impacts to**  
 19 **oystermen. I have heard of impacts to oystermen.**  
 20 **I think that agricultural water users, as I**  
 21 **said, have done an admirable job of coming to the**  
 22 **table to support the development of really good**  
 23 **Ag management practices. I think the data**  
 24 **shows -- let me rephrase.**  
 25 **I know the data shows in Georgia that farmers**  
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1 **oysters in Apalachicola Bay.**  
 2 **I'm not an expert necessarily on Apalachicola**  
 3 **Bay. I am testifying about the sustainability**  
 4 **and the stewardship of water resources in**  
 5 **Georgia.**  
 6 **Q.** Sir, the oyster industry is dependent upon the  
 7 freshwater flows that are coming down; and that's  
 8 entirely dependent on the upstream uses.  
 9 Correct?  
 10 **A. I don't know that that is necessarily correct,**  
 11 **no.**  
 12 **Q.** Sir, I would like to just finish up by addressing  
 13 some of the critiques that you outline in your  
 14 prefiled direct testimony regarding Georgia's  
 15 expert, Dr. Sunding. Do you recall those  
 16 critiques?  
 17 **A. Can you point me to a location in my direct?**  
 18 **Q.** Sure. Prefiled direct, paragraph 48.  
 19 **A. Yes, ma'am; I see that.**  
 20 **Q.** Okay, sir. And you state that you have -- you're  
 21 referencing the agricultural metering database;  
 22 and you state that you have reviewed the data for  
 23 three farms with irrigation depths above 50  
 24 inches per acre that were provided by Florida to  
 25 Georgia -- to Georgia's expert, Dr. Stavins,  
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1 during his deposition. Do you see that?

2 **A. I do see that, yes.**

3 **Q.** And you state that in those -- those instances

4 were examples of a meter measuring farmers

5 irrigating multiple fields rather than farmers

6 wasting water. Correct?

7 **A. For those specific instances that were**

8 **highlighted in the document presented to**

9 **Dr. Stavins. As I recall, there was a point**

10 **being made that some of these farmers were**

11 **irrigating more than 50 inches. I happened to**

12 **look at those three examples of the list; and for**

13 **all three of those examples, the acreage**

14 **associated with the meter was incorrect. And the**

15 **meter was actually serving more than one field,**

16 **whereas, the -- whereas, in the data that was**

17 **being used for this deposition example reflected**

18 **only one field. It necessarily showed a higher**

19 **application rate than was actually being put on**

20 **the field.**

21 **Q.** And, sir, did you actually review Dr. Sunding's

22 analysis; or did you just review these three

23 example exhibits used during the Stavins

24 deposition?

25 **A. I would not say I did a thorough review of**

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1 **have asked me about analysis Dr. Sunding did.**

2 **It's my understanding he did a lot of analyses,**

3 **and I just didn't know which one you were**

4 **referring to.**

5 **Q.** Sir, do you know that Dr. Sunding accounted for

6 whether a meter measured water that was used to

7 irrigate multiple fields?

8 **A. I'm not sure if Dr. Sunding did or not. I know**

9 **for a fact that there were at least three**

10 **instances on that exhibit that did not.**

11 **Q.** Sir, you also state in your testimony that high

12 readings from the agricultural metering database

13 could be from double-cropped acres rather than

14 wasted water. Is that right?

15 **A. It's my testimony that double-cropping or**

16 **multi-cropping can lead to irrigation depths**

17 **assigned to particular crops that would overstate**

18 **the use associated with that crop. That is my**

19 **testimony.**

20 **Q.** Did you review the source code produced by

21 Dr. Sunding?

22 **A. No, ma'am; I did not.**

23 **Q.** So you don't know whether the source code

24 accounts for any potential double-cropped acres;

25 do you?

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1 **Dr. Sunding's analysis. I looked at this**

2 **example, certainly.**

3 **Q.** Did you --

4 **A. I'm aware that it is not uncommon, depending on,**

5 **you know, the exchange of data in these databases**

6 **for meters to not be assigned exactly right to**

7 **the acreage in which they serve.**

8 **Q.** Did you review Dr. Sunding's analysis

9 sufficiently to realize that he excluded from his

10 analysis all irrigation depths greater than 50

11 inches?

12 **A. Again, ma'am, all I did was I looked at one of**

13 **the examples that was provided to Dr. Stavins.**

14 **I'm not sure what all Dr. Sunding looked at in**

15 **his analysis. I know he modeled an awful lot**

16 **of things; but, again, I'm not sure what all**

17 **Dr. Sunding did.**

18 **Q.** So the answer is, no, you don't realize that he

19 actually excluded from his analysis all

20 irrigation depths greater than 50 inches?

21 **A. Well, so I guess I should ask; in terms of which**

22 **analysis?**

23 **Q.** Sir, I'm just asking you what you looked at.

24 **A. And I believe I have testified I looked at one**

25 **exhibit that was provided to Dr. Stavins. You**

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1 **A. I did not review Dr. Sunding's source code.**

2 **Q.** Okay. Thank you, sir.

3 MR. ALLEN: Your Honor, can I suggest a

4 five-minute break before we start redirect?

5 SPECIAL MASTER LANCASTER: You can

6 suggest it, yes.

7 (Time Noted: 1:33 p.m.)

8 (Recess Called)

9 (Time Noted: 1:38 p.m.)

10 MR. ALLEN: Ready when you are, your

11 Honor.

12 REDIRECT EXAMINATION

13 BY MR. ALLEN:

14 **Q.** Mr. Masters, thank you for your time this

15 afternoon. I have a few questions for you.

16 Let's do our best to speak slowly so that

17 madam court reporter can take everything down.

18 Now, Mr. Masters, I know we talked earlier

19 briefly that you work at the Water Policy

20 Planning Center in Albany State. Can you just

21 describe for us what that institution is and what

22 it does.

23 **A. The Water Planning and Policy Center at Albany**

24 **State was developed as part of a consortium of**

25 **research institutes from a grant by the Georgia**

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1 **legislature in 1999, I believe. The overall**  
 2 **mission of the Water Policy Center is to provide**  
 3 **information, technical resources to stakeholders,**  
 4 **decision makers, policy makers in Georgia**  
 5 **concerning water use and management.**  
 6 **Q.** And, Mr. Masters, is part of the Center's work  
 7 also to work with individual farmers in the ACF  
 8 Basin?  
 9 **A.** It is.  
 10 **Q.** And what kind of work does the Center do with the  
 11 farmers in the ACF?  
 12 **A.** So over the years we have completed a number of  
 13 direct technical outreach and support projects  
 14 aimed at improving on-farm water management,  
 15 conservation planning, things of that nature. We  
 16 have also, as we have discussed already today,  
 17 supported a number of regional plans, water plans  
 18 developed in the Flint Basin in southwest Georgia  
 19 that involved a large degree of agricultural  
 20 stakeholder involvement. So there's been a lot  
 21 of work back and forth with individual farmers in  
 22 the basin.  
 23 **Q.** And how many farmers would you say that you have  
 24 worked with over the course of your career?  
 25 **A.** It's easily in the hundreds.

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1 **Q.** And in addition to the Water Policy Planning  
 2 Center, are there other institutions in or around  
 3 the ACF Basin that also work with farmers in the  
 4 ACF on water conservation?  
 5 **A.** Absolutely. So we have discussed one already  
 6 today, and that's the University of Georgia,  
 7 particularly their Stripling Irrigation Park  
 8 located in the basin. The University of Georgia  
 9 Extension Service also does a lot of work on-farm  
 10 with growers to improve irrigation and water  
 11 management. The Soil and Water Conservation  
 12 Districts, I'm -- I happen to be a supervisor in  
 13 the Lower Chattahoochee Soil and Water District.  
 14 We do some outreach projects. The Flint District  
 15 does a number of projects as well.  
 16 **Q.** Mr. Masters, as someone who lives in the ACF  
 17 Basin and has worked with hundreds of farmers in  
 18 the basin and has spent a decade or more working  
 19 with these individuals and working in the  
 20 agricultural arena, can you just tell us about  
 21 the extent and the prevalence of agriculture and  
 22 its importance to the region?  
 23 **A.** Sure. The fact of the matter is agriculture  
 24 really is the lifeblood of southwest Georgia and  
 25 the Flint River Basin. There's certainly

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1 **economic -- it's incredibly important**  
 2 **economically in terms of not just the production**  
 3 **of individual farmers, but also the industries**  
 4 **that that production supports in terms of the**  
 5 **processing of agriculture commodities and things**  
 6 **of that nature. So, certainly, jobs and**  
 7 **employment, tax base, schools are all heavily**  
 8 **dependent on Ag production in that part of the**  
 9 **world.**  
 10 **I think it's also important to understand**  
 11 **that beyond just those economic benefits, it**  
 12 **really does -- agriculture really does kind of**  
 13 **knit together the social fabric, if you will, of**  
 14 **that part of the world. It's a really good place**  
 15 **to grow agricultural commodities, and people have**  
 16 **been doing it for generations. And so I think,**  
 17 **again, just beyond that economic importance, it**  
 18 **really is just important socially to that part of**  
 19 **the world.**  
 20 **Q.** And, Mr. Masters, we're obviously talking a lot  
 21 in this case about agricultural irrigation. Can  
 22 you just explain to us why farmers in ACF Georgia  
 23 irrigate their crops?  
 24 **A.** Irrigation is, frankly, the best risk management  
 25 tool that farmers have. In southwest Georgia it

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1 **is a very good place to grow things, for sure.**  
 2 **We have a high degree of variability in our**  
 3 **soils. We grow a lot of different things. And**  
 4 **our summertime weather pattern is such that it's**  
 5 **really hard to predict. Predicting the weather**  
 6 **is tough under normal circumstance, but our**  
 7 **weather pattern during the growing season is**  
 8 **highly erratic. Irrigation allows farmers to**  
 9 **bridge those gaps where they may not receive**  
 10 **those summertime thunderstorms that crop up as in**  
 11 **the course of our normal weather.**  
 12 **Having those dry times during the growing**  
 13 **season can have a significant impact not on just**  
 14 **the yield of the crop, but also the quality. And**  
 15 **so I say it's a risk management strategy because**  
 16 **it kind of helps guarantee to the degree possible**  
 17 **that a good crop is going to be realized at the**  
 18 **end of the growing season.**  
 19 **Q.** Can you also describe for us the factors that go  
 20 into a farmer's decision about whether or not to  
 21 turn on their irrigation system on a particular  
 22 day?  
 23 **A.** Sure. And there are a lot of them. Certainly,  
 24 the growth stage of the plant, where is the  
 25 plant, the crop, in terms of its development.

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1 **That's a critical, important part of making the**  
 2 **irrigation scheduling decision.**  
 3 **Also -- and we discussed it earlier -- the**  
 4 **moisture in the soil. Is it drying out? Do we**  
 5 **need to add supplemental irrigation?**  
 6 **And then obviously farmers are going to look**  
 7 **at the forecast of rain in the future in making**  
 8 **that irrigation -- whether or not to make the**  
 9 **decision to go ahead and irrigate or not.**  
 10 **Q.** Mr. Masters, at the beginning of the growing  
 11 season does a farmer know how much water they're  
 12 going to have to apply to their crops over the  
 13 next couple months?  
 14 **A. I think that would be impossible to know at the**  
 15 **beginning of the growing season for a lot of**  
 16 **the factors that I have already talked about.**  
 17 **Farmers understand the total amount of water**  
 18 **that it's going to take to kind of get a plant**  
 19 **from, you know, planting to harvest. Knowing**  
 20 **the future about how much of that is going to**  
 21 **come from rainfall versus supplemental irrigation**  
 22 **would be almost impossible.**  
 23 **Q.** Now, Mr. Masters, Dr. Sunding, an expert for  
 24 Florida in this case, has suggested that Florida  
 25 could impose field-specific irrigation caps based

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1 on the crops being grown and the soil type and  
 2 things like that. What's your reaction to that  
 3 proposal?  
 4 **A. I think that is fine as a modeling exercise in**  
 5 **terms of estimating some potential savings from**  
 6 **farmers having and applying perfect information**  
 7 **in terms of their -- you know, all these factors**  
 8 **that go into getting a crop from planting to**  
 9 **harvest. The fact of the matter is growing a**  
 10 **crop in southwest Georgia is a textbook**  
 11 **definition of decision making with imperfect**  
 12 **information. And so I think there's a danger**  
 13 **there when assuming water savings or whatever,**  
 14 **you know, assuming we have all of this perfect,**  
 15 **nice, neat package in terms of what's actually**  
 16 **happening out in the field.**  
 17 **Q.** Mr. Masters, you were asked some questions on  
 18 cross-examination about dry-land farming and what  
 19 I'm going to call limited-irrigation farming; and  
 20 I want to ask you about those. What's your  
 21 understanding as to the circumstances under which  
 22 dry-land farming occurs in the ACF Basin?  
 23 **A. So as I mentioned earlier today, there are, in**  
 24 **fact, acres grown as dry land, without**  
 25 **irrigation. The thing I think that's important**

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1 **to understand is that those -- oftentimes those**  
 2 **dry-land acres aren't out there in a vacuum, if**  
 3 **you will. They are part of a farmer's overall**  
 4 **portfolio of production.**  
 5 **And so many times what we see is a farmer**  
 6 **will have a wide variety of acreage. Much of it**  
 7 **irrigated, some of it dry land that goes into his**  
 8 **overall portfolio of production. What I would**  
 9 **submit is there are very few examples -- I can**  
 10 **think of very few farmers that are growing crops**  
 11 **in the Lower Flint Basin purely on a dry-land**  
 12 **basis.**  
 13 **Q.** Let me ask you about that. Why do you think  
 14 there are so few examples of pure dry-land  
 15 farming in the ACF Basin?  
 16 **A. Because production under pure dry-land is**  
 17 **inherently more risky. Growing a crop is an**  
 18 **incredibly expensive proposition. And so as**  
 19 **farmers attempt to secure financing early in the**  
 20 **year to get them through from planting to**  
 21 **harvest, the lenders are also looking at their**  
 22 **portfolio of production. And they're going to be**  
 23 **looking at their risk of providing an operating**  
 24 **loan to these farmers. And so as a way to**  
 25 **mitigate their risk, it's my understanding, just**

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1 **talking to some folks I'm familiar with in the**  
 2 **basin, that lenders are becoming less and less**  
 3 **likely to provide operation financing to farmers**  
 4 **that are irrigating purely on -- farming purely**  
 5 **on a dry-land basis.**  
 6 **Q.** Let's talk about some of the limited irrigation  
 7 scenarios you were presented with. Do you  
 8 remember you were shown some charts from Shellman  
 9 Farm and some things about that and impacts on  
 10 yields from reduced irrigation. Can you just  
 11 tell us what risks do farmers face, if any, from  
 12 having to irrigate with a limited or reduced  
 13 irrigation requirement?  
 14 **A. Well, so I think that also goes back to why**  
 15 **farmers adopted irrigation in the first place.**  
 16 **It was to bridge those times of, you know,**  
 17 **reduced rainfall or dryness that are really**  
 18 **common even in normal or wet years in southwest**  
 19 **Georgia.**  
 20 **So attempting -- again, assuming we have this**  
 21 **perfect information, to impose some type of**  
 22 **limited irrigation regime sort of, I think, is --**  
 23 **is dangerously detached from what's actually**  
 24 **going on in the field in terms of farmers'**  
 25 **decisions to irrigate.**

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1 **Farmers, as a rule, are not out**  
 2 **over-irrigating their crops. It makes no sense**  
 3 **to do so.**  
 4 **Q.** Let's talk about that for a second, if we can.  
 5 Mr. Masters, in your experience do farmers in the  
 6 ACF Basin in Georgia -- do they take steps to  
 7 conserve their water use?  
 8 **A. They absolutely do.**  
 9 **Q.** Okay. And then before I ask you about what steps  
 10 they take, what incentives do these farmers have,  
 11 if any, to actually conserve their water use?  
 12 **A. So I think the first incentive is the fact that**  
 13 **irrigating is, in fact, a cost of production; it**  
 14 **is also not free to irrigate. The equipment that**  
 15 **they have installed on their farms to irrigate**  
 16 **with is very expensive. The wells or service**  
 17 **water sources that withdraw the water are**  
 18 **expensive. And there is an actual cost of**  
 19 **withdrawing water and applying it to their**  
 20 **fields.**  
 21 **And so farmers, like any sort of rational**  
 22 **agent, they're going to try to minimize their**  
 23 **cost of production. So there is an economic**  
 24 **incentive to conserve.**  
 25 **Beyond that, it doesn't make sense to drown**  
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1 **terms of things that they can do in the field to**  
 2 **conserve, we're seeing -- and as I have already**  
 3 **testified -- farmers adopted irrigation**  
 4 **scheduling tools to better understand and apply**  
 5 **water exactly when the crop needs it.**  
 6 **The final thing I would mention is**  
 7 **conservation tillage. The State's Water**  
 8 **Conservation Commission cooperates with the USDA**  
 9 **on a research farm on conservation tillage and**  
 10 **how that impacts water management. The fact is**  
 11 **we're seeing for two of our major row crops, corn**  
 12 **and cotton, a high adoption rate of conservation**  
 13 **tillage, which also saves water.**  
 14 **Q.** Mr. Masters, you were asked on cross-examination  
 15 about some of the mapping work you have done in  
 16 the ACF Basin. I just want to briefly cover that  
 17 because I think you spoke about it a lot during  
 18 your cross, and I just want to briefly cover a  
 19 couple of topics.  
 20 One is what's the purpose of that mapping  
 21 work? How is it used?  
 22 **A. So if we look back in time, we see**  
 23 **recommendations from stakeholders as well as the**  
 24 **State that we need to get better information on**  
 25 **exactly what acreage is being irrigated in the**  
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1 **your crop in water. Crops respond to water on**  
 2 **a curve, on a growth curve; and farmers**  
 3 **understand that. It can be just as harmful to**  
 4 **irrigate a crop too much as for a crop to not**  
 5 **have enough water. And so, you know, from a crop**  
 6 **development standpoint, it makes no sense to**  
 7 **over-irrigate.**  
 8 **Q.** Okay. And what specific steps do farmers take to  
 9 actually conserve water?  
 10 **A. So there are a number of them. And I think we**  
 11 **can maybe categorize them in terms of maybe**  
 12 **equipment and hardware steps. And some of those**  
 13 **we have already discussed today.**  
 14 **There are also a number of steps in terms of**  
 15 **just in-field and how they manage the growth of**  
 16 **the plant that I think are also helpful.**  
 17 **Q.** And have you actually seen these techniques  
 18 actually implemented in the ACF Basin in Georgia?  
 19 **A. Absolutely. So if we look at hardware, for**  
 20 **example, nearly 90 percent of the center-pivot**  
 21 **systems in southwest Georgia in the Lower Flint**  
 22 **Basin are already operating at low pressure. In**  
 23 **other words, they are reaching near the highest**  
 24 **percent of efficiency for center-pivot systems.**  
 25 **If we look at the other side of the ledger in**  
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1 **basin. And so our mapping efforts, first and**  
 2 **foremost, were an attempt to do that, get better**  
 3 **information about exactly where the water is**  
 4 **coming from and exactly how many acres the water**  
 5 **is being applied to. So certainly that.**  
 6 **Better information necessarily helps the**  
 7 **state as well as these regional water planning**  
 8 **councils develop better estimates of agricultural**  
 9 **demand and also informs the resource assessments**  
 10 **that are part of their Regional Water Plans.**  
 11 **Q.** All right. And how much of the irrigated acreage  
 12 in the ACF Basin has, in fact, been mapped?  
 13 **A. The Water Policy Center has mapped 100 percent of**  
 14 **the acreage in the ACF Basin.**  
 15 **Q.** All right. And we also discussed on cross some  
 16 of your field verification work. Do you recall  
 17 that?  
 18 **A. Yes, sir; I do.**  
 19 **Q.** And I want to talk about that briefly just so we  
 20 all understand what that is. Can you tell us --  
 21 what kinds of information does your team collect  
 22 when they actually go out and do these field  
 23 verifications?  
 24 **A. Sure. First thing our team members would do on a**  
 25 **field verification visit is go locate the source**  
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1 of the water and determine exactly what type of

2 source it is. Is it a groundwater well? Is it a

3 surface water withdrawal on a creek or a stream

4 or a pond? And capture any other information

5 about the source of the water that they seem --

6 that they deem relevant.

7 The second thing that they do is they capture

8 information about the exact acreage that is under

9 irrigation from a particular source. So we take

10 a GPS unit, collect points that allows us to get

11 an accurate estimate of the actual acreage being

12 wetted.

13 The third thing that we do is capture

14 information about the irrigation system. Is it a

15 center-pivot system? Is it a traveler or some

16 other type?

17 And the final thing we do is capture

18 information about the flowmeter. We locate the

19 flowmeter, take a reading at the meter. And any

20 information that we think would be helpful to the

21 Soil and Water Commission as they work through

22 their metering program, we provide that back to

23 them.

24 Q. And, Mr. Masters, if you would explain to us, if

25 you could, the extent of this field mapping

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1 and your field verification work, have you

2 noticed any particular trends in irrigation --

3 excuse me, in irrigated acreage over time?

4 A. Yes, sir; I have.

5 Q. What trend have you noticed?

6 A. In terms of the source of water, for example. So

7 we talked about how we go and locate the source.

8 Over time, over the last five, six, seven years

9 we have noticed a trend away from acreage being

10 irrigated with surface water sources towards

11 acres -- that same acreage being irrigated from

12 groundwater sources. And it's about 30 to 35,000

13 acres in the Flint Basin that is now being

14 irrigated by groundwater sources that was surface

15 water.

16 Q. And was that trend significant to you?

17 A. I believe it is significant, yes.

18 Q. Why is that?

19 A. In terms of impact to the stream, a stream

20 withdrawal is a direct one-to-one impact. If I

21 take a gallon out to irrigate, that's a gallon

22 that's no longer in the stream at that location.

23 Groundwater withdrawals are somewhat less

24 impactful. Depending on the location, they could

25 have little to no impact at all.

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1 effort. How much acreage has been mapped --

2 field verified, and where is it?

3 A. So we have field-verified hundreds of thousands

4 of acres in the Flint River Basin.

5 Q. Just so I'm clear, this is people on the ground

6 at the field. Correct?

7 A. Field verified means my team has gone to the

8 field and touched the system and captured

9 information about the system and all of the

10 attributes about that particular field. So it's

11 easy -- we have easily accounted for, you know,

12 several hundred thousand acres in the Flint River

13 Basin.

14 I think it's important to understand exactly

15 where we have done that work. So we have seen a

16 map of the Lower Flint with capacity use areas

17 and restricted use areas, the red and yellow and

18 green map. We have field-verified 100 percent of

19 the acreage in that region in Georgia. We have

20 also field-verified all of the surface water use

21 in that part of Georgia. And so I think it would

22 be accurate to say that we have field-verified

23 all of the acreage in the Lower Flint that has

24 the potential to impact streamflow.

25 Q. Mr. Masters, in doing your aerial mapping work

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1 Q. Okay.

2 MR. ALLEN: Your Honor, I want to ask

3 Mr. Masters about a demonstrative he was

4 shown. I have some others.

5 Might I approach him with a binder of a

6 couple documents?

7 SPECIAL MASTER LANCASTER: Sure.

8 BY MR. ALLEN:

9 Q. Now, Mr. Masters, if you would turn with me to

10 tab 1 of your binder.

11 A. Yes, sir.

12 Q. You will see we have reproduced a copy of a

13 demonstrative you were shown during your

14 cross-examination. Do you remember seeing this?

15 A. Yes, sir; I do remember that.

16 Q. And, Mr. Masters, have you undertaken an exercise

17 to in some way verify or evaluate the numbers

18 that were in this table?

19 A. Did I perform an analysis to try and recreate the

20 numbers that are shown on this chart? Yes.

21 Q. And what did that analysis show?

22 A. Well, the first thing that I was able to

23 determine is that over 400, around 440 of the

24 permits that are shown in this table are, in

25 fact, listed in the Georgia EPD database as

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1 **inactive.**

2 **Q.** Mr. Masters, before you get too far down the

3 line, I just want to be clear. The first time

4 you saw this table was during the course of this

5 trial. Correct?

6 **A. Yes, sir. That is correct.**

7 **Q.** I believe it was after it was shown to Dr. Cowie;

8 does that sound right?

9 **A. Yes, sir. That is correct.**

10 **Q.** Okay. And back to your analysis, I believe you

11 said that you identified some number of these

12 permits that are inactive, I believe?

13 **A. Yes, sir. I determined that around 440 of the**

14 **permits in this table are listed in the EPD**

15 **database as inactive.**

16 **Q.** Have you undertaken any other kind of analysis

17 with respect to these permits?

18 **A. I have. As I mentioned to Ms. Wine earlier, I**

19 **can see the number of permits; but I think it's**

20 **also important to understand where those permits**

21 **are in the basin. Just this number of permits**

22 **doesn't really tell much of a story.**

23 **Q.** And why is it important to know where they are?

24 **A. Because where those permits are has an impact on**

25 **whether or not the acreage associated with those**

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1 **permits is impacting streamflows.**

2 **Q.** All right. So if we turn to tab 2, sir, is this

3 a demonstrative that you helped create, sir?

4 **A. Yes, sir; it is.**

5 **Q.** And what's being depicted here?

6 **A. So as I looked at the permits that have been**

7 **issued since 2000 and looked at where they are --**

8 **because, again, where they are is critically**

9 **important -- I determined right away that over**

10 **84 percent of those new permits are in**

11 **conservation use areas or areas outside of the**

12 **Lower Flint River Basin.**

13 **Q.** Let me stop you right there. Is that significant

14 to you?

15 **A. Yes, sir. I believe it is significant.**

16 **Q.** Why?

17 **A. Because as a result of the 2006 sound -- Flint**

18 **River Plan, the culmination of that seven-year**

19 **Sound Science Study, the modeling suggested that**

20 **withdrawals in these conservation use zones had**

21 **little to no impact on the actual streamflow.**

22 **Q.** And, sir, if you look, you identified some

23 number of permits that are in the red zones;

24 and those have been broken out between the red

25 slice of the pie and what I call the pink slice

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1 of the pie. Do you see that?

2 **A. Yes, sir; I do.**

3 **Q.** Can you describe for us what we're looking at

4 there.

5 **A. So of the permits issued in the capacity use**

6 **zones, so the red zones, around 239 of them were**

7 **either for backlogged permits that were issued as**

8 **a result of the 2006 plan or they were permits**

9 **that were issued for aquifers other than the**

10 **Upper Floridan, which is important because those**

11 **other aquifers, in terms of the best available**

12 **science to date, show that there's really little**

13 **to no impact on streamflow from those aquifers.**

14 **So if we look at the total universe of**

15 **permits from the capacity use areas issued since**

16 **2000, the bulk of them are either backlogged**

17 **permits which were issued consistent with**

18 **Georgia law in the 2006 plan or for aquifers**

19 **other than the Upper Floridan.**

20 **Q.** Thank you, Mr. Masters. I want to shift topics

21 and talk about the types of irrigation systems

22 that are used in the ACF Basin. You were asked

23 on cross some questions about the prevalence of

24 center-pivots and traveler systems. Do you

25 recall that?

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1 **A. Yes, sir; I do.**

2 **Q.** And have you looked at how the prevalence of

3 those systems have changed over time?

4 **A. Yes, sir; I have.**

5 **Q.** And what did that show you?

6 **A. So if we look at the -- again, thinking about all**

7 **of our field-verified acreage, there is a**

8 **definite trend away from fields irrigated by**

9 **traveler systems. In the Lower Flint Basin**

10 **itself, the actual watershed, we have seen almost**

11 **a 50 percent reduction in acreage irrigated by**

12 **travelers. We have also seen an increase in the**

13 **acreage, again in the Flint Basin itself, of -- I**

14 **think it was between 20 and 25 percent of acreage**

15 **irrigated by center-pivots.**

16 **Q.** And just roughly, what's the difference in

17 efficiency between a center-pivot and a traveler

18 system?

19 **A. I think, all else being equal, traveler systems**

20 **are assumed to be somewhere around 50 to 60**

21 **percent efficient. Center-pivot irrigation**

22 **systems, like the ones that are so prevalent in**

23 **southwest Georgia, in terms of their technology**

24 **are assumed to be 85 to 90 percent efficient.**

25 **Q.** All right. Mr. Masters, now, are all

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1 center-pivots -- do they all come alike in terms  
 2 of efficiency?  
 3 **A. No, sir; they do not.**  
 4 **Q.** And if you look at demonstratives 3, 4, and 5 in  
 5 your binder, there are pictures of different  
 6 types of center-pivot systems. And I would ask  
 7 if you could just briefly walk us through each of  
 8 these starting with tab 3, and tell us what we're  
 9 looking at there.  
 10 **A. Certainly. So on tab 3 of the binder, this is a**  
 11 **somewhat typical irrigation system in southwest**  
 12 **Georgia that is operating at low pressure and has**  
 13 **been installed with drop nozzles. The reason**  
 14 **that is significant is the low pressure and**  
 15 **getting the water closer to the ground helps**  
 16 **prevent wind drift, in other words, wind blowing**  
 17 **the water out from where it needs to go, which is**  
 18 **to the crop, or evaporative loss. It gets the**  
 19 **water closer to the ground where the -- where it**  
 20 **can get to the beneficial use of the crop rather**  
 21 **than evaporate.**  
 22 **Q.** And what kind of system is in tab 4?  
 23 **A. In tab 4 this is an example of a low-pressure**  
 24 **irrigation system but where the water is emitted**  
 25 **from the top of the actual hardware itself. So**

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1 of efficiency rates?  
 2 **A. So, certainly, if we work backwards from tab 5,**  
 3 **the high-pressure irrigation systems have a lower**  
 4 **efficiency than do these other lower pressure**  
 5 **systems. I have seen literature that suggests**  
 6 **high-pressure irrigation systems are 70 to 75**  
 7 **percent efficient.**  
 8 **As we move back up through tabs 4 and 3,**  
 9 **those low-pressure drop-nozzle systems, I have**  
 10 **seen literature suggest they can be as high as 95**  
 11 **percent efficient. I think a good range would be**  
 12 **85 to 90 percent efficient.**  
 13 **Q.** And, Mr. Masters, as part of the field  
 14 verification, on-the-ground work that you did,  
 15 has your team identified rates of adoption with  
 16 respect to low-pressure systems and high-pressure  
 17 systems and other types of center-pivots?  
 18 **A. Yes, sir; we have.**  
 19 **Q.** And, sir, if you look with me at tab 6, is this  
 20 something you all put together, sir?  
 21 **A. Yes, sir; it is.**  
 22 **Q.** And can you tell us what's being shown here?  
 23 **A. Yes, sir. So in tab 6 there is a pie chart**  
 24 **detailing both the number and the percentage of**  
 25 **the center-pivot systems that we field-verified**

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1 **instead of having a big sprinkler on top, it's a**  
 2 **small little nozzle that just emits the water.**  
 3 **And you can see it just sort of showers down**  
 4 **around the actual hardware itself. Again,**  
 5 **operating at low pressure, helping prevent loss**  
 6 **from, you know, the wind blowing the water out of**  
 7 **the field and also helps reduce evaporative loss**  
 8 **as well.**  
 9 **Q.** And what about tab 5?  
 10 **A. So in tab 5 we see irrigation -- an irrigation**  
 11 **system that is an example of a high-pressure**  
 12 **impact type irrigation system. And so you**  
 13 **can see there is also an end-gun installed on**  
 14 **this particular example. So you can see right**  
 15 **away that this irrigation system is actually**  
 16 **throwing water much higher into the air. It**  
 17 **operates at a much higher pressure in order**  
 18 **to make those sprinklers actually work. And**  
 19 **you do have an increased likelihood of**  
 20 **evaporative loss because you're throwing water**  
 21 **so much higher in the air, and you also have a**  
 22 **more of a chance of that water getting blown**  
 23 **out of the field by wind.**  
 24 **Q.** And just generally, Mr. Masters, how do these  
 25 three systems compare with one another in terms

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1 **in the Lower Flint. So we accounted for nearly**  
 2 **4800, approaching 5,000 center-pivot systems.**  
 3 **We went out and actually touched them in these --**  
 4 **in these heavily Ag use areas of southwest**  
 5 **Georgia.**  
 6 **What we found is that almost 90 percent of**  
 7 **the center-pivot irrigation systems in southwest**  
 8 **Georgia are utilizing low-pressure technology.**  
 9 **Q.** And is that significant to you, sir?  
 10 **A. It is significant. We have discussed that the**  
 11 **low-pressure technology and certainly the**  
 12 **low-pressure drop technology which you see is**  
 13 **actually installed on approaching 3,000**  
 14 **center-pivot irrigation systems, or about 60**  
 15 **percent is a higher efficiency. There is less**  
 16 **loss from those systems as opposed to the**  
 17 **high-pressure systems, which accounts for only**  
 18 **about 10 percent of the systems in south Georgia.**  
 19 **Q.** And, sir, can you look at tab 7. It's a similar  
 20 pie chart, but it's a little different. Can you  
 21 explain to us what's being shown in tab 7?  
 22 **A. Yes, sir. So what is in tab 7 is a subset of the**  
 23 **data that was in tab 6. So we have talked a lot**  
 24 **about capacity use areas, the red zones, in**  
 25 **southwest Georgia. Those are the areas that the**

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1 **Sound Science Study suggested that -- where**  
 2 **pumping had the most impact on streamflow.**  
 3 **So if we really drilled down to just those**  
 4 **regions -- and I would remind you that we have**  
 5 **actually field-verified 100 percent of those**  
 6 **systems. If you drill down, what you find is**  
 7 **that 93 percent of the irrigation systems are**  
 8 **operating with low-pressure technology; and about**  
 9 **60 percent of those using the low-pressure drops**  
 10 **that we saw in tab 3, I believe.**  
 11 **Q.** Thank you, Mr. Masters. I want to talk about a  
 12 different topic.  
 13 You can set your binder aside. We're done  
 14 with that.  
 15 Mr. Masters, you were asked, I think, a  
 16 question or two about the agricultural metering  
 17 program. Do you remember that?  
 18 **A. Yes, sir; I do.**  
 19 **Q.** What is that program?  
 20 **A. The agricultural metering program was a result of**  
 21 **legislation adopted by the Georgia General**  
 22 **Assembly in 2003. Pursuant to that legislation,**  
 23 **the Georgia Soil and Water Conservation**  
 24 **Commission began installing flowmeters on all**  
 25 **permitted agricultural withdrawals in the State**

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1 was the ACFS Sustainable Water Management Plan.  
 2 **A. Yes, sir.**  
 3 **Q.** And, sir, can you just describe for us what the  
 4 final recommendations were that were included in  
 5 the ACF Sustainable Water Management Plan?  
 6 **A. Well, sir, there were a number of recommendations**  
 7 **as part of that plan, to be sure. I would say**  
 8 **that the bulk of the recommendations that the**  
 9 **stakeholders approved by consensus that they**  
 10 **determined made the basin better off as a whole**  
 11 **were related to the operation of the system by**  
 12 **the Corps of Engineers. And so there was a suite**  
 13 **of recommendations; and I believe, as I mentioned**  
 14 **to Ms. Wine, that the stakeholders were clear**  
 15 **that it was in fact a suite and not a menu of**  
 16 **things to pick and choose from.**  
 17 **The suite of recommendations focused on**  
 18 **essentially storing more water through changes in**  
 19 **management during times when the water was**  
 20 **available. So, for example, changing the rule**  
 21 **curve at West Point Lake, having the Corps of**  
 22 **Engineers better coordinate their releases in**  
 23 **relation to some of their action zones. There**  
 24 **was a recommendation regarding tweaks to**  
 25 **hydropower releases; and there was, in fact --**

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1 **of Georgia.**  
 2 **Q.** And do you know how many meters have been  
 3 installed statewide?  
 4 **A. I believe the commission has installed over**  
 5 **12,000 flowmeters statewide.**  
 6 **Q.** And just in the ACF Basin, do you know that  
 7 number?  
 8 **A. I believe it's around 6,000.**  
 9 **Q.** And do you know what percentage of irrigation  
 10 systems in the Lower Flint River Basin are  
 11 metered?  
 12 **A. In the Lower Flint River Basin approximately 77**  
 13 **percent, 78 percent of the systems are metered.**  
 14 **And if you look at that in terms of the acreage,**  
 15 **it's a little more than 80 percent of the acreage**  
 16 **is metered.**  
 17 **Q.** And, sir, just so we're clear, how do you know  
 18 that?  
 19 **A. Because my team has gone and located those meters**  
 20 **and touched those irrigation systems; and we have**  
 21 **determined those percentages not by an estimate,**  
 22 **but by actually going and collecting the data.**  
 23 **Q.** All right. Mr. Masters, I want to end by going  
 24 back to a topic we discussed at the very  
 25 beginning of your cross-examination. And that

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1 **given all of these other recommendations that**  
 2 **helped to store water, there was also a**  
 3 **recommendation that certain pulse flows be sent**  
 4 **down into the Apalachicola River during certain**  
 5 **periods of the year.**  
 6 **Q.** Mr. Masters, I believe you mentioned that the  
 7 bulk of the recommendations, some of them applied  
 8 to the Corps. Right?  
 9 **A. Yes, sir. That is correct.**  
 10 **Q.** Do you have an understanding as to why that was?  
 11 **A. I think the stakeholders realized through seven**  
 12 **years of really hard deliberative work and a lot**  
 13 **of technical work that in order to make the**  
 14 **basin better off as a whole, they set up a bunch**  
 15 **of performance metrics; and they -- that sort**  
 16 **of guided their management decisions. They**  
 17 **realized that in order to achieve a better**  
 18 **basin across the board, including downstream,**  
 19 **you can't extract the Corps of Engineers. The**  
 20 **fact of the matter is in order to achieve similar**  
 21 **performance metric goals downstream, one would**  
 22 **have to make significant cuts to consumptive use.**  
 23 **And in some cases you would have to cut all**  
 24 **consumptive use in order to achieve similar**  
 25 **performance metrics.**

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1 **Q.** Thank you, Mr. Masters.  
 2 MR. ALLEN: No further questions.  
 3 SPECIAL MASTER LANCASTER: Ms. Wine?  
 4 MS. WINE: Just briefly, your Honor, a  
 5 housekeeping item. I need to correct for the  
 6 record the exhibit number of tab 20 in the book  
 7 that I gave Mr. Merit -- Mr. Masters, which  
 8 was his presentation -- slide presentation  
 9 that we looked at. I said that it was  
 10 Exhibit FX-908. It is actually FX-910. I  
 11 just wanted to clarify that for the record.  
 12 SPECIAL MASTER LANCASTER: Thank you.  
 13 RE-CROSS-EXAMINATION  
 14 BY MS. WINE:  
 15 **Q.** Mr. Masters, I think I just heard about three  
 16 different analyses from you for which we have no  
 17 documentation. And I just want to make sure I'm  
 18 clear.  
 19 So, first, Georgia's counsel just asked you  
 20 about your field verification. Do you recall  
 21 that?  
 22 **A. Yes, ma'am; I do.**  
 23 **Q.** And, sir, are you aware that no documents have  
 24 been produced to Florida regarding your field  
 25 verification process?  
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1 **except for what is shown in tab 2 which, in fact,**  
 2 **is the results -- a summary of the analysis that**  
 3 **I performed regarding the information in tab 1.**  
 4 **Q.** Okay. And sticking with tab 1 for a moment, you  
 5 mentioned some inactive permits; is that correct?  
 6 **A. Yes, ma'am.**  
 7 **Q.** Did you check whether those supposedly inactive  
 8 permitted areas were actually being irrigated  
 9 against your Ag watering database?  
 10 **A. No, ma'am. What I did in this analysis was I**  
 11 **looked exclusively at the database that I believe**  
 12 **your team used to develop this table in tab 1,**  
 13 **which is the EPD permit database. And I removed**  
 14 **all of the permits that EPD had classified for**  
 15 **one reason or another -- they were either revoked**  
 16 **or never installed or whatever -- as inactive. I**  
 17 **removed those because, you know, I felt that was**  
 18 **the thing to do.**  
 19 **Q.** Well, sir, there is a chance that the permitting  
 20 database is not 100 percent complete or up to  
 21 date. Correct?  
 22 **A. I believe that the permit database has changes to**  
 23 **it made on a regular basis.**  
 24 **Q.** And so --  
 25 **A. What I can tell you, however, is when I looked**  
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1 **A. Honestly, ma'am, I'm not sure what all has been**  
 2 **provided to the State of Florida. It's my**  
 3 **understanding that all of the data that was**  
 4 **collected as part of the discovery, which would**  
 5 **have necessarily included all of that field**  
 6 **verification work, was turned over. I -- that's**  
 7 **the extent of my knowledge about what you may or**  
 8 **may not have.**  
 9 **Q.** So you're not aware that Georgia's counsel  
 10 refused to produce that to us?  
 11 **A. I'm not aware of anything of the sort.**  
 12 **Q.** Okay. And, sir, in relation to tab 1 of the  
 13 binder that Georgia's counsel just gave you, you  
 14 said you did an analysis of the permits that were  
 15 issued post-2006. Correct?  
 16 **A. I believe I looked at an analysis of permits**  
 17 **post-2000 as well as 2006.**  
 18 **Q.** Okay.  
 19 **A. Yes.**  
 20 **Q.** Thank you. And you have not produced that  
 21 analysis to us; have you?  
 22 **A. I'm not sure what has been produced.**  
 23 **Q.** Okay. We don't even have the results of your  
 24 analysis here. Correct?  
 25 **A. I don't believe there's a chart or anything**  
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1 **at the results that you showed to Dr. Cowie and**  
 2 **that you showed me earlier today, when I used**  
 3 **that same database, I find that 440 of the**  
 4 **permits were inactive; and I find that less than**  
 5 **1 percent of them are Upper Floridan capacity use**  
 6 **withdrawals permitted since 2006.**  
 7 **Q.** Well, sir, we went ahead and double-checked these  
 8 supposedly inactive permitted acres against your  
 9 wetted acreage database and found that most were  
 10 actually being irrigated right now. You have no  
 11 reason to dispute that. Correct?  
 12 **A. Again, ma'am, I'm telling you that I have not**  
 13 **done an analysis beyond trying to replicate what**  
 14 **you all showed Dr. Cowie and then showed me**  
 15 **earlier today. I have not done any analysis**  
 16 **beyond that regarding wetted acreage or anything**  
 17 **of the sort.**  
 18 **Q.** Now, sir, if you turn to tab 2 in the binder that  
 19 Georgia's counsel just gave you, sir, you have  
 20 not produced to us any of the analysis that you  
 21 did that supports this chart, correct, or this  
 22 graph or whatever you want to call it?  
 23 **A. Again, I -- I can't speak to what has been**  
 24 **produced to you.**  
 25 **Q.** Now, sir, you are not a hydrologist. Correct?  
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1 **A. No, ma'am; I'm not.**

2 **Q.** So you don't know whether there's an impact from

3 agricultural pumping on the Claiborne Aquifer

4 north of sub-area 4. Correct?

5 **A. I am not aware of specific impacts to the**

6 **Claiborne Aquifer.**

7 **I know that the State of Georgia has engaged**

8 **in a number of studies looking at the sustainable**

9 **yield of the Claiborne. And I recall that those**

10 **studies during the first round of planning**

11 **suggested that there was sustainable yield in the**

12 **Claiborne.**

13 **Q.** But, sir, you can't speak to whether and the

14 amount of impact there is on the Claiborne

15 Aquifer north of sub-area 4 particularly where

16 that aquifer is shallow. Correct?

17 **A. Ma'am, I -- as you pointed out, I'm not a**

18 **hydrologist. I'm just understanding the data**

19 **that I was shown as part of the first round of**

20 **water planning.**

21 **Q.** Sir, were you in the courtroom when Mr. Mayer was

22 testifying just before you?

23 **A. I saw what I believe was the -- somewhat the tail**

24 **end of Mr. Mayer's examination, yes.**

25 **Q.** Did you hear him say that cost is a very

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1 **A. I am.**

2 **Q.** You're aware that farmers can get crop insurance?

3 **A. I am aware that farmers can get crop insurance,**

4 **yes.**

5 **Q.** And that might be federally-backed crop

6 insurance. Correct?

7 **A. That's true.**

8 **Q.** And you're aware that in the Flint River Drought

9 Protection Act, farmers would have been bought

10 out to stop irrigating and stop farming?

11 **A. I am aware that the Flint River Drought**

12 **Protection Act had an auction provision in it**

13 **that would have reimbursed farmers for not**

14 **irrigating based on an auction.**

15 **Q.** Okay. And sticking with this concept of risk

16 management, does irrigation in Georgia limit the

17 risk to the oyster industry in Apalachicola Bay?

18 **A. I'm not sure to the degree that I can speak to**

19 **the risk of oysters in Apalachicola Bay.**

20 **Q.** Do you think irrigation in Georgia limits the

21 risk to the fish and wildlife in the Apalachicola

22 River?

23 **A. I don't know that I can speak to that.**

24 **Q.** Thank you, sir.

25 MR. ALLEN: Your Honor, we have no

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1 important driver of demand when it comes to

2 water?

3 **A. I recall that statement, yes.**

4 **Q.** And did you take that to mean that if you charge

5 more for water, demand may go down?

6 **A. I recall that was the context in which Mr. Mayer**

7 **was speaking, yes.**

8 **Q.** And, sir, farmers in the Georgia ACF are not

9 charged anything for their water. Correct?

10 **A. Farmers do not pay a fee for water, no.**

11 **Q.** Okay.

12 **A. I would --**

13 **Q.** So you --

14 **A. -- say with regard to my other testimony that, in**

15 **fact, pumping water and having the ability to**

16 **pump that water is not free, certainly.**

17 **Q.** Sure. But they don't have to pay for the water

18 itself?

19 **A. That is correct.**

20 **Q.** Now, sir, you mentioned at the outset of your

21 redirect that irrigation is the best risk

22 management tool that farmers have. Correct?

23 **A. I believe that is true, yes.**

24 **Q.** And, sir, you're aware of other risk management

25 tools that farmers have. Correct?

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1 further questions.

2 SPECIAL MASTER LANCASTER: Mr. Masters,

3 there is no reason why you should know; but

4 do you know anything about Aroostook County,

5 Maine?

6 THE WITNESS: No, sir; I do not.

7 SPECIAL MASTER LANCASTER: Or its

8 products?

9 THE WITNESS: Not specifically, no.

10 SPECIAL MASTER LANCASTER: Or farming up

11 there?

12 THE WITNESS: No, sir; I do not.

13 SPECIAL MASTER LANCASTER: Or Veazie,

14 Maine?

15 THE WITNESS: Sir?

16 SPECIAL MASTER LANCASTER: Veazie,

17 Maine.

18 THE WITNESS: No, sir, I do not.

19 SPECIAL MASTER LANCASTER: Where my

20 grandparents had a two-holer, but no app?

21 THE WITNESS: That's --

22 SPECIAL MASTER LANCASTER: You don't

23 know anything about that?

24 THE WITNESS: I have heard plenty of

25 stories.

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1 SPECIAL MASTER LANCASTER: Let me ask  
 2 you what, if anything, you know about Battle  
 3 Bend?  
 4 THE WITNESS: Yes, sir. I have traveled  
 5 down the Apalachicola River. I have -- I  
 6 don't know anything about Battle Bend  
 7 specifically. It was pointed out to me on a  
 8 trip down the river one time. That's the  
 9 extent of my knowledge.  
 10 SPECIAL MASTER LANCASTER: And you're  
 11 not a hydrologist?  
 12 THE WITNESS: No, sir.  
 13 SPECIAL MASTER LANCASTER: So you  
 14 couldn't comment on what would happen if the  
 15 river flowing -- if Battle Bend were  
 16 rerouted -- the river flowing to Battle Bend  
 17 were rerouted?  
 18 THE WITNESS: No, sir. I -- I don't  
 19 have any information about that.  
 20 MR. ALLEN: Nothing further, your Honor.  
 21 MS. WINE: Nothing further, your Honor.  
 22 SPECIAL MASTER LANCASTER: Thank you  
 23 very much.  
 24 THE WITNESS: Thank you.  
 25 MR. ALLEN: Your Honor, that's our final

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1 We're recessed until Tuesday.  
 2 (Time Noted: 2:25 p.m.)  
 3 (Proceeding adjourned to Tuesday,  
 4 November 29, 2016, at 9:00 a.m.)  
 5 (End of day)  
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1 witness for today. We would suggest that we  
 2 adjourn for the Thanksgiving holiday and  
 3 return next Tuesday.  
 4 SPECIAL MASTER LANCASTER: We will do  
 5 that shortly. But before we do, let me just  
 6 tell you all that last night on television I  
 7 was watching the snow fall in northern New  
 8 York. It was over 2 feet and still snowing.  
 9 Now, it's a bad thing for Maine; but  
 10 it's a good thing for us that our drought in  
 11 southern Maine is predicted to last until  
 12 February. So, hopefully, we won't have that  
 13 to deal with.  
 14 However, just in case, I would suggest  
 15 that because Black Friday is coming up, you  
 16 look on the L. L. Bean website, get yourself  
 17 some earmuffs, and certainly, certainly some  
 18 L. L. Bean boots. I don't think you will  
 19 need snowshoes, but you will need boots.  
 20 That's my advice.  
 21 We will adjourn until Tuesday. I wish  
 22 everyone a very, very happy Thanksgiving.  
 23 And, Mr. Perry and Mr. Primis, if I  
 24 could see you for just a second before we  
 25 break.

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CERTIFICATE

1 I, Claudette G. Mason, a Notary Public  
 2 in and for the State of Maine, hereby certify  
 3 that the foregoing pages are a correct  
 4 transcript of my stenographic notes of the  
 5 Proceedings.  
 6 I further certify that I am a  
 7 disinterested person in the event or outcome  
 8 of the above-named cause of action.  
 9 IN WITNESS WHEREOF, I subscribe my hand  
 10 this 12th day of December, 2016.  
 11  
 12  
 13  
 14  
 15 /s/ Claudette G. Mason  
 16 Claudette G. Mason, RMR, CRR  
 Court Reporter  
 17 My Commission Expires  
 18 June 9, 2019.  
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