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SC Court of Appeals

STATE OF SOUTH CAROLINA
IN THE COURT OF APPEALS

APPEAL FROM ADMINISTRATIVE LAW COURT
Shirley G. Robinson, Administrative Law Court Judge

Appellate Case No. 2022-001179

KDP II, LLC Appellant,

v.

South Carolina Department of Health and Environmental Control.....Respondent.

**RECORD ON APPEAL
VOLUME II OF IV**

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1 picked the crest of the primary dune. In
2 other words, if this is the first dune before
3 the ocean, I've looked at the profiles, and I
4 said, what is this doing? Because it
5 actually -- I came off of a spreadsheet where
6 you could go up, you could follow all the way
7 up to the very first peak off the beach. It
8 was about 10 and a half feet above sea level.
9 I'd go to that and then I would look over
10 time each year, what was that doing? And
11 what we found, without a doubt, was that this
12 was actually moving in a seaward direction,
13 that the dune field's building out until
14 about 2015 when we had some storms and of
15 course we had -- you know, then we had
16 Matthew and Irma and it cut back. And then
17 we went back again in 2020 and sure enough
18 there's another primary dune, another
19 foredune ridge that's being built up.

20 Q: Well, you used two words there. You talked
21 about primary dune and foredune ridge. Is
22 there a distinction?

23 A: Well there's a -- maybe a regulatory
24 distinction with respect to -- OCRM has a
25 definition for primary dune, but I guess the



1 geological term you would use is a foredune
2 ridge.

3 Q: And where's the foredune ridge on that ---

4 A: This would be ---

5 Q: --- beach cross section profile?

6 A: This would be the very first dune, right
7 here.

8 Q: All right.

9 A: That's the foredune ridge. And if you go out
10 to a beach, you usually walk up on that, and,
11 of course, they have signs that say stay off
12 the dunes. So, maybe you find a path to be a
13 good citizen. But you go out and you see the
14 big sea oats. That they're very scenic and
15 very pretty. And a lot of people take
16 pictures of the sun setting with the sea oats
17 in the foreground and things. But that's
18 what you see on the top of this primary dune.

19 Q: When you were doing your analysis to
20 determine what was going on with the
21 shoreline, did you analyze the beach profile
22 data from monuments 2620 and 2625 that was
23 available?

24 A: Yes, I did.

25 Q: All right. And we're going to come back to



1 that. So, you looked at the monument data.
2 Did you do your own independent assessment?

3 A: Correct. I took OCRM's profile data and I
4 made an independent assessment of whether --
5 the foredune ridge is a proxy -- whether it
6 was moving seaward or landward.

7 Q: All right. And we're going to come back to
8 that. But did you do another methodology in
9 order to determine if the -- the movement of
10 the shoreline?

11 A: Yes. And one of the things I mentioned, Your
12 Honor, was the presence of vegetation. And
13 this is something I think you'll hear a lot
14 about in this case. And I went to the very
15 first appearance of what we call stable
16 rooted vegetation on the -- off the beach.
17 And, again, that's because you're above that
18 water -- salt water table. Your environment
19 where there's a little bit of fresh water in
20 the sediment, in the sand, and these plants
21 are very hearty and they can live there, and
22 that they're very sensitive to those
23 conditions. So if the beach is accreting,
24 that vegetation will move in a seaward
25 direction. If it's eroding, you know, well,



1 you might not see it at all, or it would move
2 in a landward direction. Say you might not
3 see it at all, because you might have a
4 scarp. And then, of course, there'd be
5 vegetation on top of a scarp, maybe but my
6 point is, is that the vegetation is a really
7 good indicator for whether the shoreline is
8 eroding or accreting. And in the literature,
9 it's, you know, been well documented, if you
10 look at the appearance of vegetation on the
11 beach. And I think that's the important
12 thing. We'll probably get into this a little
13 bit later about the density, how much
14 vegetation is enough and that kind of thing.
15 We may talk about that, but ---

16 Q: Is that vegetation the shoreline?

17 A: No, no. The vegetation is what we call a
18 proxy. It's an indicator for the shoreline.
19 The actual shoreline is right down here. And
20 so if this vegetation moves seaward, then,
21 you know, we're saying that the beach's
22 building out. It's accreting if this
23 vegetation disappears or moves landward, then
24 we're saying it's eroding. But the important
25 thing is that this is a proxy for the



1 shoreline. So proxy just means it's an
2 indicator, because it -- say you've got two
3 tides a day out here high and low. And if
4 you go look at the wet/dry beach, the part of
5 the beach where the tide rushes up, and it's
6 a little bit darker and discolored, all that
7 tells you is what's the uprush of waves in
8 the last high tide. And with two tides a day
9 and 30 days in a year, there's 60 different
10 tides, each one is in a different location.
11 It's not all the same. And from -- because
12 of the gravity from the sun and the moon and
13 because of waves, because of temperature of
14 the water, there are a number of --
15 atmospheric pressure, they're a whole bunch
16 of factors that go into where the tide is.
17 And so each tide basically is in a different
18 position on the beach. So, this has kind of,
19 I guess, bedeviled coastal scientists for
20 many, many years to say, okay, well, where
21 can we pick a position for the shoreline? We
22 really can't. We know that there's a zone
23 here. We call it the intertidal, from the
24 high tide to the low tide. But essentially
25 you can't pick out one spot and say -- on the



1 beach that's wet/dry and say this is the
2 shoreline. So what -- this is a very useful
3 indicator, the vegetation is a very useful
4 indicator. The other thing, and I need to
5 say this too, is that oftentimes along the
6 beach, there are very short-term changes in
7 the elevation of the beach, very minor, they
8 come and go. And so it's also well
9 documented in the literature, that when you
10 try to go out to look at, say, mean high tide
11 or go out and measure that, that might change
12 again because of short -- over really short
13 terms, over a few weeks, over a month or
14 something. So consequently, that -- using,
15 say, mean high tide is not the -- is really
16 not that good for looking at longer term
17 changes. It's too sensitive at being
18 subjected to short term changes. Like if one
19 of these ridge and runnels comes up to where
20 your mean high tide is, all of a sudden
21 there's a trough right there. And so your
22 measurement may be different. And actually I
23 did some calculations on the beach at Kiawah
24 from these OCRM profiles, and if you change
25 the elevation three inches, out on the



1 intertidal beach out there, we're talking
2 about a 30-foot lateral difference, because
3 the beach is so flat. So consequently,
4 trying to use mean high tide is really not
5 as, I guess, as preferred a way of kind of
6 mapping shoreline changes. So using this
7 vegetation line is really important.

8 Q: Is the use of the seaward line of vegetation
9 as a proxy for movement of the shoreline in
10 the accepted literature and peer reviewed
11 articles?

12 A: Absolutely. It's accepted. And I think of
13 this in terms of, I guess, the ecological
14 implications. If you pick, let's say, a
15 vegetation that's back from the beach, that's
16 not really affected by these short-term
17 changes. So if I said, okay, I'm going to
18 look at the appearance of vegetation back on
19 this dune or this dune, one of these things,
20 that there can be changes out here that this
21 will never detect, because that's -- it's
22 further back from the beach. So the
23 important thing is to get on the leading edge
24 of the vegetation, because that's where the
25 changes are going to take place. Once these



1 dunes are vegetated, they're not going to --
2 unless the dune is taken out by a storm, it's
3 not going to respond to the erosion or
4 accretion of the beach. So, I think it's
5 important, as we look at vegetation, to look
6 at the leading edge vegetation, the first
7 appearance of, again, stable rooted living
8 vegetation.

9 Q: Did you do that through aerial analysis -- or
10 analysis of aerial photographs?

11 A: I did aerial analysis, and the times I was at
12 the site, I also walked it and did the same
13 thing.

14 Q: Did you do anything to determine the accuracy
15 of your visual observations ---

16 A: Yes.

17 Q: --- in the photographs?

18 A: We had the area surveyed. In other words, I
19 went out -- for example, when I went out and
20 flagged the -- I guess, the appearance of
21 vegetation, Mr. Byrnes came in and did a
22 survey. And then we actually overlaid that
23 on to aerial imagery. And I was quite
24 surprised, because the image matched up
25 extremely well. And so it gave me confidence



1 that where I'd marked in the field, the
2 appearance of vegetation was also documented
3 well on the aerial photographs.

4 Q: Did you involve anybody to confirm your
5 reading of aerial photographs, any experts?

6 A: Yes. Mr. Tolleson will testify later. And
7 he's a photogrammetrists, among a few other
8 things, and he is experienced in this area.
9 So I wanted to have someone to back me up.
10 And, of course, as a geologist, you're used
11 to interpreting aerial photography and aerial
12 imagery. But I wanted to make sure I had
13 kind of a second chair. In other words, I
14 had some internal peer review to make sure
15 that -- if he was in agreement with what I
16 had delineated. And it turns out ---

17 Q: If ---

18 A: --- it was.

19 Q: If one is using -- one like you, a geologist
20 and a coastal geologist, is looking at the
21 movement of the shoreline, is the accuracy of
22 the aerial important at all?

23 A: Yes, it is. Because, if an aerial photograph
24 is distorted in some fashion, then you're
25 comparing apples and oranges and you can't



1 compare one photo to another. Now, if you
2 have a photograph, you can certainly look at
3 it and say, well, there are beach ridges and
4 there's vegetation and there's a tidal delta,
5 but you can't really do measurements. And I
6 think that's the important thing, is trying
7 to have images that you can compare one to
8 another. But you can certainly look at them
9 and make what we call, you know, the analysis
10 of what's the geomorphology, what features
11 are we seeing? And I think that's, you know
12 -- in the old days, we didn't have all the
13 technology that we have today where you can
14 actually digitally, you know, kind of compare
15 one photo to another as accurate as we do
16 today. So the technology's better. The
17 older photographs that we have are less
18 accurate. And we just have to accept that.

19 Q: How did you use Mr. Tolleson to assist you
20 with determining whether the aerials you had
21 were accurate, so that you could measure?

22 A: I had him go into what we call the metadata
23 to go into the image quality. And he then
24 tried to run comparisons. I think he can
25 probably best explain it better than I can.



1 But he validated the fact that these images
2 are what we call orthorectified, which
3 basically means that you can use them for
4 measurement and calculations. And there's a
5 lot more to it than that, but to keep it
6 simple, he verified that these images were
7 sufficient for me to go into the GeothinQ
8 tool and make my measurements.

9 Q: Do you recall what years you had aerial
10 photographs that you used to measure the
11 movement ---

12 A: Oh, let's see.

13 Q: --- seaward or landward of the seaward
14 vegetation?

15 A: Well, we had orthorectified imagery that we
16 could use from 1988. We had it from 1998.
17 We had it, I believe, from, let's see, 2004,
18 2006, 2015. I think we have 2011 and 2017.
19 There were some older images, too. There was
20 a '77 image -- imagery that we looked at, and
21 it was, shall we say, damaged and we didn't
22 think that the '77 image could be used for
23 measurement, so we didn't count that because,
24 again, we were tasked with using the best
25 available scientific evidence, and it was



1 sort of warped. And because the image was
2 warped, we just -- we decided that we could
3 use it to say is there any evidence of
4 erosion here, but we couldn't use it for
5 measurement purposes.

6 Q: Does Mr. Tolleson have any capability for
7 applying process to determine if there's
8 vegetation beyond something that you would do
9 just with your eye visually?

10 A: Yes. And he can give far more detail about
11 this than me, but I've known for a number of
12 years that Mr. Tolleson really has a lot of
13 expertise in an area that we call
14 hyperspectral imaging, looking at the
15 reflecting -- light being reflected from
16 different kind of colors are reflected. And
17 so for example, that -- by using this, you
18 can look in different wavelengths, and you
19 can see things that the eye might not see.

20 **MR. CHURDAR:** Your Honor, I would object to being
21 beyond the scope of his expertise

22 **MR. WALKER:** I'll move on.

23 **THE COURT:** Okay. Thank you.

24 Q: Did you work with Mr. Tolleson on your
25 vegetation readings?



1 A: I worked with him and he validated my
2 readings as well.

3 Q: All right.

4 A: Yes.

5 **MR. WALKER:** Now, I am -- Your Honor, I'm about to
6 get in ---

7 **MR. CHURDAR:** Your Honor, actually I would object
8 to that being hearsay as well.

9 **THE COURT:** I'm sorry?

10 **MR. CHURDAR:** Just talking about what Mr. Tolleson
11 said. Mr Tolleson can testify, but him
12 affirming what he said I think is an out-of-
13 court statement by someone else other than
14 him, and it's hearsay.

15 **THE COURT:** Okay.

16 **THE WITNESS:** I think I said he validated my
17 result.

18 **MR. CHURDAR:** Well, I'm assuming that he validated
19 it by making some kind of a positive
20 statement. So I would say that's hearsay.

21 **THE COURT:** Okay. It's overruled.

22 **MR. WALKER:** I probably have about 45 minutes or an
23 hour or more, and we've been going for an
24 hour and 45 minutes. Would it be okay to
25 take a short break?



1 **THE COURT:** I'm not sure about that. We'll take a

2 ---

3 **MR. WALKER:** Can we -- yeah.

4 **THE COURT:** We'll take a short ten-minute break.

5 **MR. WALKER:** Thank you very much.

6 **(Off the record from 3:59 p.m. until 4:27 p.m.)**

7 **THE COURT:** We're back on the record.

8 Q: Mr. Hodge at this time, I'd like to turn to
9 the results of your independent analysis.

10 A: Okay.

11 Q: And my first question deals with the
12 locations that you did your measurements on.
13 Did you identify particular locations on
14 Captain Sam's?

15 A: Yes, I picked up -- in addition to the two
16 DHEC monuments that they had, I went out with
17 a 400-foot spacing and located this on an
18 aerial image, a number of points. I think
19 about 12 points that were 400 feet apart
20 going down the beach. And we should have an
21 exhibit that shows that.

22 Q: We do. Petitioner's Exhibit 9, page 15. All
23 right.

24 **(Petitioner's Exhibit Number 9 was referenced.)**

25 A: Okay. So I've got stations K-9 to K-21, and



1 then I've got the two OCRM -- actually there
2 are two OCRM stations. There's a third one
3 we'll talk about later too, 2615. But we had
4 2620 and 2625. And actually I'll go ahead
5 and ---

6 Q: Go ahead.

7 A: --- mention 2615. It's location had moved
8 over time, the benchmarks, so we did not use
9 that.

10 Q: So what are those little blue marks?

11 A: That's the location where I established my
12 own kind of profiles or actual waypoints to
13 draw profiles from.

14 Q: Did you number them?

15 A: Yes, I did.

16 Q: And as a profile, are you talking about 90-
17 degree transect ---

18 A: It's a 90-degree transect, correct, out to
19 the beach.

20 Q: Did you do a table that showed the results of
21 your calculations?

22 A: Yes, I did.

23 **MR. WALKER:** All right. And if we could have

24 Petitioner's Exhibit 9, pages -- page 16.

25 **(Petitioner's Exhibit Number 9a was introduced.)**



1 Q: What is page 16?

2 A: All right. This is a graph showing the
3 average accretion rate annualized, feet a
4 year between 1988 to 2017 along the beach at
5 Captain Sam's Spit. And so the vertical
6 access, which is the Y axis, is actually the
7 amount of accretion in feet per year. And
8 then on the X axis, the horizontal axis, it
9 just shows you the different stations. And
10 so, if one could visualize from the left side
11 is not too far from the neck going all the
12 way down to the spit. So K-9 is up above up
13 the neck and K-21 is down at the end of the
14 spit.

15 Q: Did you double check those figures?

16 A: Yes, I did.

17 Q: Who prepared this bar chart?

18 A: I did.

19 Q: Your Honor, we would move this exhibit that
20 appears in Petitioner's Exhibit 9, page 16,
21 as Petitioner's Exhibit 9-A into evidence.

22 **THE COURT:** Mr. Churdar?

23 **MR. CHURDAR:** No objections.

24 **THE COURT:** Okay. It's admitted.

25 **(Petitioner's Exhibit Number 9a was marked and**



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1 entered into evidence.)

2 COURT REPORTER: So just page 16?

3 MR. WALKER: Page -- yeah. It's confusing. Page -
4 - Petitioner's 9 has 50 pages, so we're just
5 going to select pages. So page 16 was into
6 evidence as Exhibit 9a. Now, if we go to the
7 next page please.

8 (Petitioner's Exhibit Number 9b was introduced.)

9 Q: Did you do an assessment of accretion rates
10 over different periods of time?

11 A: I did. And this presents the same type of
12 data, only I've broken it up for different
13 years, different sort of zones. For example
14 ---

15 Q: Do you have the legend for the colors?

16 A: Yes. Exactly. There are different colors
17 for different -- you know, different years,
18 different periods of years. And so the
19 legend is at the bottom. For example, from
20 1988 to 2017 is in blue, 1988 to 2015 is in
21 this, you know, pinkish red, 1988 to 2006 is
22 in green, and then in purple we have 1988 to
23 1998. So, the message here is that, even
24 with the different periods, the rates, they
25 differ somewhat, but the trend is still the



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1 same, that there's annual accretion rate --
2 this annual accretion rate at Captain Sam's
3 spit, and that accretion rate increases as
4 you head further down toward the end of the
5 spit.

6 **MR. WALKER:** Petitioner moves into evidence
7 Petitioner's Exhibit 9, page 17 as
8 Petitioner's Exhibit 9b.

9 **THE COURT:** Mr. Churdar?

10 **MR. CHURDAR:** No objection.

11 **THE COURT:** Okay. It's admitted with no objection.
12 **(Petitioner's Exhibit Number 9b was marked and**
13 **entered into evidence.)**

14 Q: All right. Now I'd like to turn to your
15 study of the profile data. You mentioned
16 that.

17 **(Petitioner's Exhibit Number 9 was referenced.)**

18 A: Okay.

19 Q: Correct?

20 A: Yes, sir.

21 Q: And did you do a comparative analysis of the
22 profiles over time?

23 A: I did. I took the OCRM's profiles for the
24 two stations that we discussed, 2625 and
25 2620, and I looked at those over time, from



1 1988 to two thousand -- I think -- I believe
2 it's '18, but I'll check.

3 Q: And would you show us those two stations
4 right now?

5 A: Yes. 2625.

6 Q: And you can mark it.

7 A: I'm going to draw a circle. I've learned how
8 to draw a circle here, so. This is 2625
9 right here. Here's 2620.

10 Q: All right. And did you do a comparative
11 analysis for those two?

12 A: Yes, I did.

13 Q: And did you do a chart that shows that?

14 A: Yes.

15 **MR. WALKER:** At this time, Alex, could you show us
16 pages 22 and 23 of Petitioner's -- there we
17 go. Let's do 22 first.

18 **(Petitioner's Exhibit Number 9c was introduced.)**

19 Q: So does this have a legend that denotes the
20 particular year?

21 A: This is a screen shot. Yes, it does it does,
22 it does.

23 Q: And would you explain what we're looking at?

24 A: Yes. This is a fairly busy slide, but you've
25 got the legend in terms of number of years



1 from the left, 2018 back to 1998. And this
2 is actually a series of beach -- of profiles.
3 This is from OCRM's data. And you can -- the
4 vertically axis is actually the elevation,
5 and then the horizontal axis is the distance
6 from the benchmark. And let me say, there's
7 another slide that starts at zero. I just
8 blew this up, so it would be easier to see
9 the individual kind of peaks for the foredune
10 ridge. So this is only a excerpt from the
11 entire profile.

12 Q: Does the profile data show a dune at 15 feet,
13 a dune crest?

14 A: Yes. And let me ---

15 Q: Where would that be?

16 A: Let me see if I can draw that in too. So
17 this, for example, is a sand dune that peaks
18 out at about 15 feet. And there's some lower
19 -- this is a foredune here, you see that.
20 There are several dunes in this area. So
21 when you see that peak like that, that is
22 actually the peak of the sand dune. And I
23 was interested in the one that's closest to
24 the beach, one that is really the -- what we
25 call the foredune ridge.



1 Q: And which one of the three circles is the
2 foredune ridge?

3 A: Well, it's different -- represents different
4 years. So, in other words I think at
5 different time periods they're all foredune
6 ridges. But it actually shows how that ridge
7 has migrated. And I think that's one of the
8 points ---

9 Q: So did you circle a foredune ridge here, a
10 foredune ridge? In the third circle to the
11 right?

12 A: Yes. All three of those capture a foredune
13 ridge or several foredune ridges at different
14 times.

15 Q: All right. And what did -- what was your
16 calculation as to the average annual rate of
17 accretion at beach profile station 2625 per
18 OCRM's profiles?

19 A: Okay. It averaged 4.1 feet a year.

20 Q: And did you do a similar --

21 **MR. WALKER:** And we would move Petitioner's Exhibit
22 9, page 22 into evidence as 9c.

23 **MR. CHURDAR:** No objection, Your Honor.

24 **MR. WALKER:** Thank you.

25 **THE COURT:** It's admitted.



1 **(Petitioner's Exhibit Number 9c was marked and**
2 **entered into evidence.)**

3 Q: Did you do a similar overlay or profiles that
4 was blown up for 2620?

5 A: Yes, I did.

6 Q: Is that this slide?

7 **(Petitioner's Exhibit Number 9d was introduced.)**

8 A: This is the slide you're looking at now it
9 shows a similar legend, from about 2018 to
10 1998, and then you see the different years.
11 And, again, there are a number of foredune
12 ridges here.

13 Q: Let me ask you about the '98 -- 1988 profile.
14 What line is 1988?

15 A: It's this dark blue line that you see and
16 it's -- again, this is a excerpt, so you
17 don't see the entire profile, you just see it
18 up in the dune field and down the first part
19 of the beach.

20 Q: Is there anything about the 1988 profile that
21 may lead you to doubt its accuracy?

22 A: Yes. There are only a few points that were
23 taken. And if I had a student that had done
24 that, I would have given them probably a D or
25 an F, because there's not really enough



1 locations to get an accurate depiction of the
2 profile going from the monument out to the
3 beach.

4 Q: Is it different in any way from all the other
5 profile years?

6 A: Yes. You can actually see in this picture
7 the other profile years are fairly detailed.
8 In 1998 (sic) you see it goes down to one
9 line, there's a -- you see what appears to be
10 a foredune ridge or whatever, and then it
11 goes down and it slides straight off as if
12 there's maybe just a handful of data points.
13 So it really is highly inaccurate.

14 Q: Which year?

15 A: 1998 -- excuse me 1988. Let me clarify.

16 Q: Very good.

17 A: The blue 1988 line is the one that I would
18 give someone an F for doing, because there
19 are only a handful of data points, and it
20 really doesn't give you an accurate depiction
21 of the profile that exists.

22 Q: When you were measuring, you start with a
23 fixed point, correct?

24 A: Correct.

25 Q: And then to what point were you measuring in



1 order to compare year over year?

2 A: I would start at the monument, at the zero
3 point, and I would measure out from that.
4 And typically, as I would look at these
5 things, I would take it all the way out to --
6 in other words, the zero-foot contour. And I
7 believe there was a datum of NAVD '88 that
8 that was -- it was a conversation of one
9 point, but there's a datum. What I was
10 really interested in is the position of the
11 foredune ridge. And I'm circling a number of
12 ridges there. That's what I was interested
13 in seeing, the position of those.

14 Q: And what does that graph show with respect to
15 the foredune ridge in terms of its movement
16 from the monument?

17 A: It shows that the foredune ridge migrated in
18 a seaward direction. And then about the time
19 we get to around -- you know, after 2015, and
20 then it cuts back in 2016, and that
21 corresponds to the period of erosion that's
22 been discussed previously.

23 **MR. WALKER:** Petitioner moves into evidence page 23
24 as Petitioner's 9d.

25 **MR. CHURDAR:** No objection.



1 **THE COURT:** Admitted.

2 **(Petitioner's Exhibit Number 9d was marked and**
3 **entered into evidence.)**

4 Q: And what did you determine, based on that
5 chart, to be average annual rate of accretion
6 at monument station 2620 from 1988 to 2018?

7 A: Five point eight feet a year on average.

8 **MR. WALKER:** Now, if we could have Petitioner's
9 Exhibit 9, page 25, please.

10 **(Petitioner's Exhibit Number 9e was introduced.)**

11 Q: What is this page the chart of, John.

12 A: Okay. This is a summary of the profile work.
13 And it really shows the position of the --
14 what we call the foredune proxy, the foredune
15 peak. From OCRM's profile data, out on the
16 left side, the vertical axis starting at
17 zero, that's the monument. And then as it
18 moves higher, that's the distance from the
19 monument. And then moving on the X axis from
20 left to right, it goes from the years 1998
21 (sic) to 2018. And so by picking those --
22 the position of the foredune ridge, for
23 example, on 26-25 you see that it moves away
24 -- the blue line, it moves away from the
25 monument is the -- as the foredune ridge



1 progresses out and moves in a seaward
2 direction, the beach is accreting. Then you
3 get to 2015 and then this is when the stormy
4 period kind of began and you notice that
5 distance from the foredune ridge to the
6 monument then decreases. So you see that.
7 And then 2620 the data really started around,
8 I think, 2007. We didn't have the '88 before
9 that. So you see the same trend as expressed
10 from 2620. And the dotted lines just give
11 you kind of a mathematical expression of the
12 trend overall that shows the foredune ridge
13 is accreting and the beach is moving -- the
14 dune is moving away from the monument, it's
15 moving out toward the sea.

16 Q: Just to make sure we all understand this, in
17 1988 how far was the foredune ridge from the
18 monument station?

19 A: A hundred and fifty feet.

20 Q: All right. In 2005 how far was the foredune
21 ridge from the monument?

22 A: Oh, about 200 and, I say, 20 feet.

23 Q: What was the maximum distance that the
24 foredune ridge -- on the profile data, how
25 far seaward did the foredune ridge get from



1 the monument?

2 A: It moved out as far as three -- about 350
3 feet from the monument.

4 Q: And so that would be how much movement
5 seaward over those 27 years?

6 A: About 200 feet.

7 Q: Okay.

8 **MR. WALKER:** Petitioner would move this particular
9 exhibit into evidence is Petitioner's 9e.

10 **MR. CHURDAR:** No objection.

11 **THE COURT:** Thank you. It's entered.

12 **(Petitioner's Exhibit Number 9e was marked and**
13 **entered into evidence.)**

14 **MR. WALKER:** And if we can have the next page.

15 Q: Did you attempt to determine the average
16 foredune height?

17 A: Yes. As a check to ensure general
18 consistency, not only did we look at the
19 position from the monument on the profiles,
20 but we looked at the height that was
21 expressed. And for profile 2625, the height
22 of that foredune was 10.06 feet, that was the
23 average height. And for 2620 the average
24 height for the dune was 10.22. And the datum
25 was NAVD '88, datum which is basically a



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1 datum that's used to indicate height above.
2 For example, whether you're going above or
3 below that datum tells you, you know, it's
4 like sea level. It's a similar datum, it's
5 something that people measure from. It's not
6 sea level, but it's essentially a agreed-upon
7 elevation.

8 Q: And the final table that I'm going to ask you
9 about is another one that you prepared. Did
10 you do comparison of your derived rates of
11 accretion with the rates of accretion that
12 you derive using the OCRM monument data?

13 A: Yes. Yes.

14 **MR. WALKER:** If we can please go to Petitioner's
15 Exhibit 9, page 27.

16 **(Petitioner's Exhibit Number 9f was introduced.)**

17 A: All right. This is comparing the different
18 sources. And let me say that, in looking at
19 the imaginary in trying to determine
20 accretion, looking at the profile, we used
21 profile data. We tried to use one as a check
22 against the other to see what they were. And
23 we certainly expected -- there might be some
24 slight differences in calculations, but
25 what's important is the overall trend. So,



1 again, on the Y axis is the number of feet
2 per year the average amount of accretion.
3 Then each of these graphs represents a
4 different, sort of, methodology. So the
5 first one, the average from imaginary, that's
6 all those K-9 through K-21 and the two OCRM,
7 their benchmarks, we're using that for -- you
8 know, as a basis for imaginary. We saw from
9 -- the blue number is from 1988 to 2015 and
10 the average accretion, oh, it's over 11 feet
11 a year. Of course, we hit the stormy period
12 that we talked about of Matthew and Irma and
13 a few other storms. And so when you compare
14 1988 to 2017, it's down to about seven and a
15 half feet a year of accretion. Then when we
16 look at the imaginary for the two OCRM
17 profiles, we see a similar trend. In other
18 words from '88 to 2015 it's about eight feet
19 a year. And then from '88 to '17 the average
20 is around, oh, just under five feet a year.
21 Then per 20 -- station 2620, from 1988 to
22 2015 the average accretion was just over ten
23 feet. And then from 1988 to 2017 the average
24 accretion was about seven and a half feet a
25 year. Now, when we look at the OCRM profiles



1 -- now we're going to compare the two
2 imagines that we just saw, 2620 station and
3 2625, we look at what the profile data shows.
4 And the profile data for 2625 is extremely
5 similar. I was quite surprised actually when
6 I plotted this data out. But from 1998 to
7 2015, again, it's just about seven and a
8 half, maybe 7.7 feet a year. And then from
9 1988 to 2017 it's four feet a year, the
10 average. Then you go into the profile 2620.
11 And the reason this is a different color is
12 because we didn't have data back to 1988.
13 The data started at 2017. But they are --
14 from 2007 to 2015 it's up over 12 feet a year
15 of average accretion and then from 2007 to
16 2017 it's back down to about, oh, just about
17 5.8 feet a year.

18 Q: Which -- in the profile stations which of the
19 monuments is closer to the neck of Captain
20 Sam's, 2620 or 2625?

21 A: Oh, I'd have to look at the graph to see, but
22 I think 2620 probably is, but I'd have to
23 look and see.

24 Q: Very good. Go ahead.

25 A: Okay. And then on OCRM's website, and we



1 have screenshots of this ---

2 Q: All right. Could we just got to this right
3 there ---

4 A: Okay.

5 Q: --- before going to the website?

6 **MR. WALKER:** And we'd offer this graph as
7 Petitioner's Exhibit 9f.

8 **MR. CHURDAR** No objection.

9 **THE COURT:** Admitted.

10 **COURT REPORTER:** Can I get what page that is?

11 **MR. WALKER:** That is page -- Exhibit 9, page 27.
12 **(Petitioner's Exhibit Number 9f was marked and**
13 **entered into evidence.)**

14 A: On OCRM's website, they have a beach website.
15 And you can click on different stations,
16 2625, 2620, it will give you the average
17 amount of accretion or erosion per year. And
18 back in 2016, actually when I went to this
19 website -- and I say published in '15.
20 That's when I think when it was posted out
21 there. But for station 2625, OCRM then was
22 saying that 2625 was just over five feet a
23 year. I think it was like 5.4 feet a year --
24 -

25 Q: Did you take a screen shot of that?



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1 A: Yes, I do.

2 Q: Okay.

3 **MR. WALKER:** May we see Petitioner's Exhibit 9,
4 page 18?

5 A: This is from OCRM's beach map or berm site.
6 I took this back in -- I think it was
7 sometime in early -- sometime in 2016, but it
8 shows the adopted -- they say the erosion
9 rate. It's really the accretion rate is
10 5.22. If it was erosion, it would be a
11 negative number. It's clear that OCRM says
12 it's accreting and we say it's accreting.

13 Q: Did you do a similar screenshot ---

14 A: Yes.

15 Q: --- for the other station, 2620?

16 A: Yes. And this one shows 6.15 feet a year.

17 **MR. WALKER:** We would move these two exhibits,
18 which are Petitioner's Exhibit 9, pages 18
19 and 19, in as Petitioner's Exhibit 9g and 9h.

20 **MR. CHURDAR:** No objection.

21 **THE COURT:** Admitted.

22 **(Petitioner's Exhibit Numbers 9g and 9h were marked**
23 **and entered into evidence.)**

24 Q: Mr. Hodge, in coastal geology are individual
25 storm events considered to be indicators of



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1 whether a shoreline is accreting or eroding
2 over the long term?

3 A: No, they're not. In other words -- and I
4 testified to this earlier as well, that storm
5 events are a normal part of the coastal
6 environment. And that's just kind of part of
7 the -- what we expect, is that there will be
8 storms from time to time, and they may cut
9 the beach back. But just because the storm
10 passes over and causes erosion, it's not
11 necessarily indicative of a period -- a
12 trend, should we say, or that the island is
13 erosional, for example.

14 Q: To a reasonable degree of coastal geological
15 certainty, is the beach of Captain Sam's
16 eroding or accreting or -- excuse me, let me
17 re-phrase it. Is the beach -- did the beach
18 of Captain Sam's erode or accrete over the
19 last 40 years?

20 A: To a reasonable geological certainty, the
21 beach at Captain Sam's is accreting and has
22 been accreting over the last 40 years.

23 Q: Now, we're going to turn to the most landward
24 point of erosion. But before I get into the
25 specifics of that, did a determination of



1 whether the beach had accreted or eroded over
2 last 40 years play into your analysis of the
3 most landward point of erosion over those 40
4 years?

5 A: Can you explain your question?

6 Q: Sure. When you went to determine the most
7 landward point of erosion over the last 40
8 years, did the fact that the -- you
9 determined the beach was accretional have any
10 role in what you were going to look for for
11 an erosional --

12 A: Okay. The main thing I wanted to look for
13 was the -- was what we call the geomorphic
14 expression of erosion, which would be a
15 scarp, or heavy mineral deposit, dunes that
16 are blown out, those kinds of things.
17 Obviously to see what was the most landward
18 point of erosion, you had to say, okay, what
19 has the shoreline done over these last 40
20 years? But ultimately to be point of
21 erosion, you know, I wanted to see some
22 geomorphic expression of erosions. Some
23 factor; a dune scarp, something like we
24 talked about with the vertical scarp or the
25 little cliff, some evidence that the beach



1 had been cut back.

2 Q: In coastal geology is a beach, an accreting
3 sand beach like the one at Captain Sam's,
4 considered a point of erosion?

5 A: No. Because it's accreting, it cannot be a
6 point of erosion. A point of erosion refers
7 to some -- in other words, there has to be
8 some history; that, in other words, the
9 vegetation is not moving seaward, the dunes
10 aren't moving seaward, it's actually going in
11 the reverse direction and there's a -- and
12 you would have some evidence of that. And so
13 I think that an accreting beach in it of
14 itself does not indicate a point of erosion
15 at all.

16 Q: If the beach is accreting what is happening
17 day to day over time? Is the surf eroding or
18 building the beach?

19 A: Well, ultimately the beach is being built up.
20 And hopefully we'll have a few pictures of
21 this. But these ridge and runnels will
22 attach to the beach and the beach builds up.
23 And then eventually with the wind blown sand,
24 the dune starts -- dunes start to develop and
25 there's a foredune ridge that develops in



1 front of the last foredune ridge, so to
2 speak, and the island keeps moving in a
3 seaward direction.

4 Q: Does the beach in normal times at Captain
5 Sam's, not during storms, have geomorphic
6 expressions of erosion?

7 A: No, it really doesn't. In other words, you
8 may see some older historical evidence. For
9 example, after Irma we saw evidence of that.
10 But then I came back in last summer and much
11 of that -- we had a new dune developed and it
12 was accreting again. And, oh, I could still
13 see some, you know, areas where I knew,
14 because I'd been out after Irma, that there
15 had been an erosional event, but that had
16 been, kind of, you know, covered or replaced
17 by the accreting sand dunes and vegetation.

18 Q: Did you make a determination to a reasonable
19 degree of geological certainty based on all
20 the information you had and your studies as
21 to what was the most landward point of
22 erosion over the last 40 years?

23 A: I did. I examined the aerial photographs.
24 And in addition to looking at the accretion
25 that we talked about, I was also looking for



1 anything from a geological perspective that
2 would tell me that there was erosion going
3 on. And that could be anything, again, from
4 a scarp -- from a dune that's been -- series
5 of dunes that have been blown out, seeing
6 heavy mineral assemblages on the beach, be
7 dead vegetation out on the beach, things of
8 that nature. And so that would tell me that
9 there would be, you know, some erosional
10 event. And really what happened is, when we
11 had Matthew, we looked at the beach. We
12 said, oh, this is an -- we have evidence of
13 erosion here from Matthew. And I thought,
14 okay, well, maybe this is was it. And then,
15 of course, the next year Irma hit and Irma
16 took the dunes back about another 10 feet or
17 so. So ultimately, I advised Mr. Walker, I
18 said, well, looks likes Irma is now our most
19 landward point of erosion. And so I went out
20 to the site and that's when I documented it,
21 and walked it, had flagged it, and then Mr.
22 Byrnes did his survey showing, you know, that
23 boundary that we identified as the most
24 landward point of erosion.

25 Q: What were you looking for when you walked the



1 beach?

2 A: Again, I was looking for any evidence of the,
3 kind of, erosional event. The dunes scarp --
4 there was a scarp of about two thirds of the
5 way down the beach. Then there was an area
6 where some of the dunes were blown out and we
7 had what we'd call washover fans or where the
8 dune was essentially pushed back, and it's
9 maybe some places a little bit of dune left
10 and it was pushed back. And so that was
11 determined to be an erosional event looking
12 at that. And, of course, we saw the heavy
13 minerals, the dark minerals at the toe of the
14 scarp, if you will. What happens is, the
15 wind blown sand will cover up those heavy
16 minerals, so it's important to scrap that
17 away or just -- you can get your hand to go
18 down and take a piece of beach sand to look
19 at it, and it's mostly black with these heavy
20 minerals in there. Some of these are
21 actually magnetic, I guess. If you put a
22 magnet to it, you may get some of those to
23 come off, but not all of them. But anyway, I
24 say that just for the purpose that it's
25 different than the quartz sand that makes up



1 the beach, and so you look for that. And
2 there was one area -- and we talk about
3 vegetation. When you have a post-storm
4 beach, there was dead vegetation that was
5 certainly seaward of my most landward point
6 of erosion, because that wasn't stable,
7 living, rooted, vegetation, it was dead. I
8 put my line seaward of the dead vegetation,
9 because to me that was not -- that was
10 actually an indicator of erosion, an
11 indicator of the ---

12 Q: Well, let me ask you, you just said your put
13 your lines seaward of the dead vegetation.
14 Does that ---

15 A: I put it landward. I'm sorry. I misspoke.
16 I put it landward of the dead vegetation.

17 Q: When did you go and do your site visit after
18 Hurricane Irma?

19 A: Irma occurred on September the 11th, 2017,
20 and I was out on October 9th, 2017. So it
21 was about a month after Irma, and I spent a
22 day out at the spit, and went the entire
23 length of the spit back into the -- around
24 the corner of the spit and documented what we
25 saw.



1 Q: And we're going to look at the photographs.
2 And how did you document where you were
3 finding your line?

4 A: Well, I tried to -- we put flags out. We put
5 flags out for that, and I walked the beach.
6 You'll see pictures of these little orange
7 flags to identify that. And then Mr. Byrnes
8 came behind me and actually did his survey
9 work after that.

10 Q: Who was with you when you were actually out
11 on the beach?

12 A: Mr. Pantlik and I walked the beach.

13 Q: All right. Did Mr. Pantlik have anything to
14 do with the locations where you planted the
15 flags?

16 A: No, not at all.

17 Q: All right. Did you take photographs?

18 A: I did.

19 Q: All right. Let's -- why don't we take a look
20 some of those photographs? And they're in
21 Petitioner's Exhibit 20.

22 **(Petitioner's Exhibit Number 20 was introduced.)**

23 Q: Okay. Did you also have the drone that day?

24 A: I did. And when I finished walking and
25 flagging the beach, then I flew the drone



1 down the beach to get a good -- kind of a --
2 what'll be a bird's-eye picture. And I
3 thought it would be helpful to memorialize
4 what I'd seen that day.

5 Q: And is that the picture that we're looking
6 at, the first picture in 20, a fair and
7 accurate representation, to the best of your
8 knowledge, of what you observed?

9 A: Yes, it is.

10 Q: Okay. And we can go through these pictures
11 and all you have to do is ask Alex to go to
12 the next one.

13 A: Okay. All right. Do you want me to describe
14 what I see here?

15 Q: Yeah.

16 A: All right.

17 Q: If it's important.

18 A: Let me see if I can get a little drawing took
19 up. All right. So the first thing you see
20 is there's a dune scarp. In other words,
21 this is the -- kind of the -- what's left of
22 the dunes right here. And you can see that
23 it's cut back and there's a little scarp
24 that's there. That's important. You also
25 see there are several different dunes, you



1 know, that are still in existence. There's
2 this -- you know, you really see three
3 different sort of dune crests right here.
4 And then we've talked a lot about the ridge
5 and runnels. There's a couple of them right
6 here. There's one here and there's another
7 one out here. So this is at constructive
8 phase. So we had the storm a month before
9 and now you've got two of these kind of
10 packets of sand or these ridge and runnels
11 that eventually will migrate up the beach.
12 And this is, you know, one of the reasons you
13 look at these in coastal geology, you want to
14 look at a barrier island, look at a inlet at
15 low tide, as you get to see the character of
16 lower beach face and get to see the character
17 of the tidal deltas and those kinds of
18 things. So -- but that's the first thing.
19 Next slide, please.

20 Q: And when you talk about those ridges and
21 runnels, is that the system you were talking
22 about when sand gets washed off the beach
23 into the -- what was -- where you ---

24 A: Correct. So what happens is the sand has
25 eroded off of the dune front in the storm.



1 It ends up in the shallow subtidal and then
2 it migrates back up onto the beach in the
3 series of ridge and runnels that eventually
4 weld onto the beach and it builds up the berm
5 of the beach. And, again, I described this
6 ridge and runnel and I said my wife calls it
7 the baby pool. You could imagine kids and
8 families like to sit out in the shallow water
9 side of the waves. And that's what that
10 really is, it's a packet of sand that's
11 moving onto the shore.

12 Q: To a reasonable degree of coastal geologic
13 certainty, will that ridge or those ridges
14 that we see most probably, the sand in them,
15 end up on the shore?

16 A: Yes, it will. That's right. Something else
17 I'd like to point out is, among the dune
18 scarp, you see how the dune has been cut back
19 in places as there -- it's almost scalloped
20 like this. When you see my aerial that has
21 the most landward point of erosion, you see
22 that same pattern. And I made a point to try
23 to go back and capture these areas on
24 purpose. So it looks -- it's a fairly busy,
25 you know, when you see the vertical where



1 it's -- we can back that out. It's really
2 busy because we wanted to capture the scarp
3 as it went back and if there was a dune
4 blowout. Like I say, down at this part of
5 the beach -- and we'll get -- maybe we have a
6 picture from down here, the dunes were kind
7 of blown out in the area, so there's an open
8 area as well. But it's pretty clear -- I'm
9 just going to go -- I'm going to oversimplify
10 it really quick.

11 Q: Did you have any difficulty locating
12 geomorphic expressions of erosion that day?

13 A: Not at all. I mean, you can see it plain as
14 day right through here. And so, you know, as
15 you -- the further away you get, it's a
16 little bit harder to see, but that's
17 basically it.

18 Q: Very good. Again, are we just moving down
19 towards the inlet?

20 A: Yeah. It's the same picture. I think we
21 could probably continue. This is a picture
22 from up high. And this is the boardwalk
23 right here that, I think, Mr. Pantlik had
24 talked about, that there's a means of getting
25 access out to the beach. But the important



1 thing here, you can really see a scarp line.
2 And, of course, one could smooth it out like
3 that, but actually I've used -- I was more
4 busy and actually I did these -- I showed
5 more detail on it. But you can see that's,
6 and again, the most landward point of
7 erosion. And here a great view of these
8 ridge and runnels and ---

9 Q: Would it be unusual to have them be in that
10 parallel shape like that?

11 A: Excuse me?

12 Q: It is unusual for the ridges to be so
13 parallel?

14 A: Yeah, they're generally parallel to the beach
15 like that, that's correct. And then the ebb
16 tidal delta is visible in the distance. And
17 I think we may have a closeup of that too. I
18 can get rid of this. Just a second.

19 Q: Now, we're down to the ground photographs.

20 A: All right. That's fine. I just want to get
21 rid of this mark. Okay. So this is on the
22 ground. And now you see the scarp that we're
23 talking about. This is a good erosional
24 scarp right there. You can see the dune was
25 blown out and the sand was deposited back in



1 here, so this is the erosional scarp. And
2 here are the sea oats that we talked. Yeah,
3 they're very pretty, very distinctive that
4 you see on top of the dune as well. But
5 looking down the beach, it really is a scarp
6 pretty much, you know, all the way to about
7 two-thirds down the beach. All right. This
8 is another view looking back toward the
9 northeast. These are my survey flags. Do
10 you see these orange flags? So this is where
11 I actually marked the most landward point of
12 erosion. And you could see those. And
13 there's vegetation that's present. But,
14 again, what I want to emphasize is, if -- you
15 know, you don't live by vegetation alone, you
16 have to also look at the geomorphology and to
17 determine -- you know, look at the scarp,
18 look at where the sand is, is there something
19 that's depositional or not. So these are the
20 flags that I put out. And, again, it's
21 really a geomorphic analysis as well as --
22 you know, the vegetation is only a part of
23 it, but that's not the whole story. This is
24 ---

25 Q: And what is significant in this photograph,



1 John?

2 A: Excuse me?

3 Q: What is significant in this photograph? Is
4 there anything significant?

5 A: There actually is. Of course, the -- this is
6 a sand dune that's developing again. The
7 dune was cut back and there was a scarp. And
8 at this point you've got some -- you see
9 these wind blown ripples? The wind causes
10 these ripples on the sand as they -- as the
11 sand kind of bumps along, if you will, along
12 the surface and migrates. But here we are a
13 month after the storm and sand dunes are
14 already kind of reconstituting themselves.
15 And I think that's important. And you also
16 see the survey flags over here on the right.

17 Q: What does the rebuilding of the dunes so
18 quickly signify?

19 A: That shows that beach is recovering and it
20 certainly is an accretional beach, they're
21 getting recovery after the storm.

22 Q: All right. Where are we now? Are we now
23 moving towards this -- to the inlet?

24 A: This is looking down the beach toward the
25 inlet. And, again, it's just another view



1 showing the dune scarp. In other words,
2 there's a scarp where erosion has taken
3 place. See the sea oats on top of those
4 dunes and you see these blowout areas where
5 the dune was removed. In between this point
6 and that point the dune was removed and you
7 see sand has been deposited back behind. You
8 can't really see it because it's around the
9 corner. But this gives you an idea of what a
10 post-storm beach looks like. And of course,
11 again, you see these wind ripples. You see
12 the ripples down and it clearly shows the
13 wind's been blowing. Again, that's part of
14 this, you know, recovery that takes place
15 with the wind-blown sand building the dunes
16 back. And the wind finds some of the dead
17 vegetation, for example, and as the sand
18 builds around that, then the wind velocity
19 drops off, and then the dunes start to build.
20 But it uses dead vegetation like this to --
21 actually to start growing incipient dunes
22 again.

23 Q: All right. Is that just another indication
24 of your flags further ---

25 A: Exactly. Same concept. You see the flag and



1 you see the grass, you see the scarp.

2 Q: And is this a flag in here?

3 A: That's one of my survey flags.

4 Q: Okay.

5 A: Yes.

6 Q: All right. Next.

7 A: This is looking further down the beach. The

8 same deal. The scarp here is not quite as

9 high as it was before. You do see some areas

10 where there have been some kind of blowouts

11 in the dunes right here. And, of course,

12 there's evidence of these ripples. You see

13 some aeolians, some wind-driven activity

14 taking place. This is an example how a dune

15 forms. You see how the sand is being trapped

16 around that dead vegetation, and so that'll

17 eventually form into a small dune feature.

18 Those are really good examples of both where

19 the vegetation kind of helps trap the sand.

20 But that's dead vegetation and one would not

21 use that for mapping purposes, I'll say that.

22 Q: Do all those photographs accurately depict

23 the conditions that you observed on Captain

24 Sam's ---

25 A: Yes, sir, it did.



1 Q: --- on that day in October?

2 A: Yes, they did.

3 **MR. WALKER:** Petitioner moves the photographs
4 marked as Petitioner's Exhibit 20 into
5 evidence.

6 **MR. CHURDAR:** No objection.

7 **THE COURT:** Okay. They're entered.

8 **(Petitioner's Exhibit Number 20 was entered into**
9 **evidence.)**

10 Q: What type of drone do you have?

11 A: It's a Phantom 4 Pro DJI.

12 Q: Did you take some video going the whole
13 length of track at Captain Sam's?

14 A: I did. I took several videos as well.
15 Again, just to memorialize the condition of
16 the beach that day.

17 **MR. WALKER:** Your Honor, we're going to play two
18 videos. They're about a little over a minute
19 a piece, so they're not hugely long, but why
20 don't we start ---

21 **(Petitioner's Exhibit Number 21 was introduced.)**

22 A: Now, here's a question: If I need -- want to
23 stop this at any time ---

24 Q: You ask Alex to stop it.

25 A: Okay.



1 Q: All right. Where -- before you get it
2 rolling, where are we now? Is this ---
3 A: This is pretty much over the boardwalk and
4 it's -- this is an access road that comes out
5 just right down below.
6 Q: And what's way off in the distance?
7 A: The inlet is off in the distance. And you
8 can really see the scarp. I just want to
9 point this out. And you can see some of
10 these little blowout areas all down here. So
11 that's the scarp we're looking at, there's
12 the ridge and runnels. Okay. Let me clear
13 this out. And, Mr. Walker, I'd also like to
14 make sure we have the low level drone ---
15 Q: We're going to do that next.
16 A: Okay. But you can see here these scarps and
17 you can see how -- places where the dune's
18 been blown out. There's little small
19 washovers, washover fans back into the --
20 what was the crest of the ---
21 Q: Is the fan behind -- the washover fan itself
22 an erosional feature?
23 A: A washover fan really is depositional.
24 That's a function of an erosional event, but
25 it's a depositional feature. And you can see



1 some with these areas here where the -- on
2 the right where the sand has been blown back
3 to the dune. But when you look at this, it's
4 a very clear boundary. And I think that's
5 the important thing, looking at the
6 geomorphology. And, again, you don't just
7 look at vegetation, but you look at the
8 geomorphology and the vegetation and you look
9 for evidence of any kind of erosional
10 signature.

11 Q: And what about the dunes that are behind this
12 erosional features, the feature that you
13 flagged, what is the health of those dunes?

14 A: Well, you have several sets of dunes, and
15 actually they protect, you know, the rest of
16 the island. In other words, if the first set
17 of dunes is removed, then there are other
18 dunes there that do provide some overall
19 protection from storm waves.

20 Q: Did any of the dune ridges behind the
21 escarpment part of the beach show any
22 indication that they were breached ---

23 A: No. No. None.

24 **MR. WALKER:** Is this the second video?

25 Q: All right. This is the lower one, John.



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1 A: And this one you can actually see some of the
2 orange flags. If you look along the scarp
3 there, you can see my orange flags. And I
4 want to show this, because you really get a
5 picture that this is a point of erosion.
6 There's no question about it. Here the
7 orange -- there's a flag, there's a flag,
8 there's a flag. And you can see these --
9 these are these little kind of washover fans
10 right here.

11 Q: Is there a flag right there in that
12 indentation of -- that you just drew on?

13 A: Yes, there's a flag -- there's a flag here
14 and there's one right there as well.

15 Q: Very good.

16 A: Let me clear this just to make the video --
17 just a moment. Okay.

18 Q: And this is -- and where is -- is this going
19 by the neck?

20 A: This is near the neck and we're actually
21 going down the beach now. And you can see
22 the flags as we fly over. I think that's
23 actually helpful to see where it was flagged.

24 Q: Is there -- were you -- if we can just go
25 back a second. Were you also -- well, here's



1 a good example -- you don't have to go back.
2 Is -- were you also flagging the area
3 landward where there was a breach?

4 A: Well, this is a -- what I would call a dune
5 washout. Correct. So I ran my line back --
6 you can see the flag here, back through here,
7 and back around. This is a washover. So
8 this is actually a depositional feature.

9 Q: Which feature?

10 A: And it's in the trough. But this is the
11 erosional feature where it's cutting back,
12 so.

13 Q: How far down did you go with your flags?

14 A: I went all the way around the recurved spit.
15 I'm not sure that the video here goes that
16 far. Partially because you're suppose to
17 keep the drone in sight and it gets a little
18 bit far away down there. And you can see
19 that here, where it becomes a bit more cut
20 out, and so -- let's stop for a second.
21 Okay. Let's back up, back up just a tad. I
22 think this is really important. Okay. So --
23 there we go. That's good. So here you've
24 got the remnants of the dune and you see a
25 scarp, clearly erosion. So in my mind, you



1 follow the flags, it goes in, there's another
2 flag and it goes out and it kind of goes
3 around like this. And so that was the
4 pattern that I tried to delineate, even
5 though it was fairly busy. When you see the
6 vertical aerial that we have, it's very wavy.
7 I think by seeing this video, you develop an
8 understanding of why it's that way. And so
9 the sand that you see -- this is another
10 thing that I think that is important to
11 illustrate. Just a moment. A lot of this
12 sand you see here was part of what was on the
13 foredune, and that's all been thrown back
14 into the other dune. And that's just --
15 that's, again, part of the erosional event.
16 But this is a depositional, kind of an
17 overwash if you will. And so it's just a
18 veneer of sand that gets thrown back.

19 Q: And you're -- are you talking about the rear
20 -- this part right here?

21 A: Well, it's the white -- the white sand that
22 you see behind the vegetated area.

23 Q: And when you say depositional, is that
24 because the sand was moved from the ---

25 A: That's right. The sand has been moved and so



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1 -- there it is right -- it's been deposited
2 there. That sand was formerly probably out
3 here in the dune and then the storm, it was
4 taken back, it was moved in that direction,
5 the direction of the arrow. So it probably
6 was formed somewhere out here. And as the
7 dune was -- the foredune was taken out, so to
8 speak, that sand was then kind of put back in
9 a fan shape veneer back behind there.

10 Q: All right.

11 A: If that makes sense. And you can follow the
12 flags. It really zig-zags in and out going
13 down the beach like this.

14 Q: Let me ask you, were you flagging isolated
15 clumps of erosion ---

16 A: That's a good question.

17 Q: --- in advance of the erosional features?

18 A: I think it's been alleged, at least in a
19 deposition, that I was flagging isolated
20 clumps. And ultimately I was not doing that.
21 I was compiling geomorphic -- geomorphology
22 and the presence of vegetation. This is an
23 erosional beach, and so there was once a dune
24 ridge probably out here. This is a remnants
25 of one dune ridge. And that's why my



1 delineation kind of goes -- does this sort of
2 thing. I'm not sure that there's a -- you
3 can see the flags down here, but we can go
4 see, but the intention was not to flag an
5 isolated kind of clump, if you will, but was
6 to actually follow, you know, the -- you
7 know, the -- you can see the flag right over
8 here, you see, right there. Stop. See
9 there's a flag there and then here's a scarp.
10 So, you know, I really did not flag isolated
11 clumps per se. Where there were some so-
12 called clumps -- and that's in the eye of the
13 beholder, I think. If there was a line --
14 clearly if there was a line, particularly on
15 a constructional beach -- and this is an
16 erosional beach, but on the constructional
17 beach, if there was a line of clumps,
18 obviously that formed a line of vegetation.
19 And I think that's the difference. And,
20 again, I'm looking -- this is an erosional
21 beach, so it's a little different than a
22 fair-weather beach, I'll just -- I'll say
23 that. But, see, I didn't flag these for
24 example. There's a flag right there only
25 because it comes out. And you see it go --



1 there's a flag. Let me just stop for a
2 second. This is important. There's a flag
3 here and there's a flag there. So we come
4 out and it goes back. This is an erosional
5 situation. And that -- so when you see the
6 vertical, you'll see it scallop like that
7 quite a bit. When we get down here, this is
8 the dead vegetation that I mentioned. And I
9 think there's a little orange flag you can
10 see there. And actually I ran my line -- I'm
11 just going to kind of approximate it, because
12 I can't see them all. But I ran the line
13 back through here because this is -- you can
14 see this is -- it's kind of reddish and it's
15 brown, it's dead. There might be a few
16 little living bits of vegetation, but there
17 again, you know, I discounted that simply
18 because it was effected, you know, by the
19 storm, and so my line goes back behind it.
20 Continue.

21 **MR. WALKER:** Petitioner moves the two videos into
22 evidence that were Petitioner's Exhibit 21
23 into evidence as Petitioner's Exhibit 21.

24 **MR. CHURDAR:** No objections.

25 **THE COURT:** They're entered.



1 **(Petitioner's Exhibit Number 21 was entered into**
2 **evidence.)**

3 Q: We've heard from Mr. Byrnes. Did you review
4 the data points and the line that Mr. Byrnes
5 surveyed?

6 A: Yes.

7 Q: And how did you, if you did at all, seek to
8 confirm its accuracy?

9 A: I looked at his points, then we overlaid them
10 on a orthorectified aerial imagine. And when
11 you lay them on top of one another, it's
12 called a dead hit. In other words, my
13 scallop and what you see in the other
14 photograph match up perfectly. So we had
15 high confidence, not only did we mark it and
16 it was surveyed properly, but it also
17 corresponds to the aerial photograph when you
18 see that there's a vertical imagine of what
19 we have that shows the actual line, and so it
20 matches up.

21 **MR. WALKER:** If we could have Petitioner's Exhibit
22 9, page 29, please.

23 **(Petitioner's Exhibit Number 9i was introduced.)**

24 Q: What was the data that orthorectified
25 photograph that was used?



1 A: This photograph was obtained by a satellite.
2 And it's red because it's color infrared
3 imagine. And it was obtain in November of
4 2017. We had one that was closer to the time
5 period of the storm, but we didn't -- again,
6 we excluded that one, because we were
7 concerned that maybe it wasn't as accurate as
8 this.

9 Q: What do you mean by accurate?

10 A: It was more of a oblique photograph. It
11 wasn't looking straight down.

12 **MR. WALKER:** All right. And if we could go --
13 Alex, if you could go to --

14 Q: First of all, let's stick on this for a
15 second. What is depicted here?

16 A: Okay. What we show with this red squiggly
17 line is what I just testified to that
18 identified the most landward point of
19 erosion. And then what we put on the
20 photograph too is OCRM's proposed line, the
21 green being the proposed baseline, the purple
22 being the proposed setback line.

23 Q: You mentioned this, but was this two thousand
24 -- November 2017 photograph orthorectified to
25 a degree of accuracy, to your knowledge, that



1 would allow you to plot those points on?

2 A: Yes. It was orthorectified and we did verify
3 that, and it was suitable for us to plot the
4 points and overlay the information.

5 Q: All right. You've got your line, which
6 you've designate as an MLPE. And what are we
7 looking at here? This is which end of spit?

8 A: Okay. This is going down the beach. And I'm
9 glad we had these blown up. MLPE stands for
10 the most landward point of erosion. And,
11 again, you see my line is that red boundary
12 line. And you see the two OCRM lines, the
13 proposed baseline in green and the proposed
14 setback line in purple. And what's, again,
15 interesting to me is, I did this delineation
16 back in 2017. Mr. Byrnes surveyed it then.
17 And then this past fall Mr. Tolleson actually
18 found this photo -- this satellite photograph
19 that was commercially available. And we
20 overlaid the data on top of the satellite
21 photograph and it matches dramatically close,
22 closer than I would have imagined. It's a
23 really a good representation.

24 Q: And then the next couple pages moves
25 southwest on the spit.



1 A: And, again, as I say, it's kind of busy,
2 because you can see where I cut into some of
3 those blowouts and came out with some points,
4 and so it's not just a single line, but it's
5 multiple, kind of, lines that are all, kind
6 of, together. Then down to this one that
7 we're looking at, this particular imagine,
8 you can see the dead vegetation is seaward of
9 the most landward point of erosion.

10 Q: Next.

11 A: Same here. Exact same situation.

12 Q: Where is that in relation to ---

13 A: That is -- as you go around the recurved
14 spit, this is actually down near the inlet.
15 And you see the dead vegetation and -- which
16 is brown. And the red vegetation is actually
17 living vegetation. So I was looking, again,
18 at geomorphology and vegetation in this
19 setting. And you don't see really isolated
20 clumps that formed this. You see it is all
21 part of a unified area. And the red
22 vegetation you see to the -- those are -- a
23 lot of those are trees and larger plants.

24 **MR. WALKER:** Petitioner moves Petitioner's Exhibit
25 9, pages 29 through 36, as Petitioner's 9i



1 into evidence.

2 **MR. CHURDAR:** Your Honor, the Department does not
3 object, if all of the language is removed.
4 These are making representations -- or least
5 they can be interpreted as representations of
6 the landward point of erosion that the
7 Department does not agree with. I think
8 these are also -- we would object based on
9 just the hearsay nature of the language
10 that's on the images. We don't object to the
11 images without the language. And, Your
12 Honor, that is the -- one other matter is
13 this is, in essence, invading the province of
14 The Court in that these are legal conclusions
15 that are being contested by the Department.

16 **MR. WALKER:** Your Honor, the most landward point of
17 erosion is not a legal conclusion. The
18 statute says what the standard is. And Mr.
19 Hodge went out and applied geological --
20 coastal geological principles to locate the
21 most landward point of erosion. It's a
22 factual determination. Your Honor, can --
23 does not have to accept it, but he made his
24 factual determination as a trained
25 professional in coastal geology and coastal



1 processes based on what he knows about
2 Captain Sam's and secretional history to
3 determine the most landward point of erosion,
4 so he determined the facts. And the rules
5 are pretty clear that an expert, through his
6 experience, if he knows the facts and has
7 firsthand experience with them, that he can
8 testify to the ultimate fact to be
9 determined. Your ultimate fact is the most
10 landward point of erosion. He has given his
11 opinion. You can reject it, but he's not
12 making a legal conclusion. The standard is
13 set by a law in the statute. He's not
14 saying, the statute says that you must pick
15 the most landward point of erosion. He's
16 saying the statute, it's given that that's
17 the standard. Not, I went out and I found
18 it. He's not testifying or interrupting the
19 language in the statute. What he's doing is
20 applying what the statute said. No different
21 from when the Department goes out and sets a
22 critical line. That's not a legal
23 conclusion. They set the baseline. The
24 baseline's not a legal conclusion. It's a
25 factual determination. We know what the



1 legal conclusion is. It's in the statute.

2 **THE COURT:** I agree with you. I'm overruling his
3 objection.

4 **MR. WALKER:** Thank you, Your Honor. We have about
5 20 more minutes, would Your Honor like to
6 continue. We received from The Court the
7 trial days. I'm happy to continue. I'm
8 happy to pick it up in the morning, but I
9 didn't want to go too late. Whatever your
10 pleasure is.

11 **THE COURT:** Okay. And you've got about 20 more
12 minutes with this witness?

13 **MR. WALKER:** Yes, ma'am.

14 **THE COURT:** And, tell you what, let's pick it up in
15 the morning.

16 **MR. WALKER:** All right. And that'll allow me to
17 kind of compress things and not be as
18 scattered, so I hope I'll be more efficient.
19 Thank you, Your Honor.

20 **THE COURT:** That will be fine. I have a car
21 missing in my house, and so I've got someone
22 picking me up.

23 **MR. WALKER:** Oh, well, please.

24 **THE COURT:** And, remember we're starting at 9:00 in
25 the morning.



1 **MR. WALKER:** Yes. Yes, Your Honor. Thank you.

2 **THE COURT:** Thank you all.

3 (There being nothing further, the hearing adjourned
4 at 5:26 p.m. on Tuesday, August 24, 2021, and
5 reconvened on Wednesday, August 25, 2021, at 9:09
6 a.m.)

7 **DAY TWO - WEDNESDAY, AUGUST 25, 2020**

8 **CALL TO ORDER:**

9 **THE COURT:** Well, we're back on the record. Mr.
10 Hodge, if you'd come back, and you're still
11 under oath.

12 **MR. HODGE:** Good morning.

13 **THE COURT:** And good morning to you.

14 **MR. HODGE - CONTINUED DIRECT EXAMINATION BY MR.**
15 **WALKER:**

16 Q: Mr. Hodge, we wrapped up your testimony
17 yesterday talking about your visit in October
18 of 2017. And you went over the line that you
19 marked with survey flags and was later
20 surveyed and you described it. What I'd like
21 to do today is start with the definition of
22 active beach. And I've got it on the screen.
23 This is 48-39-270(13). Do you see that there
24 in front of you?

25 A: Yes.



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1 Q: Active beach is that area seaward of the
2 escarpment or the first line of stable
3 natural vegetation, whichever first occurs,
4 measured from the ocean. My question is, how
5 did the line that you marked compare with
6 this definition of active beach?

7 A: The line that I marked was, I would say,
8 above the active beach because it really was
9 the first -- you know, I would say first line
10 of stable vegetation. And I believe, when
11 you see the video, it's pretty clear that
12 that's where it was located. But the
13 vegetation was off the active beach.

14 Q: Very good. Thank you. Now, after 2017, did
15 you periodically check on Captain Sam's,
16 visit it?

17 A: Yes.

18 Q: Are you a pilot?

19 A: Yes.

20 Q: At some point after that visit in 2017, did
21 you fly over Captain Sam's?

22 A: Yes. I have an antique aircraft, and I fly
23 the coast periodically just to see what
24 changes have gone on and go to different
25 parts of the coast at different times. And



1 so on October the 10th, 2019, I believe, I
2 flew the coast from south to north and I, of
3 course, passed Kiawah. And having reviewed
4 the aerial imagery and some of the questions
5 about where's the vegetation, is there
6 vegetation or not, I took an oblique
7 photograph. I think I took several, but
8 there's one that I provided to you.

9 Q: All right.

10 **MR. WALKER:** Could we have on the screen, please,
11 Alex, Petitioner's Exhibit 17?

12 **(Petitioner's Exhibit Number 17 was introduced.)**

13 Q: And what is this?

14 A: Okay. This is an oblique photo of the
15 central part of Kiawah Island, and it was
16 taken from about 700 feet.

17 Q: Let me pause you there. You said the central
18 part of Kiawah Island.

19 A: Excuse me. Central part of Captain Sam's
20 Spit. I apologize. I misspoke.

21 Q: Proceed.

22 A: Okay. So, one of the issues that's in the
23 case, of course, is whether, you know, the
24 clumps of vegetation would constitute a
25 vegetation line. And so this picture is a



1 good analogue for, for example, what we saw
2 in the 1988 image. And OCRM's line -- I'll
3 let you ask me the question. I can -- unless
4 you want me just to go ahead and narrate.

5 Q: All right. Well, I'm going to ask you ---

6 A: Okay.

7 Q: --- based on what you testified to today, how
8 is this picture significant to your opinions,
9 or how does it play into your opinions?

10 A: It is significant because this picture is an
11 analogue to what we -- when we look at the
12 '88 image of Kiawah, there's a question of
13 where the vegetation is located. And so it's
14 significant because I see this picture as an
15 analogue. And you also -- what, to me, is
16 very important, you see -- in other words,
17 this is certainly after Irma. And you see
18 the vegetation starting to take hold. In
19 other words, the dunes had been previously
20 destroyed and we -- I showed that in the
21 video yesterday. And so you see this, kind
22 of, line of vegetation right across here.
23 And so that is a -- you know, essentially, a
24 line of continuous vegetation. And that's
25 important because, when we look at other



1 photographs, we see a similar view.

2 Q: If that area was inundated with salt water on
3 a periodic basis, would those plants be
4 there?

5 A: No. The plants could not survive if the salt
6 water -- in other words, if the -- either the
7 surf got that high for a period of time or if
8 the ground water -- periodic ground water
9 every day with the tides going up and down
10 twice would get to the roots and kill those
11 plants. So, that actually is -- I would call
12 that emergent vegetation. That's a
13 relatively new vegetation that's -- you know,
14 I would say has grown since Irma.

15 Q: Is it stable?

16 A: Yes. It's stable. It's rooted. It's
17 living. It's stable.

18 Q: Did you return again to Captain Sam's a
19 little less than a year later?

20 A: Yes, I did.

21 Q: And when was that?

22 A: That was in early August of 2020.

23 Q: Who was with you on that visit?

24 A: Andy Tolleson and then Mr. John Byrnes, the
25 surveyor.



1 Q: And what was the purpose of that visit in
2 twenty -- August of 2020?

3 A: The purpose was to see what sort of recovery
4 the beach had had since Hurricane Irma had
5 impacted it. And so I performed a similar
6 walkthrough that I did back in 2017, and
7 essentially walked down -- went out to the
8 boardwalk and walked down the beach. And
9 where we saw the scarps in the video and the
10 picture yesterday, we then saw sand dunes
11 that were growing and vegetation that was
12 rooted in the sand dunes. And so really I
13 wanted to see how much the beach had
14 recovered since Irma. And it was a -- quite
15 a -- I would say a substantial recovery.
16 When I got further down the beach, there was
17 a foredune ridge that had grown up. And it
18 was certainly -- I'm about six-feet tall and
19 it was taller than me. And so in just couple
20 of years, that dune had actually grown up and
21 it had sea oats on top of it. And I called
22 Mr. Tolleson over and said, look at this.
23 I'm sort of a teacher when I'm out there.
24 So, I was actually just describing to him
25 what I was looking at and that sort of thing.



1 Q: And did you mark a line?

2 A: I did. We had stakes -- I had stakes that I
3 had put out along the -- I mapped the
4 vegetation line. And I say vegetation line.
5 Really, I looked at vegetation and I look at
6 geomorphology together and marked a line.
7 And then, Mr. Byrnes -- that afternoon -- I
8 did it in the morning, and we finished maybe
9 early afternoon. And then he, you know,
10 surveyed it immediately. And I will say
11 that, you know, going down the beach, all the
12 way around the spit, we marked it. And when
13 I came back, I -- this is just my technique.
14 I said, okay, I'm going to play devil's
15 advocate with myself, and I'm going to look
16 at each of these locations and verify that
17 I'm comfortable with the setting of the
18 stakes. And for the most part, I believe,
19 they stayed in the same place, but we may
20 have moved one or two. But I tried to use
21 the walk back to be kind of a second look to
22 say, okay, you know, did I put them in the
23 place of my best judgement, constitutes the
24 leading edge of vegetation, the first line of
25 moving stable vegetation. And so we finished



1 that. And it was a very hot day. I think
2 Mr. Byrnes testified as well that it was very
3 hot. We took a lunch break, got some water,
4 came back, and then, we did a drone flyover,
5 you know, to memorialize what it looked like
6 that day.

7 Q: Where were the stakes that you had placed in
8 relation to the terminus of the active beach?

9 A: The stakes, I would say, were really up above
10 the active beach. There was a berm, you
11 know, that had developed. And I would say,
12 it was up at the -- sort of toward the end of
13 the berm, but at the base of the primary dune
14 that was developing.

15 Q: Did you take still photographs along with the
16 drone?

17 A: Yes, I did.

18 **MR. WALKER:** Let's have Petitioner's -- before we
19 move onto that, I forgot to introduce
20 Petitioner's Exhibit 17, which was the
21 photograph that Mr. Hodge took on October 10
22 of 2019. Petitioner offers it as the
23 Petitioner's Exhibit 17.

24 **MR. CHURDAR:** No objection.

25 **THE COURT:** It's admitted.



1 **(Petitioner's Exhibit Number 17 was entered into**
2 **evidence.)**

3 Q: All right. Now, let's go to Petitioner's
4 Exhibit 22.

5 **(Petitioner's Exhibit Number 22 was introduced.)**

6 Q: All right. Again, we're starting with -- is
7 that -- what is that?

8 A: Okay. This is a view of Captain Sam's Spit
9 that was taken from a drone out on -- in
10 early August 2020.

11 Q: Is there anything significant in this
12 photograph with respect to the recovery of
13 the beach seaward of those -- of where the
14 scarp was when you visited three years
15 earlier?

16 A: Well, let me see if I can draw a line here.
17 Just roughly, you see this is all new
18 vegetation that's grown along here. And this
19 was -- the dune scarp was on the -- the line
20 on the right. In other words, the line on
21 the right corresponds to dune scarp that was
22 saw in 2017. And then in 2020 the line on
23 the left corresponds to that location. And I
24 also -- and maybe there's another image that
25 we -- well, I'll wait until we get to the



1 images ---

2 Q: All right.

3 A: --- on the ground. There's some more detail
4 I'd like to discuss, but I'll wait until we
5 get something a little more closer up.

6 **MR. WALKER:** All right. That's a different one.
7 Can we go back? Are there any others along
8 22? All right.

9 Q: This is more of a ground level photograph.
10 Now, are we looking basically in the same
11 direction?

12 A: This is the same direction from a lower
13 altitude and do you want me to describe what
14 I see here?

15 A: Yes, please.

16 Q: Okay. And say which direction we're looking
17 at.

18 A: Okay. This is looking south toward the
19 inlet. And so the leading edge of the
20 vegetation goes pretty much along this. And
21 you can see it, it's very much of a line of
22 vegetation and it's -- to me it's really no
23 question that you've got living, rooted
24 vegetation. This is the foredune ridge and
25 this is way back where the scarp was after



1 Irma. You can see a little dune. This is a
2 blowout where the -- some sand had been
3 pushed back in a small washover right there.
4 But it's -- but all this, I would say from
5 this line forward, all this is -- it's new,
6 so. And there's another thing that I would
7 like to address. Sometimes on the beach when
8 we talk about living vegetation, many times
9 you go out to the beach and you seen some
10 dead vegetation that's laying on the beach.
11 And you -- there's some here. What it is, is
12 the green marsh grass called -- it's called
13 spartina alterniflora. And the spartina gets
14 washed out of the ---

15 **MR. CHURDAR:** Your Honor, I object. Mr. Hodge has
16 been qualified to testify about the
17 vegetation.

18 **MR. WALKER:** Mr. ---

19 **MR. CHURDAR:** Your Honor, I believe it's outside of
20 his recognized expertise that The Court has
21 recognized him in.

22 **MR. WALKER:** I'll ask a question or two about that,
23 Your Honor.

24 **THE COURT:** Okay.

25 **MR. WALKER:** All right.



1 Q: Mr. Hodge, are you familiar with the plants
2 that typically grow in the South Carolina
3 coast in the brackish tidal zone?

4 A: Yes.

5 Q: And during the course of your studies,
6 including your graduate program in marine
7 sciences at USC, did you study that
8 ecosystem, including the flora?

9 A: Absolutely. And one of the core classes in
10 marine science at USC was biological
11 oceanography. In order to be a good coastal
12 geologist, you have to know the -- how the
13 plants interact with the geology and how they
14 actually affect the geology and vice versa,
15 so it's all integrated. And, sure, I'm not a
16 botanist. I don't claim to be a botanist, but
17 I know enough about the coastal vegetation
18 and their functions to -- and I could
19 identify a spartina alterniflora and whether
20 it be on the beach or the in the salt marsh.
21 So, I believe that I'm certainly qualified to
22 testify as to, you know, the types of
23 vegetation that one sees in the coastal zone.
24 It's an integral part of the education. You
25 can't really understand coastal geology



1 without knowing something about the
2 vegetation.

3 Q: During your visit in October of 2020, did you
4 identify marsh grass or spartina ---

5 A: Yes.

6 Q: --- alterniflora on the beach?

7 A: Yes. And there's a term of art, it's called
8 wrack. And so, that's -- that is dead
9 vegetation. The marsh grass that's -- is
10 dead, it washes out of the salt marsh into --
11 along the beach and it comes up on the beach.
12 And if you've gone out walking on beach, you
13 see this -- these brown kind of long, narrow,
14 sort of, chutes, so to speak. It's the marsh
15 grass that comes -- that you see. And in
16 this picture, the living marsh grass is
17 actually on the right. It's in the back, the
18 bright green grass. But on the beach, you
19 can see it seaward of this vegetation line.
20 And I'm going to circle -- this is an area of
21 wrack right here. And a few days before we
22 were on the beach, there was a tropical
23 storm. I think it was Isaias, Isaiah,
24 something like that. I can't remember the
25 exact name. But, anyway, there had been a



1 tropical storm that came by the coast, and so
2 there had been some relatively high tides.
3 And so you do see some areas of wrack on the
4 beach, which is really this area. You see
5 the dark. And that's not living vegetation.
6 I just want to make that distinction, because
7 it's important, and it's common to see that
8 kind of grass. And maybe there -- you have
9 some closeup pictures down the beach where
10 you'll see the wrack. But that's not what
11 we're talking about for the vegetation line.
12 We're talking about this green vegetation.
13 And you can certainly see that it's in a
14 linear fashion going down the beach, and it's
15 not isolated clumps.

16 Q: Very good.

17 A: Let's see if I can clear this. There.

18 Q: All right. And this is another photograph.
19 Anything you want to say or should we move
20 onto the next?

21 A: I think it's essentially the same view, maybe
22 a little bit higher altitude. You do see a
23 dune -- several dune fields. I can count
24 maybe three across the neck. At least three
25 dune fields.



1 Q: At what portion of Captain Sam's are you
2 seeing the three dunes fields?

3 A: Right across the neck. Right across ---

4 Q: All right.

5 A: --- this area.

6 Q: Very good. All right. Is this another still
7 of -- but much higher up?

8 A: Much higher altitude. There's something
9 else, as soon as I clear this circle, I'll
10 tell you about. The other thing that's
11 noticeable here, and I think this is
12 significant, you see a number of trails back
13 through the dunes. And of course, you know,
14 when we go to the beach, there are signs that
15 say, don't walk on the dunes. And that'll
16 mean vegetation, fragile. But any time you
17 have, you know, any sort of marks, whether
18 they be a human trail or mud rise vehicle or
19 something like that, those marks stay visible
20 for a long time. And I just throw that out
21 here because ---

22 Q: Could you use your marker to show us what ---

23 A: Sure. Here's a trail. And I don't want to
24 cover it up, so I'll just go off to the side.
25 But you can see these trails. This is where



1 people would walk. And maybe they are -- I
2 don't know if they think it's an established
3 trail, but it might be. But you can see some
4 of these marks. I'm not covering them up.
5 I'm just trying to go off to the side to show
6 that, when people do step on the dunes or
7 drive on the dunes or whatever, that those
8 marks -- you know, there they are. They
9 leave, I would say, a fairly -- I wouldn't
10 call them permanent. But the difference is,
11 if somebody walks on the beach or drives on
12 the beach, the blowing sand will cover them
13 up. But in the dunes, you can -- you really
14 see those trails and they stay there for
15 years. And I just wanted to point that out.

16 Q: Is one of the -- so, does the tidal cycle on
17 the active beach play a role in the
18 elimination of those tracks on the ---

19 A: Yes. In other words, it -- just like when
20 you build a sand castle, the next -- after
21 the next high tide, it's gone. If you drive
22 down the beach and you're within the range of
23 the tides and the uprush, those tracks will
24 be gone. And if they're not gone because of
25 that, the wind will cover them up and they'll



1 eventually -- and after a day or two, you
2 won't see them anymore.

3 Q: So with tracks like that, to a reasonable
4 degree of geologic certainty and just based
5 on your experience, would tracks like that
6 appear on the active beach?

7 A: No. No. It would be very temporary if they
8 were there.

9 Q: Let's continue on. All right. Anything on
10 this or is it based -- any significance to
11 this photograph, which is the next one, or
12 should we go to the next one, Mr. Hodge?

13 A: I'm sorry. Repeat your question.

14 Q: I was asking about this photograph. Any --
15 anything significant with this one or is it -
16 --

17 A: Oh. It ---

18 Q: --- basically the same features as the ---

19 A: It shows the same thing. You see the --
20 there's a nice foredune ridge right along
21 here. I think that's important. And you see
22 these are the -- I would call these the
23 incipient or embryotic dunes that are
24 forming. And there's the line of vegetation
25 clearly right down the beach. So that's the



1 main point that you can see. It's not quite
2 low tide. It looks like a mid-tide picture.

3 Q: All right. Here's another still photo
4 drawing.

5 A: This a vertical picture. And this is the
6 wrack that I talked about. This is the dead
7 kind of marsh grass that's on the beach. And
8 the -- correct, the vegetation line would be
9 along -- this is the living vegetation right
10 along there. And you see the tracks back
11 over here. You see the maritime forest.

12 Q: Is this another example of it here?

13 A: I'm sorry?

14 Q: This photograph ---

15 **MR. WALKER:** Did you go to the next photograph?

16 Q: All right. Is this another example of what
17 you were just saying ---

18 A: Yes.

19 Q: --- in this photograph? All right.

20 A: Yes.

21 **MR. WALKER:** Next photograph.

22 A: Exactly the same. This is a good one,
23 because you can -- this is a wrack right
24 here. I'm just going to circle it. And then
25 the actual living vegetation kind of goes



1 along this line right through here.

2 Q: And then the next photograph, we have another
3 area. Is this similar to what we were just
4 looking at?

5 A: Yes.

6 Q: Mr. Hodge? Okay.

7 A: It basically shows the same features. I
8 could point them out again if want, but ---

9 Q: All right. And I'm going to let Alex go --
10 scroll through them. And you -- when you ---

11 A: Okay.

12 Q: --- see one that you want to talk about, you
13 have him stop it and you talk.

14 A: Okay.

15 Q: So, why don't we spend about five seconds on
16 each.

17 **MR. ROSEN:** This is the last one.

18 Q: It's the last one.

19 A: Okay. That's fine. I will say that you see
20 this kind of speckle from above. This is a
21 vertical image looking down. And on this
22 dune field, it's just speckled and it's
23 different colored. I'll just say that you
24 see the white color from the beach, kind of
25 the speckled color in the dune field, and



1 then the green maritime forest. And so there
2 are three generalized kind of areas or
3 geomorphic areas there.

4 Q: Did you also do a video?

5 A: I did.

6 Q: of a drone?

7 A: I did.

8 **MR. WALKER:** And before we move onto that,
9 Petitioner's offers Petitioner's Exhibit 22,
10 the series of photographs, into evidence.

11 **MR. CHURDAR:** No objection

12 **THE COURT:** They're admitted.

13 **(Petitioner's Exhibit Number 22 was entered into**
14 **evidence.)**

15 Q: We will now take a look at the video that you
16 took from your drone on August -- in August
17 of 2020.

18 **(Petitioner's Exhibit Number 23 was introduced.)**

19 A: Same day. This is just flying down along the
20 foredune ridge and all the vegetation, just
21 to get a good -- kind of memorialization of
22 what we observe. And you see the foredune
23 ridge very clearly right through here.
24 Here's the vegetation line right across
25 there. So, there's the sea oats on top of



1 the foredune ridge. And then, I tried to fly
2 over a little closer to the vegetation line.
3 So in a minute you'll see that. So, we're
4 going right down along the vegetation line at
5 this point. And this is a dune field that's
6 building up. And it's fairly straightforward
7 and fairly clear right there. You see the
8 brown wrack, and that's from the tropical
9 storm that left it at high tide, probably a
10 pretty, you know -- pretty good high tide
11 right there. And the brown on the left is
12 the wrack, and you see the green, you know,
13 marsh grass -- or, excuse me, the green dune
14 grass. There's some old -- there's some dune
15 blowouts right here. There's a -- this is
16 one of the erosional areas that we -- we saw
17 back in 2017. And you can see that, not only
18 is the --grass going seaward of that, but
19 also that it eventually will build up and
20 fill in too, so. That tall marsh grass is
21 called uniola as well. That's actually the
22 name for it. And you can also see there are
23 three -- at least three, maybe four dune
24 ridges across here if you're looking off to
25 the right. Now, I wanted to go sort of back



1 and forth across this, so, you know, it would
2 give a picture of what it's like, you know,
3 not only seeing the foredune ridge, but also
4 seeing the vegetation line. And then you can
5 see into the island a little bit more. So,
6 again, there's the vegetation line right
7 through here. It's rotating. There's the
8 brown wrack that's just beyond it. And there
9 we are looking back the way that we came.

10 Q: Okay. To a reasonable degree of coastal
11 geologic certainty, has the beach at Captain
12 Sam's that we were looking at been eroding or
13 accreting since Hurricane Irma?

14 A: To a reasonable degree of geological
15 certainty, since Hurricane Irma, the beach
16 has been recovering, it's been accreting, and
17 the dunes have been building up as well.

18 Q: Did you receive the data from John Byrnes
19 that marked the line that -- or actually, the
20 data points from the line that you marked
21 that he surveyed ---

22 A: Yes.

23 Q: --- that day?

24 A: Yes.

25 Q: And with that data, did you, yourself, do



1 some calculations of the seaward line of
2 vegetation?

3 A: I did.

4 Q: Then as compared with after Irma?

5 A: I looked at the line that we delineated after
6 Irma. The one that, you know, we referred to
7 yesterday as the most landward point of
8 erosion, and then I looked at the line that
9 Mr. Byrnes had surveyed from our 2020 visit,
10 and I measured the distance between the two.

11 **MR. WALKER:** And before we go onto that, Petitioner
12 offers the video that we just saw, which is
13 Petitioner's 23.

14 **MR. CHURDAR:** No objection.

15 **THE COURT:** Admitted with no objection.

16 **COURT REPORTER:** Tell me the number again?

17 **MR. WALKER:** That's was Petitioner's 23.

18 **COURT REPORTER:** Thank you.

19 **(Petitioner's Exhibit Number 23 was entered into**
20 **evidence.)**

21 Q: At this time, I'd like to -- did you compile
22 some tables at various transects to show the
23 difference?

24 A: I did.

25 Q: All right.



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1 **MR. WALKER:** Alex, if we could take a look at
2 Petitioner's Exhibit 9, page 43, please.

3 **(Petitioner's Exhibit Number 9j was introduced.)**

4 Q: What is this?

5 A: I made a table, and on the left are the
6 various stations. In other words, they're
7 the different stations that I had used
8 previously, as well as the two OCRM stations
9 that we were using to benchmark. And I went
10 straight out to the beach to the most
11 landward point of erosion line that we
12 identified in 2017. And what it tried to do
13 is, the erosion really started about 2015.
14 We see a May 2015 image that shows the -- I
15 would say the maximum amount of accretion.
16 And then we had the stormy period between
17 2015 and 2017. So, each of the stations, the
18 central column, this is how much -- you know,
19 how many feet -- linear feet the beach lost.
20 And then between 2017 and 2020, this is how
21 much the beach recovered. The column on the
22 right is how much the beach recovered. So,
23 it shows that the beach has certainly been in
24 the recovery phase and has been accreting.
25 So, it cut back and it's accreting again.



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1 And I guess sort of like when the stock
2 market takes a dip, it comes back. And
3 that's what the beach is doing here.

4 Q: Just so we're geographically oriented, which
5 is the station closest to monument 2625 by
6 Beachwalker Park?

7 A: Okay. Which monument? Say again.

8 Q: Which station is closest to Beachwalker Park
9 ---

10 A: Okay.

11 Q: --- the monument? So, that we're ---

12 A: I would say ---

13 Q: --- oriented in this column.

14 A: I would say K-9. And if I could -- I'll be
15 lousy artist here and draw a picture of the
16 spit. And that's the spit. So, K-9 is up
17 about here. K-21 is down here. And the two
18 OCRM stations -- well, I've got 2615 in this
19 one, because I went back to that just to
20 measure this location. But, anyway, that --
21 and then ---

22 Q: Which of these stations is closest to the
23 neck or in the neck?

24 A: I would say probably K-11 is closest to the
25 neck.



1 Q: So, looking at that, between 2015 when those
2 storms started and when you went out at Irma,
3 how much did you measure the loss of the
4 beach over those erosional storms?

5 A: I would say, you know, it lost somewhere
6 between 89 -- it looks like it lost about 89
7 feet and it's gained 41 back at K-12.

8 Q: Okay. So, you're at K-12?

9 A: Yes.

10 Q: All right. And that would be these columns
11 in the middle -- or excuse me, the numbers in
12 the middle column are the loss over that
13 period from the storms ---

14 A: Correct.

15 Q: --- for each station? And the far right
16 column is ...

17 A: So, the center column is how much the beach
18 lost between 2015 and 2017. And then we
19 identified the most landward point of erosion
20 then. And then from 2017 to 2020, the right
21 column shows how much the beach has
22 recovered. So, it hasn't recovered all of
23 that back, but it certainly has recovered, I
24 would say, at least about 40 percent on the
25 average.



1 **MR. WALKER:** If we could go to the next, slide two
2 here.

3 **Q:** Did you do a graph?

4 **A:** I did. And this is just a graph, again, K-11
5 being up -- K-12 up near the neck. And I'll
6 draw the spit again just to kind of give a
7 perspective as to where it is, if I can do it
8 this way. And so this shows the amount of
9 accretion, the vertical up to 100 feet. And
10 the -- with the horizontal axis, it just
11 shows the different stations going down the
12 beach. So, this corresponds roughly to where
13 each station is. And I'll just -- I'll kind
14 of do this to make it easy, and points --
15 I'll put some markers. So, in other words,
16 going down the beach, this is the amount of
17 accretion that was observed.

18 **MR. WALKER:** And if we could go to the next slide,
19 please.

20 **Q:** The next slide is page 45 of Exhibit 9,
21 Petitioner's 9. And we see two lines here.
22 Do you have a legend for the colors on this
23 graph, Mr. Hodge?

24 **A:** Yes. So, the legend -- first off, let me
25 just cover the axes. You've got the distance



1 from the benchmark in feet on the vertical
2 axis, and then the horizontal axis, again, is
3 going down the beach. There's the spit. And
4 so this is going down the beach. And I've
5 got two different colors here. One is from
6 the benchmark to the most landward point of
7 erosion. That's what we identified in 2017.
8 That's the distance from the benchmark to the
9 most landward point of erosion in each of
10 these stations. And then in 2020, we
11 measured from the benchmark to the 2020
12 vegetation line. So, everything in between
13 the blue line and the green line is all
14 accretion. And I -- that's really the point,
15 I think, of the graph, is all this -- excuse
16 me. I'm going to -- all this is all new.
17 I'll see if I can color it in. I'm not that
18 good at this, but I'll try. So, all that is
19 essentially new accretion.

20 **MR. WALKER:** Petitioner offers into evidence pages
21 43 through 45 of Petitioner's Exhibit 9 as
22 Petitioner's Exhibit 9j.

23 **MR. CHURDAR:** Your Honor, I just maintain the same
24 objection that I had yesterday as to the
25 words on there and the confusion caused by



1 that, most landward point of erosion and
2 subsequent accretion. I know you ruled on
3 that, I'm just ---

4 **THE COURT :** Thank you.

5 **MR. CHURDAR:** --- preserving that. Do you remember
6 what I'm talking about?

7 **THE COURT:** I know what you're talking about.

8 **MR. CHURDAR:** Okay.

9 **THE COURT:** And -- yeah. And your objection ---

10 **MR. CHURDAR:** Okay.

11 **THE COURT:** --- is noted, but ---

12 **MR. CHURDAR:** I understand.

13 **THE COURT:** --- my ruling stands.

14 **MR. CHURDAR:** Thank you.

15 **THE COURT:** Thank you.

16 **(Petitioner's Exhibit Number 9j was marked and**
17 **entered into evidence.)**

18 Q: Mr. Hodge, with this information that you
19 accumulated in August of 2020, did you do a
20 visual representation of the location on an
21 aerial photograph overlaying it on an aerial
22 photograph, along with the line that you
23 marked ---

24 A: Yes.

25 Q: --- in October 2017?



1 A: Yes. We marked the line on the aerial image.
2 Correct.

3 Q: Was the image that you used geo --
4 orthorectified for accuracy?

5 A: Yes. It was. It was orthorectified, and
6 that was verified.

7 Q: Were the points that you added, the
8 coordinates for the two lines, surveyed
9 lines?

10 A: I'm sorry. Say again.

11 Q: Were the two lines that you added, your
12 October 2017 line and your August 2020 line,
13 surveyed lines?

14 A: Yes. They were surveyed lines by Mr. Byrnes.
15 Correct.

16 **MR. WALKER:** May we please have Petitioner's
17 Exhibit 9, page 46?

18 **(Petitioner's Exhibit Number 9k was introduced.)**

19 Q: What is Petitioner's Exhibit 9, page 46?

20 A: This was a color, infrared that has a false
21 color of the vegetation, that normally is
22 green, is depicted as being red here. And
23 it's a satellite image. And what we depicted
24 here is, first, it's labeled as the 2020
25 vegetation line. And that is the line that



1 we saw in the videos and in the -- you know,
2 that we just discussed. And then the red
3 line that's more squiggly, that was the line
4 that identified in 2017 that we've called the
5 most landward point of erosion. Then the
6 other two lines, the green line is OCRM's
7 proposed 2017 proposed baseline, and then the
8 purple line is OCRM's proposed, you know,
9 setback line.

10 Q: Great. Did you break this photograph into a
11 series of closer images of segments of the
12 Captain Sam's Spit?

13 A: I did, because this -- even though this shows
14 the whole spit, it doesn't give you the
15 details. And so when we zoom in, you can see
16 a lot more detail.

17 **MR. WALKER:** Let's go through those slides, please,
18 Alex.

19 A: Now, this actually is pretty interesting.
20 This is a satellite image from space and you
21 can see beach umbrellas and you can see beach
22 chairs, and things like that, which is really
23 pretty high resolution overall. And -- do
24 you want me to describe the features here or
25 ---



1 Q: Yes, please.

2 A: Okay. So, what you can see -- the thing
3 that's most striking here is you see the red
4 line that, in 2017, was the most landward
5 point of erosion that we identified. And
6 then seaward of that you see the accretion,
7 you see the 2020 vegetation line, but in
8 between you can see the same, you know, dune
9 field that we showed in the drone video just
10 a few minutes ago. Then there's the several
11 beach ridges if we go toward the river. And
12 then there's OCRM's two lines. But really
13 the dune field shows up quite well in this
14 image.

15 Q: And how did your line that we talked about at
16 the end of yesterday, that's marked as the
17 most landward point of erosion, compare with
18 the features that were visible on this 2020
19 satellite image that was orthorectified?

20 A: Oh, it compares well simply because you see,
21 it might -- where the most landward point of
22 erosion is, it's a little bit darker on the
23 image as you move landward from that, and so
24 the vegetation is slightly more dense. But
25 you clearly see, you know, linear, you know,



1 vegetation across the new area from 2020 to
2 the 2017, the red line.

3 Q: Let me ask you about this grey area. It's a
4 little smudgy. Were you able to see on the
5 ground this area between your MLPE line and
6 the proposed line from OCRM 2017? When you
7 visited the site, did you look at this area
8 that's in between these dune ridges?

9 A: Yes. I actually -- I've walked up in --
10 several times when I was out there, I walked
11 up into the dunes, because I wanted to a
12 transect myself and walk up and down the
13 dunes to go into the island to see what it
14 looked like.

15 Q: What does this smudgy grey represent?

16 A: That is a series of dune fields. There are
17 basically three, we called beach ridges.
18 They were vegetated dunes. And I think
19 that's the important thing. So, there are
20 three vegetated dunes, and then we get out to
21 where the MLPE, the most landward point of
22 erosion, was identified, and we continue to
23 see vegetation growing, you know, seaward of
24 that.

25 Q: Great. And how do these images progress, Mr.



1 Hodge? As we go through the series, are we
2 going in a particular direction?

3 A: Yeah. Yes, Mr. Walker. We're actually going
4 down the beach toward the inlet. So, each
5 one has a slight overlap, you know, that was
6 done on purpose. But the intention here was
7 to really show the vegetation that had grown
8 between 2017 and 2020, which corresponds to
9 the accretion. And it's, again, you know,
10 the image taken from space. This is really
11 good technology that you can develop that
12 kind of detail from a commercial satellite.
13 And this is the same, just moving down the
14 beach. So, you know, to me it's undisputed
15 that we've had accretion in that area between
16 the MLPE line and the 2020 vegetation line.

17 Q: Do you take these images all the way around
18 the ---

19 A: Yes.

20 Q: --- curved ---

21 A: I do.

22 Q: --- portion at Captain Sam's Inlet?

23 A: Yes. And the vegetation down along the
24 inlet, you can see it's red, it's living
25 vegetation right here. There was some other



1 isolate clumps of vegetation that were
2 outside of that. And frankly, because the
3 inlet was relocated, it's a bit modified once
4 you turn down the inlet. But I made a point
5 to look at the vegetation that was rooted,
6 living, and stable. And, you know, it forms
7 a clear, well, linear feature. Clear that
8 out.

9 Q: Would this be the last one of your ---

10 A: Yes.

11 Q: --- slides of the segments of Captain Sam's
12 spit?

13 A: Correct. That's at the end of the spit. And
14 the water you see on the left is part of the
15 inlet.

16 **MR. WALKER:** Petitioner moves pages 46 through 53
17 of Exhibit 9 into evidence as Exhibit 9k.

18 **MR. CHURDAR:** Your Honor, other than the objection
19 that I've already made, I have no additional
20 objections.

21 **THE COURT:** Thank you. Noted and they're admitted.
22 **(Petitioner's Exhibit Number 9k was marked and**
23 **entered into evidence.)**

24 Q: Mr. Hodge, let's turn now to OCRM's
25 determination of the lines that we -- the



1 baseline that we were looking at on the
2 screen in October of 2017. Have you obtained
3 information related to OCRM's method of
4 determining the location of the baseline in
5 2017?

6 A: Very interesting. We've made a FOIA request
7 and I've looked on line at what was
8 published. And it's actually been fairly
9 cursory as to what OCRM's methods were. They
10 did talk in earlier memos, for example, the
11 2009 line, about using vegetation lines. And
12 they were advised to use -- in earlier
13 reports, advised to use the seaward edge of
14 vegetation. And then in the course of those
15 case, oh, some few months back, I received an
16 undated document, and I tried to figure out
17 when it was produced. OCRM didn't put a date
18 on it, which kind of surprised me in the
19 beginning. And I went back through and they
20 have a time line, so they do talk about the
21 Governor signing an amendment to Beachfront
22 Management Act sometime in twenty -- I
23 believe 2018. So, I surmised that after they
24 had developed these lines, they put together
25 a document to say, this is how we did it. In



1 that document, they talked about using, you
2 know, continuous, you know, kind of
3 uninterrupted, I think, vegetation.
4 Something of that nature. That was the first
5 time I'd ever seen that. And, again, that
6 was after the -- their line was developed.
7 So, it looked to me like this document was
8 put together after the fact.

9 Q: Well, regardless of that, did you determine
10 that there was an aerial photograph that
11 played a significant role in OCRM's
12 determination of the most landward point of
13 erosion?

14 A: It seems that the 19 -- there's a 1988, kind
15 of a black-and-white image, and it's not a
16 very clear image. And that seems to be the
17 one that they had placed there most landward
18 point of erosion on.

19 **MR. WALKER:** Could -- Alex, could we see
20 Respondent's 16a?

21 **(Respondent's Exhibit Number 16a was introduced.)**

22 Q: Do you recognize that as the base map 1988
23 orthoimagery of ---

24 A: Yes, I do.

25 Q: --- Captain Sam's? Is that the '88



1 photograph that you were referring to?

2 A: This is the 1988 photograph that, you know --
3 yes, that we've looked at, we've reviewed,
4 and I believe that OCRM actually uses the
5 basis for their most landward point of
6 erosion.

7 Q: Did you do an analysis to determine whether
8 or not there was living vegetation, stable
9 vegetation, seaward of the line that OCRM
10 marked as the vegetation line on this 1988
11 area?

12 A: Yes. I did. And in several ways. One, you
13 know, on the image, one can look clearly
14 seaward of their line ---

15 Q: We're going to give you a closeup.

16 A: Closeup.

17 Q: Mr. Hodge, I don't mean to interrupt.

18 A: Okay.

19 **MR. WALKER:** Could we go to Joint 13.1? All right.
20 That's the same one. Can we go to Joint
21 Exhibit 14?

22 **(Joint Exhibit Number 14 referenced.)**

23 Q: All right. This is Joint Exhibit 14 and a
24 closeup. Go ahead.

25 A: Okay. So, first off, that -- there's a



1 yellow line, it's somewhat covered up by the
2 blue line, but that's the Department's 1988
3 vegetation line. And then you see -- in
4 other words, this -- that blue line is their
5 vegetation line that they have derived. And
6 then you see this shaded area that is seaward
7 of that. And reviewing this and mapping
8 this, we marked the vegetation line seaward
9 of that. And the reason why you see this
10 dark, you know, kind of speckled area, again
11 -- and that is very similar to what we saw on
12 some of the more recent aerial imagery. And
13 it is my belief, and I can refer to Mr.
14 Tolleson on this ---

15 Q: Could you mark on here on this -- I won't use
16 this pointer, but could you mark with your
17 finger on this image the speckled area or the
18 smudged area that you're referring to?

19 A: I'm sorry. Say again the first part.

20 Q: Could you mark, again, on this image ---

21 A: Yes.

22 Q: --- the area you're referring to?

23 A: Yes. Yes. It's right -- this zone right
24 here.

25 Q: All right.



1 A: Now, notice how it's different. It's darker
2 than this -- you know, the beach is off to
3 the right. This is -- the dry beach is right
4 through here. This is the wet beach. In
5 other words, this is all where the tide runs
6 up here. This is the dry beach. And then
7 above the dry beach, there is this dark area.
8 And what struck me as being significant, you
9 see some wind shadows for some -- right here
10 where there's some active dune development
11 going on. And so, you know, it appears that
12 this is a -- I probably -- let me clear this
13 out somewhat. But we interrupted this image
14 to be, this is a -- this is vegetation, this
15 is grass. And the -- in looking at this --
16 and we went down the shore. And you see the
17 beach is clear and white. This is a
18 different color. Because of the resolution,
19 it doesn't pick up the level of detail that
20 you see in some of the other images. And
21 that's unfortunate. But we have, you know,
22 looked at this and, you know, there's
23 certainly -- because of the shading and we
24 did some -- and Mr. Tolleson will testify
25 more about this, but we did some analysis and



1 determined that the area that is -- that the
2 edge of that -- I call it the 5:00 o'clock
3 shadow, that kind of grey area, if you will,
4 that's vegetated. And then to the right of
5 the green line is the -- actually, the active
6 beach. So, the active beach begins just
7 seaward of the green line, if you will. So,
8 that's -- this is the active beach out here
9 and we mapped this green line as -- this is
10 vegetation in here. But unfortunately, just
11 the resolution isn't sufficient to bring out
12 quite all the detail.

13 Q: Do ---

14 A: It's an old image that I think was taken with
15 film and it just -- the quality is such that
16 you transfer it to digital and you try kind
17 of bring detail out, it's just difficult to
18 do that.

19 Q: How far down the spit did you determine the -
20 - or did you determine a stable line of
21 vegetation?

22 A: We took it all the way down around the spit.
23 This is the same series of images.

24 Q: Which direction are we moving now?

25 A: We're headed down -- again, down toward the



1 inlet. Down toward -- we're going down
2 toward the inlet. And let me say, even
3 though there was -- let's back up one,
4 please. Even, for example, though there was
5 vegetation out here, just because it was
6 near, you know, the inlet and with the inlet
7 relocation, you know, having happened, I
8 didn't feel that that -- even though that
9 was, you know, clearly visible there, I
10 didn't feel that that was one that I would
11 want to mark just because you do see the fact
12 that there's been some, you know, swash and
13 that sort of thing. And it's really been
14 affected somewhat by the high tides. So, I
15 cut the line off and moved it to straight
16 back up toward the top.

17 Q: To a reasonable degree of coastal processes
18 and coastal geologic certainty, is the area
19 above that green line in the active beach?
20 Or let me rephrase it. Where is that green
21 line in relation to the active beach?

22 A: Okay. To a reasonable degree of geologic
23 certainty, you know, in my opinion, that the
24 line -- the line that's -- the area that's
25 above the green line is not on the active



1 beach. It actually is -- you know, has
2 living stable rooted vegetation.

3 Q: All right. If we could just pause on this
4 one as a for example. In reviewing the 1988
5 orthoimagery, did you see any geomorphic
6 expressions of erosion at the line that was
7 chosen by OCRM to be the baseline?

8 A: No. There really are no expressions of
9 erosion along OCRM's line. And you don't see
10 any expression of -- of erosion. In fact,
11 there's no start, like you would have after a
12 storm. There's no heavy mineral assemblage
13 at the base of the scarp. You don't see wash
14 overs. You don't see dune washouts. You
15 don't see any of that. In fact, what you see
16 is vegetation that's seaward of that line.
17 So, to me there's -- really, there's no
18 evidence that I can detect on this image that
19 OCRM's line is actually a point of erosion.
20 And I think, as we've gone through and talked
21 about accretion and the grove of vegetation
22 in determining where the shoreline is, the
23 vegetation is above the active beach. So,
24 consequently, I don't see any evidence of a
25 point of erosion along OCRM's line.



1 Q: Have you reviewed the information -- most or
2 some of the information that OCRM has
3 provided in this case related to its various
4 surveys and lines that it has done on the
5 beach?

6 A: I've reviewed some. There's a lot of
7 information in this case, so I have reviewed
8 some.

9 Q: Have you reviewed the location of the two --
10 August 2016 line that OCRM marked as the then
11 vegetation line on Captain Sam's?

12 A: Yes.

13 Q: All right. Did -- what did you understand
14 that line to represent?

15 A: I understood that Ms. Boynton had gone out
16 with a Trimble GPS unit and taken positions
17 with that along a dune ridge that was in
18 existence. And actually that was -- she --
19 it was not the edge of vegetation, but it was
20 up on a dune ridge. And that's my
21 understanding.

22 Q: How did the vegetation that -- or let me
23 rephrase that. How did the vegetation
24 landward of her line compare to the
25 vegetation that you've shown between your



1 green line and OCRM's designated baseline in
2 2017?

3 A: Ask me the question again just to make sure -
4 --

5 Q: All right.

6 A: --- I'm clear on that.

7 Q: I'm just talking about type of vegetation.

8 A: Okay.

9 Q: How did the type of vegetation that -- well,
10 first, did you overlay Ms. Boynton's 2016
11 line on an aerial photograph reasonably
12 proximate in time?

13 A: Yes. I've overlaid her 2016 line. I've
14 looked at it in different aerial images,
15 particularly ones that we had that were close
16 to that time period, that -- when it was --
17 her work was done.

18 Q: Was there vegetation landward of the line
19 that she marked?

20 A: Yes, it was.

21 Q: How did the type of vegetation, density of
22 the vegetation, landward of the line that she
23 marked compare with what you have opined as
24 vegetation landward of your green line?

25 A: I would say that it was similar. Again,



1 you're dealing here with an older image that
2 is not at the best quality and resolution.
3 But I would say that, you know, that it was
4 certainly similar.

5 **MR. WALKER:** One moment, Your Honor.

6 Q: All right. Mr. Hodge.

7 A: Yes.

8 Q: We have on the screen on the left one of the
9 closer-up images from the '88 photograph, and
10 on the right we have the 2020 orthorectified
11 photograph that's already in evidence.

12 **(Petitioner's Exhibit Number 9k was referenced.)**

13 Q: And my question is -- to you, is there any
14 similarity between this grey area between the
15 MLPE that you marked on the 2020 photograph
16 and the greyish area landward of the line
17 that you marked for the seaward line of
18 vegetation on the '88 photograph?

19 A: Yes. And this comparison is really
20 instructive, because you can see that the
21 image on the right that is our recent
22 satellite image, you see the speckled area.
23 And I'll just -- I'll draw this right here --
24 that is clearly the dune field and
25 vegetation. In here you see a similar



1 texture, and you see also evidence -- I can
2 see evidence of windblown activity in that
3 area. And unfortunately, the resolution on
4 the picture on the left isn't quite as good
5 as what you see on the right, but it -- when
6 you compare these two, I think it's a good
7 match and it's a good comparison as to what
8 features that one is looking at.

9 **MR. WALKER:** Just a moment, Your Honor. That's all
10 we have at this time. Thank you.

11 **THE COURT:** Thank you. Is there ---

12 **MR. WALKER:** Yeah. May we move into evidence -- I
13 forgot to do it. It's Joint -- well, Joint
14 Exhibit 14, we'll move that into evidence.
15 Any objection?

16 **MR. CHURDAR:** None.

17 **THE COURT:** It's admitted.

18 **(Joint Exhibit Number 14 was entered into**
19 **evidence.)**

20 **THE WITNESS:** Could we take a short bathroom break,
21 please?

22 **THE COURT:** I was just getting ready to do that, so
23 that we don't have to interrupt Mr. Churdar
24 as soon as he starts. So, we'll take a quick
25 ten-minute right now.



1 (Off the record from 10:05 a.m. until 10:25 a.m.)

2 THE COURT: Okay. Mr. Churdar, are you ready for
3 your Cross?

4 MR. HODGE - CROSS-EXAMINATION BY MR. CHURDAR:

5 Q: All right. Good morning, Mr. Hodge.

6 A: Good morning.

7 Q: So, I want to just follow up on one point
8 that you and Mr. Walker were talking about at
9 the very end of your testimony. You were
10 testifying about the 1988 image.

11 A: Right.

12 Q: And if I -- my annotations are correct, you -
13 - your descriptions of this were it's older,
14 it's not the best resolution, it's not a very
15 clear image, it's not detailed; is that --
16 would that be ...

17 A: Certainly compared to the imagery we have
18 today, I would say that's correct.

19 Q: Okay. And you used that 1988 image in your
20 own analysis, correct?

21 A: That's right.

22 Q: Okay. All right. So, what I'd like to do
23 before we get into some other substantive
24 issues is I'd like to ask you some questions
25 about your financial relationship with Kiawah



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1 as an expert in this case.

2 **MR. CHURDAR:** If you could please pull that image
3 up.

4 Q: What I'm going to show you, Mr. Hodge, this
5 is -- this is a letter from Mr. Tom Gressette
6 proving a summary of expert witness fees
7 provided by you, Mr. Byrnes, and Mr.
8 Tolleson. So, what I'd like to do is go
9 through your fees.

10 **(Respondent's Exhibit Number 124 was introduced.)**

11 A: Sure.

12 Q: Okay. So, on January 31st ---

13 **MR. CHURDAR:** Can you please turn to page 4? Just
14 bring that down just -- okay.

15 Q: So, on January 31st, 2017, KDP, Kiawah paid
16 you an initial \$2500 retainer to work on this
17 case?

18 A: I don't handle the business side of my firm.
19 So, while I believe that these probably are
20 good numbers, that I don't handle that and
21 somebody else does. So, I really probably
22 can't give you a lot of detail on the
23 financial side of what I've received.

24 Q: Okay. Well, do you have any reason to doubt
25 that someone from your firm provided these



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1 numbers to ---

2 A: I think they're probably -- are reasonably
3 correct, but I can't for sure.

4 Q: Okay. All right. So, they -- do you have
5 reason to doubt that \$2500 retainer was
6 accurate in what was paid to you?

7 A: All of these I have no reason to doubt it.

8 Q: Okay. Okay. So ---

9 A: But I just -- I'll tell you, I don't know
10 firsthand, because I don't handle the
11 business side of things.

12 Q: I totally understand that. Well, let's just
13 go through them briefly. On March 27th, 2017
14 Kiawah paid you \$7500 to work on this case,
15 and the description was for beach project.
16 Do you see that up there?

17 A: Yeah. I see the numbers, yes.

18 Q: Okay. And you would endorse that that's
19 true, that's correct.

20 A: Well, I think, just to simplify it, I would
21 say that I have a reason of belief that each
22 of these numbers probably is reasonably
23 accurate. I -- again, as I've said before, I
24 don't handle the business side of things, so
25 I can't say with certainty. But they appear



1 to be in line with -- you know, generally
2 speaking, with what was charged. But, again,
3 I'd have to go back and look at our own
4 business records.

5 Q: Okay. So, if you add up all of those -- and
6 if you don't want to trust my math, which is
7 fine, you can do it yourself. But I've added
8 that up and that comes to \$169,802. Would
9 you dispute that is the total charge as of
10 April 5th, 2021?

11 A: I'd have to add it up.

12 Q: Would you like to do that?

13 A: I can sit here with a calculator and do it,
14 but ...

15 Q: Well, I mean, I -- you can use my phone, if
16 you'd like.

17 A: I'd like my own. If you want to do that,
18 fine.

19 Q: Well, if you're -- if you question my math,
20 then, yeah, please go ahead, so you can ---

21 A: I'll just say the numbers speak for
22 themselves and I -- you know, if you want to
23 -- yeah. I'll represent that these numbers
24 that you put up here, you know, appear to be,
25 you know, within a range that I would expect



1 were paid.

2 Q: Okay. So, what I'd like to do is, if you
3 don't agree with the -- with my
4 representation of \$169,802.04, just satisfy
5 yourself with it or except what I'm saying.
6 It's your call.

7 A: Again, I've testified to what I've -- that I
8 believe these numbers are reasonably correct,
9 and I think that I don't need to say anything
10 more about that.

11 Q: Okay. And your hourly charge for your
12 services to Kiawah is \$350 per hour?

13 A: Correct.

14 Q: Okay. So, since April 5th, which is the last
15 bill that we have been provided -- since
16 April 5th, 2021, approximately how many hours
17 have you worked on this case?

18 A: I have no clue. I record my time, it goes
19 into a system, and so I can't tell you with
20 any certainty.

21 Q: Okay.

22 A: It's been a lot. Obviously, we've been
23 getting ready for trial.

24 Q: I'm sorry. You said it's been ---

25 A: It's been a lot.



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1 Q: It's been a lot.

2 A: I can't tell you how much it is. Been
3 getting ready for trial, we've been, you
4 know, trying to get these exhibits together
5 and analyzing. You guys have thrown a lot of
6 documents at us, particularly at the last
7 minute. And because there was not really --
8 in this case, the Department really didn't
9 have a technical kind of response when it --
10 created these lines, there was no technical
11 document that said this is how we did it and
12 these are the files -- in other words, these
13 are the photographs, these are the
14 calculations, you know. So, we had to go
15 back from kind of ground zero and try to
16 figure out what y'all did ---

17 Q: Okay.

18 A: --- simply because the Agency didn't put
19 together any kind of technical, you know,
20 document whatsoever. All we had was about a
21 four-page document about Kiawah line report,
22 and then on your website you had some nice
23 fluffy little photographs, and PowerPoint
24 type descriptions. And so we really had to
25 go back and try to recreate what we could.



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1 And so it took a lot of time, and we wanted
2 to be accurate.

3 Q: Okay. Well ---

4 A: And that's another thing, is we didn't want
5 to be sloppy, so, you know, we had to do --
6 you know, use -- I guess, do the -- you know,
7 do the work.

8 Q: If ---

9 A: And the time it took is the time it took, and
10 I don't apologize for that.

11 Q: I'm not asking for your apology. All I'm
12 asking is for some idea, and you've described
13 a lot of work. Would you say it's 50 hours?
14 Would you say it's a hundred hours?

15 A: I have no -- to a reasonable certainty, I
16 couldn't tell you.

17 Q: You have zero idea?

18 A: I have zero idea. If I told you a number, it
19 would be just throwing a dart at the wall.

20 Q: Okay. Well, could you provide, so we have
21 some idea, if it's more than and whatever
22 your conservative estimate is? More than 20
23 hours? More than 40 hours?

24 A: Well, I'd say it's more than 20, but I can't
25 really say how much it is, because I could



1 say, I don't really know.

2 Q: Okay. But would you agree that at this point
3 your fee that you have earned from Kiawah is
4 close to \$200,000 for this case?

5 A: I agree that the numbers on the screen
6 represent generally what had been paid. And
7 that's been paid over about five years.

8 Q: Okay. So, yesterday when you were talking --
9 excuse me, when you were testifying, you made
10 reference to a relationship, if you will,
11 between the sediment deposit and sea level
12 rise, correct?

13 A: I didn't quite put it like that, but there
14 was a relationship between sediment supply
15 and sea level rise. Correct.

16 Q: Okay. And you did no specific work or
17 calculations incorporating the effects of sea
18 level rise in forming your opinion, correct?

19 A: Say again.

20 Q: I said, you did no specific work or
21 calculations incorporating the effects of sea
22 level rise in forming your opinions?

23 A: I did make a general evaluation regarding sea
24 level rise. And I think in my deposition I -
25 - there's testimony to that effect. But over



1 a 40-year period, you know, the effects of
2 sea level rise at this location are fairly
3 negligible. And frankly, the sediment supply
4 is sufficient, you know, to -- you know, at
5 this point to negate any effects of sea level
6 rise.

7 Q: Well, I'll tell you what -- let me just hand
8 you the deposition ---

9 A: Sure.

10 Q: --- because all of my questions are based on
11 what you said.

12 A: Okay.

13 Q: Okay. So, if you could turn, please, to page
14 110.

15 A: Okay.

16 Q: Starting at line 17.

17 A: Okay.

18 Q: You said, and I think just in terms of the
19 overall education in coastal processes, we
20 have to understand that there -- that
21 relationship exists. That relationship is
22 what you're talking about is between the
23 sediment supply and sea level rise. And then
24 you said, in terms of any specific work or
25 calculations, you know, I don't have -- I



1 have not included any specific work or
2 calculations. Right?

3 A: Well ---

4 Q: I read that correctly, didn't I?

5 A: And -- yeah. And let me kind of explain the
6 answer, so it's clear for you, Bradley.
7 There's a general relationship between
8 sediment supply and sea level rise, but we're
9 looking at either the most landward point of
10 erosion or accretion on the beach. So, we're
11 looking at a point, a physical point on the
12 beach, and that may be affected by sea level
13 rise. But I wasn't doing a sea level rise
14 calculation. I didn't need to. What I was
15 looking at was, this is the point where the
16 vegetation appears on the beach. This is the
17 vegetation line. This is the most landward
18 point of erosion. And that may be affected
19 by sediment supply. It may be affected by
20 sea level rise.

21 Q: I understand, but you acknowledge that you --
22 that there is a relationship between those
23 two, correct?

24 A: Absolutely.

25 Q: Okay. And, in fact, you didn't factor sea



1 level rise into your opinion at all regarding
2 where you thought the jurisdictional lines
3 were set.

4 A: No. I disagree with that.

5 Q: Okay. I'll tell you what. Why don't we go
6 to page 119, starting at line 7. This is
7 your testimony. You said, I have got a
8 general awareness at sea level rise
9 projections and I'm certainly, you know, well
10 aware of those. But specifically, did I
11 factor sea level rise in the setting of
12 jurisdictional lines? No. I didn't. Now, I
13 read that correctly, right?

14 A: Correct.

15 Q: Okay.

16 A: Because it's certainly important to know what
17 sea level is doing. But in order to set a
18 jurisdictional line or in order to find a
19 most landward point of erosion, one does not
20 necessarily have to know whether the sea
21 level is rising, falling or stagnant.

22 Q: My question though is -- your answer was not
23 an answer to my question. My question was,
24 you didn't factor sea level rise into your
25 opinion at all regarding where you thought



1 the jurisdictional line should be set.

2 A: It wasn't necessary. And I did answer your
3 question the first time. Thank you.

4 Q: Okay. Now, you've testified that sea levels
5 had been rising for 18,000 years, correct?

6 A: Correct.

7 Q: But the rates of sea level rise has
8 dramatically risen in the last 100 years,
9 right?

10 A: The rate -- it was about -- in the Charleston
11 area, it's been about one foot in the last
12 hundred years. And one of the things that's
13 important in talking about sea level rise is
14 that people like to have a one size fits all.
15 You look at a -- one graph of what sea
16 level's doing. The sea level is rising at a
17 different rate in New York. It's rising a
18 lot faster in New York and in Norfolk,
19 Virginia and in Boston, Massachusetts than it
20 is in Charleston, South Carolina. And
21 there's an area called a ---

22 Q: But generally, over the last 100 years though
23 it has ---

24 A: Let me finish. There's an area called a hot
25 spot.



1 **THE COURT:** Don't talk over each other.

2 A: And it's been well documented in the
3 literature. And there's -- there are
4 physical reasons for that. But because the
5 glaciers are melting and we're -- you know,
6 we're past the Ice Age and we're getting into
7 a warmer period, sea level is rising. But
8 that doesn't affect the position of -- when I
9 go out and identify most landward point of
10 erosion or identify a vegetation line, it is
11 what it is.

12 Q: That wasn't my question though. My question
13 was the rate of sea levels has risen
14 dramatically over the last hundred years.

15 A: Where?

16 Q: That's a question for you. Do you disagree
17 with that?

18 A: I'm not sure how you characterize
19 dramatically. It certainly has been rising
20 and there are projections it may rise at a
21 faster rate. But the ---

22 Q: And do you agree ---

23 A: --- the calculations are one foot in the last
24 hundred years. If that's dramatically to
25 you, fine. But that's -- it is what it is.



1 Q: Okay. Has it been rising for the last 18,000
2 years at one foot a century?

3 A: That rate actually varies over time. And I
4 think that's the other thing. Sea level
5 rise, over the last 18,000 years, there's
6 been times when it was rising a little bit
7 faster, a little bit slower, there'd been
8 some what we call still stands. And then
9 we've probably had a few slight periods where
10 we had what was called a regression, where
11 sea level dropped slightly, and then it
12 continued its rise. But my point is, is that
13 you can't apply these sea level graphs all
14 over the -- that you see on every ocean basin
15 around the world. You have to look at, you
16 know, the actual location. So, because the -
17 - for example, the Intergovernmental Panel on
18 Climate Change publishes a graph of sea level
19 rise, that may be a generalized graph for,
20 you know, the ocean as a whole, but it may
21 not apply to what you see in Charleston or
22 other places.

23 Q: Okay. Would you -- so, if you've answer the
24 question, it was unclear to me and that's on
25 me. But my question is, do you agree that



1 the sea level rise of one foot over the last
2 century is at a higher pace than the 18,000
3 years that you testified to that we've had
4 sea level rise? Do you agree with that?

5 A: I'd have to look at the data. I can't say
6 sitting right here.

7 Q: Would you agree that focusing on the past
8 18,000 years would produce a different result
9 than focusing on the last hundred years?

10 A: Well, I think that's true in any scientific
11 endeavor, that you look over different times
12 periods and you find, you know, different
13 numbers, because you're taking a different
14 slice of a time period, so.

15 Q: Okay. Mr. Hodge, you also testified that
16 Kiawah has been accreting in a seaward
17 direction for 4,000 years, right?

18 A: Approximately that. Correct.

19 Q: Okay. But Captain Sam's Spit has not existed
20 for 4,000 year, correct?

21 A: Well, we don't know when Captain Sam's Spit
22 was initially, you know, formed. We do know,
23 in the -- at least as far as human knowledge,
24 that in 1696 was the first nautical chart
25 that showed it. But I would bet that it was



1 there long before that.

2 Q: Well, let -- I'll tell you what, let's look
3 at Respondent's Exhibit 30.

4 **MR. CHURDAR:** If you could put that up on the
5 screen. And go to the last page.
6 Respondent's Exhibit 30.

7 **(Respondent's Exhibit Number 30 was introduced.)**

8 **MR. CHURDAR:** One moment, Your Honor. I'm sorry.

9 Q: So, Mr. Hodge, I think this was what you were
10 talking about ---

11 A: Correct.

12 Q: --- when you were talking about the 1661
13 image. So, the historic kind of trajectory
14 or changes of the -- of Captain Sam's Inlet,
15 the spit did not exist in 1822, correct?

16 A: Well, according to this, that -- if you -- if
17 this chart were to be correct, it shows that
18 -- doesn't show the same morphology. I'll
19 put it that way. So, it probably doesn't.

20 Q: So, it -- you're saying -- you agree with
21 what I said, the spit did not exist in 1822.

22 A: There was a spit prior to that, but it
23 appears it was truncated. And, again, this
24 was -- this is a drawing taken from an old
25 chart that was superimposed into a report.



1 And I certainly, you know, believe that there
2 was some kind of breach at that point. But
3 whether it looked exactly that, I'm not sure.

4 Q: Do you have reason to believe that that image
5 of 1822 is incorrect?

6 A: I don't know whether it's correct or
7 incorrect, but I believe that's it's been
8 excepted as a -- as certainly a
9 representation of what the shoreline looked
10 like in 1822. And I've certainly testified
11 that there was a -- the spit was truncated at
12 that time, so yes.

13 Q: Okay. Okay. And then if you would look --
14 it reappeared in 1854. But if you look at
15 that up there, the configuration of the spit
16 is significantly different from how it
17 appears today, correct?

18 A: This is what we testified to, that the spit
19 lengthens as it goes towards Seabrook, and
20 then at some point that it is -- it
21 lengthens, and at some point that it's --
22 there's a breach that takes place, and then
23 it reforms again. And I think that that's
24 what the record shows.

25 Q: Okay. And then, the spit disappeared again,



1 and in fact it did not even exist in 1922,
2 correct?

3 A: Well, it does show some shoals there and so,
4 you know, it doesn't look the same as it did
5 in 1854, but yes.

6 Q: But those shoals are not a spit. You do --
7 you kind of defined for us what a spit was
8 yesterday.

9 A: Right.

10 Q: That would not a spit.

11 A: Yeah. That's correct.

12 Q: Okay. So, when you say that Kiawah Island
13 has been accreting for 4,000 years, you're
14 not saying that Captain Sam's Spit has been
15 accreting for 4,000 years?

16 A: No. No. The -- and I think I testified
17 yesterday that the central part of the island
18 was 4,000 years old. But the spit was first
19 identified in the late 1600s and it's -- and
20 I testified that it -- there were three
21 episodes where it was truncated. And I think
22 those are also documented well in this
23 diagram.

24 Q: Okay. And back to your earlier testimony
25 where you said that there is a relationship



1 between sediment supply and sea level rise.

2 You have testified that Kiawah's sediment
3 supply historically has been so abundant that
4 it is largely negated the affects of sea
5 level rise.

6 A: That's a fair statement.

7 Q: Okay. But sea level rise was not even a
8 central part of your case in forming your
9 opinion though, correct?

10 A: Well, that -- such that it didn't really need
11 to be a central part of the case.

12 Q: Okay. But it wasn't though, right? That was
13 -- sea level rise was not a central part of
14 your opinion.

15 A: Well, only the fact that I testified I had a
16 -- an awareness of sea level rise and its
17 potential effects here. But I didn't --
18 you're right. The opinion was based upon
19 identifying in the field a most landward
20 point of erosion and identifying from
21 profiles and also from aerial images the
22 accretion from either vegetation lines and
23 depositional features. And so that's the
24 central part of my opinion.

25 Q: Right. Which did not include sea level rise



1 though. That's all I'm asking.

2 A: I would say that sea level rise was sort of a
3 secondary consideration ---

4 Q: Okay.

5 A: --- in the opinion.

6 Q: Again, could I invite your attention back to
7 109 -- excuse me, page 119 of your deposition
8 ---

9 A: Sure.

10 Q: --- starting ---

11 A: Go ahead.

12 Q: Starting at page 10 or page -- line 9. You
13 said, but specifically I did not factor sea
14 level rise in setting of jurisdictional
15 lines. No, I didn't. That's all I'm asking.

16 A: Correct. Because it wasn't necessary.

17 Q: Okay. If we were to look at your analysis
18 and your work as it relates to sea level rise
19 to determine that it wasn't necessary, we
20 wouldn't be able to find that, correct?

21 A: Now, repeat your question please.

22 Q: Well, you've -- you have said that there is a
23 relationship that -- between sediment supply
24 and sea level rise.

25 A: Right.



1 Q: And you just testified, well, I didn't need
2 to consider sea level rise, correct?

3 A: That's right.

4 Q: Okay. So, my question is, if we were to look
5 at your work and analysis, we would not -- as
6 it relates to sea level rise, we would not
7 find any opinion that says sea level rise,
8 which is in tandem with sediment supply, is
9 not a necessary consideration. We would not
10 find that opinion in your ---

11 A: Well, actually let me give my opinion, so
12 we're clear on it.

13 Q: If I could just finish. Just -- we would not
14 find that opinion, that work, that analysis
15 as part of your opinion, correct?

16 A: Let me give you my opinion to make sure we're
17 both on the same page, please.

18 Q: Okay. Before you do that, can you just
19 answer yes or no? I'm not trying to hem in
20 your, but I'm ---

21 A: Well, the answer needs to be explained, and
22 so ---

23 Q: Well, could you give me an answer first?

24 A: Well ---

25 **THE COURT:** Let's do this: Mr. Churdar, don't



1 argue with the witness. But let me say to
2 the witness, please answer yes or no.

3 **THE WITNESS:** Yes, Your Honor.

4 **THE COURT:** And then you can go on and explain.

5 A: Okay. So, ask your question one more time,
6 make sure we're clear on it.

7 Q: My question is, if we tried to find your work
8 and analysis on sea level rise or
9 particularly on its inapplicability to your
10 opinion in this case, we wouldn't be able to
11 find that, would we?

12 A: Well, I made mention of sea level rise, so I
13 think you can find it. You can derive it
14 from my report, if you actually look closely.
15 Because the point of the -- making the
16 statement about sea level rise and sediment
17 supply is that Kiawah has a very abundant
18 sediment supply that largely negates the, you
19 know, issue of sea level rise. Now -- and I
20 think I testified at the deposition, two or
21 three hundred years from now that could be
22 different. But at least for the short-term,
23 that, you know, there's a sufficient sediment
24 supply to overcome that. I can give you
25 other samples of shorelines around the world



1 where you have exactly the same kind of
2 setting, where you've got, you know, abundant
3 sediment supply from various sources that has
4 negated, not only sea level rise, but also
5 the, you know, tectonic forces as well.

6 Q: Let's go to page 109 of your deposition.

7 A: Okay.

8 Q: Starting at line 24. You're asked this same
9 question.

10 A: Okay.

11 Q: Starting at line 24. And where can I find
12 your work and analysis on sea level rise in
13 this case? And then, your answer is, well,
14 you won't find it. Correct?

15 A: Finish the -- finish my answer.

16 Q: Because actually I did that investigation
17 just as part of my own kind of due diligence
18 going through it. But my point is ---

19 A: Finish my answer, please.

20 Q: I did give you a slide showing Tom Maslow's
21 research. Hang on. Sorry. My screen is --
22 let me just shrink this a little bit. And
23 there is a slide in my presentation that
24 talks about the relationship of sediment
25 supply and sea level rise. So, if you want



1 to look for it, that's probably the place to
2 look. But what I'm saying is, you were
3 including other things in their slides of Tom
4 Maslow, for instance. But what I'm -- my
5 questions is -- well, I've already asked my
6 question. I mean, so. And I think you've
7 answer it, so I won't beat a dead horse.

8 A: Thank you.

9 Q: Would you agree that if sea level rise
10 increases at a faster pace, then sediment
11 supply has to increase to stay up with
12 increased sea level rise?

13 A: Not necessarily. It depends upon the time
14 period that one is referring to.

15 Q: Now, did you do any of your own analysis on
16 sediment supply in forming your opinions?

17 A: No. I read existing works, and there's a
18 fair amount of body of literature that's been
19 done on the -- for Kiawah Island. It's been
20 done for the Town of Kiawah, it's been done
21 for various developers. And some of those
22 documents have been submitted to the
23 Department and they're -- some of those are
24 public documents. And I read those to get a
25 sense. In other words, when I started the



1 work, I wanted to find out what's been done.
2 And so that was one of the things that jumped
3 out at me, is that really the ebb tidal delta
4 at the end of the Stono River has been -- has
5 got a huge amount of sediment, and that has
6 been feeding Kiawah for quite a long time.

7 Q: Okay. Now, yesterday you testified that the
8 shoreline representing the most landward
9 point of erosion is landward of the active
10 beach; is that correct?

11 A: Say again one more time.

12 Q: I said, yesterday you testified that the
13 shoreline representing the most landward
14 point of erosion is landward of the active
15 beach, correct?

16 A: Correct. That's right.

17 Q: Okay. And the intertidal area between the
18 low and high tide is part of the active
19 beach; is that correct?

20 A: The intertidal is part of the active beach,
21 correct.

22 Q: Okay. Now, I would like to ---

23 **MR. CHURDAR:** If you could please get to Exhibit --
24 Respondent's Exhibit 140, please, and put
25 that up there.



1 **(Respondent's Exhibit Number 140 was introduced.)**

2 Q: Now, Mr. Hodge, can you look at the first
3 three pages -- well, let's just go with this
4 page. Is this your work product?

5 A: Yes.

6 Q: Okay.

7 **MR. CHURDAR:** Can you go to the second page?

8 Q: Is that your work product?

9 A: Yes.

10 **MR. CHURDAR:** And the third page, please.

11 Q: And that is -- I believe you already
12 testified to that, but that's your work
13 product as well?

14 A: Correct. That's right.

15 Q: Okay. Okay.

16 **MR. CHURDAR:** If you'll pull up Respondent's
17 Exhibit 3, please.

18 **(Respondent's Exhibit Number 3 was introduced.)**

19 Q: All right. Mr. Hodge, would -- under remand
20 -- well, I believe you wrote you this, but
21 that's what I want, your confirmation of it.
22 It says -- as you see in the highlighted
23 portion, it says, it is our opinion that the
24 most landward point of erosion is more
25 properly the position of the shoreline at



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1 MSL, end quote. Now, that was something that
2 was provided by Mr. Walker. My question is,
3 is that your product, is that your work
4 product, did you write that?

5 A: I don't -- can't see the top of the document.
6 I don't know what it is.

7 Q: Okay. It's an email.

8 **MR. CHURDAR:** You want to go -- I mean -- yeah.
9 There we go.

10 Q: My question is not did you send the email,
11 but I'm -- what I'm wanting to find out from
12 you is, when it says, the highlighted
13 portion, it is our opinion that the most
14 landward point of erosion is more properly
15 the position of the shoreline at MSL, that's
16 not Mr. Walker's just opinion as a lawyer,
17 that comes from some expert witness. And I'm
18 asking if that came from you?

19 **MR. WALKER:** I have an objection to this line of
20 questioning, Your Honor, because the exhibit
21 was one that was communicated as part of
22 settlement negotiations, confident settlement
23 negotiations. And later, we did say that the
24 Department could take a look at the technical
25 information that was submitted as part of



1 this confidential negotiation in producing
2 its decision on remand. In other words, if
3 they wanted to respond to it, they could
4 respond to it. But this was -- and if we go
5 up to the top of that, you can see -- and
6 could you -- up at the top, it's Confidential
7 - Inadmissible Settlement Negotiations. So,
8 this memo is part of those discussions and
9 was not within the scope of what we agreed
10 that OCRM could consider when we said they
11 could refer to the technical analysis to
12 respond to arguments in their decision on
13 remand.

14 **MS. PHELAN:** Your Honor, may I be heard, since I
15 handled this?

16 **MR. WALKER:** That's fine, because it was -- the
17 communication was with Ms. Phelan.

18 **MS. PHELAN:** I had several communications with Mr.
19 Walker and Mr. Gressette about whether they
20 were lifting the confidential and
21 inadmissible settlement negotiations from
22 these documents, and I was informed that they
23 -- it was lifted, that they were no longer
24 maintaining the confidential and inadmissible
25 nature of these documents. This was



1 identified in our exhibit conference, and
2 they never said that these documents, that
3 they were claiming again that they were
4 confidential and inadmissable. And it's very
5 clear to me that that had been changed and
6 lifted ...

7 **MR. WALKER:** Well, we did not agree to this exhibit
8 as being admissible. And that was our
9 response, was that we did not agree to it
10 being admissible. It what was listed, we did
11 not agree to it being admissible. And may I
12 do this, Your Honor, because I don't want to
13 hold us up unnecessarily? I will withdraw
14 the objection. But I don't want to waive
15 confidentiality by not objecting. In other
16 words, he may proceed, but I don't want it to
17 constitute the waiver of the confidentiality
18 as to other communications simply because I
19 didn't object to this particular exhibit. In
20 other words, it would be an exhibit -- it
21 would be an exhibit specific ---

22 **THE COURT:** Okay.

23 **MR. WALKER:** --- concession. And I only say that
24 because there is law that, if a part waives a
25 part of a privilege on a subject matter, it



1 waives the entire privilege or
2 confidentiality. And I'm going to sit down
3 right now. I'm only doing it as to this
4 document for purposes of this examination.
5 Thank you.

6 **THE COURT:** Okay.

7 **MS. PHELAN:** Your Honor.

8 **THE COURT:** Yes.

9 **MS. PHELAN:** Just if I may. I was -- I was told
10 there was no objection to this exhibit. It -
11 - that they weren't agreeing that it would be
12 a Joint Exhibit, but there was no -- but
13 there was no objection.

14 **THE COURT:** Okay. He's withdrawing his objection --
15 -

16 **MS. PHELAN:** Okay. I just wanted to note ---

17 **THE COURT:** --- as it relates to this exhibit.

18 **MR. WALKER:** Yes.

19 **MR. CHURDAR:** Okay. All right.

20 Q: So, Mr. Hodge, you can see what the top of
21 this document is. It says, Proposed Baseline
22 Revisions, September 2019. And ---

23 **MR. CHURDAR:** If you can scroll down to the -- the
24 bottom, please.

25 Q: Okay. So, see the highlighted ---



1 A: Yes.

2 Q: --- portion. And I'll just read it into the
3 record. It says, it is our opinion that the
4 most landward point of erosion is more
5 properly the position of the shoreline at
6 MSL. Now, this was provided to us by Mr.
7 Walker, but my question for you is did you --
8 is this your opinion? Did you write this?
9 Did you prepare this?

10 A: Well, that's actually interesting, because it
11 does say at the top it's an inadmissible
12 settlement negotiation. And I don't -- I
13 can't really remember who all had hands on
14 this. I wrote some information for Mr.
15 Walker. He may have edited it somewhat. So,
16 you know, to that extent, it would -- taking
17 it out of the context in which it was
18 originally offered.

19 Q: Well ---

20 A: But ---

21 Q: --- would Mr. Walker have edited a
22 substantive opinion of yours?

23 A: I don't -- you know, he may have provided me
24 comments. I don't know. And then maybe I
25 changed something based on comments. But I'm



1 just telling you that, you know, I prepared
2 probably most of this. But, you know, we
3 were getting ready for a settlement
4 negotiation with the Department, and so it's
5 quite possible that counsel may have had some
6 input to me, you know, on the wording. I
7 can't say for sure.

8 Q: I'm not talking about wordsmithing. I'm
9 saying, is that your opinion, that quote?

10 A: Well, there's -- it's a little bit more
11 detailed than what's there. I think what
12 this stands for is that the -- you know, the
13 point of erosion -- in other words, the --
14 for example, a vegetation line is not the
15 shoreline. And that's really, I think, what
16 this is intending to say. It may not have
17 been worded for well, and I'll give you that.
18 But the vegetation line is not the shoreline.
19 It is actually landward of the shoreline.
20 And the most landward point of erosion is --
21 you know, it may not necessarily be the
22 shoreline. And certainly, at Kiawah, it
23 wasn't. But there may be erosional beaches
24 where that is the case. So, I think in
25 hindsight I would probably word this



1 differently than it's worded right here.

2 Q: Okay. But you would agree that that is your
3 opinion?

4 A: Well, that may have been my opinion when I
5 wrote it, but I think it may be somewhat
6 misstated. And frankly, at that time I wrote
7 it, I didn't know I would be in court
8 defending a settlement negotiation, so.

9 Q: Okay.

10 A: But I will tell you that the most landward
11 point of erosion, you know, is really not
12 technically the shoreline at Kiawah.

13 Q: Okay. And ---

14 A: And I will say that I would disagree with
15 this statement based upon my knowledge today.

16 Q: Okay. In fact, yesterday you indicated --
17 you testified -- well, here you indicated
18 under remanded that the most landward point
19 of erosion is MSL, but yesterday you
20 testified that it was the 2017 escarpment; is
21 that correct?

22 A: That's right. And so that's why I say that I
23 don't agree with the statement that is here.
24 And to the extent that I may have written it,
25 I think it's not correct.



1 Q: Okay. What is geomorphic expression of
2 erosion?

3 A: Well, we talked about it a good bit
4 yesterday. It's some physical evidence on
5 the coastline of erosion, such as the dune
6 scarp is one. We talked about dune ---

7 Q: Okay.

8 A: --- blowouts. We talked about heavy mineral
9 assemblages on the beach. We talked about
10 overwash fans, and those kind of things.

11 Q: Okay. So, you would agree then that an
12 escarpment is an erosional feature?

13 A: The escarpment itself is evidence of erosion,
14 correct. Correct.

15 Q: I'd like to talk to you about Respondent's
16 Exhibit 18.

17 **MR. CHURDAR:** Will you please pull that up, and go
18 to the last page, please? Okay.

19 **(Respondent's Exhibit Number 18 was introduced.)**

20 Q: Now, the last page of this exhibit shows nine
21 vegetational lines from 1982 to 2019. It
22 also shows the 2017 escarpment line. That is
23 -- that's the black dotted line; is that
24 correct?

25 **MR. CHURDAR:** Can you enlarge that a little bit,



1 please?

2 Q: And so the 2017 escarpment line, that's the
3 black dotted line; is that correct?

4 A: I didn't create this document. I don't know.
5 It has a legend that says that's what it is.

6 Q: Okay. Now, is it your testimony that the
7 2017 escarpment line represents the most
8 landward point of erosion at anytime during
9 the past 40 years in accordance with 48-39-
10 280(A)(2)?

11 A: Yeah. From my findings, that's correct.

12 Q: Okay. So, those four lines, you can see
13 there's a red line, there's a yellow line,
14 there's a green line -- light green line, and
15 a darker green line that are landward of the
16 dotted line, the 2017 escarpment line. So,
17 would you reject the 1988 yellow vegetation
18 line as being the most landward point of
19 erosion at anytime during the past 40 years?

20 A: Well, let me say that this appears to be --
21 it says it's a base map as a drone image from
22 2021. And there are a bunch of colored lines
23 on here that somebody has claimed were
24 vegetation lines. And I have no way of
25 evaluating the original imagery that they



1 came from. And this goes back to a complaint
2 that I've set forth in my deposition, is that
3 the Department should have had a technical
4 document when these lines came out.

5 Q: Well, let me ask you that.

6 A: Let me finish my answer, please. The
7 Department should have had a document when it
8 came out that said, this is this photograph
9 in this year, the next year, the year after,
10 and here is our interpretation of the
11 vegetation lines. The first time I've seen
12 this particular document was yesterday, so I
13 really haven't had a chance to analyze it at
14 all.

15 Q: But you had the underlying data to support
16 the position of this line, correct?

17 A: No, I haven't.

18 Q: You're telling me that your attorneys didn't
19 give you the data that the Department
20 provided?

21 A: I believe there's some, what we call,
22 shapefiles. That's a digital file that you
23 overlay on a map. And certainly, we've had
24 possession of some shapefiles, but we haven't
25 had the underlying data that those shapefiles



1 were generated from. So, we're asked to take
2 at face value the inclusions that you're
3 trying to make, and we have not seen the
4 original information where these shapefiles
5 were generated.

6 Q: So, you're saying the Department did not give
7 you the data that you could then upload and
8 create these lines yourself. Is that your
9 testimony?

10 A: Basically, yes.

11 Q: Okay.

12 A: We didn't have the aerial imagery. We didn't
13 have the line superimposed. We got some
14 shapefiles and that was it.

15 Q: I'm just talking about the data for you to do
16 your work.

17 A: Well, the data would be the entire package.
18 This is the image, this is the vegetation
19 line, this is where we marked it.

20 Q: Okay. On that yellow line right there, with
21 the shapefiles that you said you have
22 received, did you check that yellow line or
23 the data that's associated with that, the
24 shapefiles associate with that, to see if
25 there were any erosional events during this



1 year that would be at odds with your opinion?

2 A: All right. Repeat your question, please.

3 Q: I said, did you -- the Department provided
4 the data to you. You've -- you dispute that,
5 but ---

6 A: We -- I don't know that I -- that we got data
7 for each of these lines in the source
8 material. I know we got some shapefiles, and
9 I know we uploaded shapefiles and we looked
10 at them. But I can't say that we had
11 specifically the shape files for all of
12 these.

13 Q: Okay. Well, my question for you is, did you
14 take the data that the Department provided to
15 you regarding that 1988 line to see if there
16 were any erosional events during that year,
17 during 1988, that would be at odds with your
18 opinion?

19 A: Well, we certainly looked at the 1988 imagery
20 to see if there were any -- if there was any
21 evidence of erosion and any erosional
22 features. And we do know that, you know,
23 there were some storms during that time
24 period. But, again, that the 1988 image did
25 not show evidence of a point of erosion.



1 Q: So, from what you've said just now, you do
2 acknowledge that there was erosion at this
3 time and that this land would be -- this line
4 would be further landward than your 2017
5 line?

6 **MR. WALKER:** I would object to the question. He
7 misstated the answer what Mr. Hodge said. He
8 said, you agree that there was erosion during
9 this time. Mr. Hodge said, I agree there
10 were storms during this time, but the review
11 of the photograph did not show any erosional
12 features.

13 **MR. CHURDAR:** Okay. I mean, I believe he answered
14 the question anyway, but I -- it was ...

15 **THE COURT:** Okay. So, the -- so, you're satisfied
16 with his response to your last question?

17 **MR. CHURDAR:** Well, I'll accept it. I'll just put
18 it that way, so.

19 **THE COURT:** Okay.

20 **MR. CHURDAR:** Yes, ma'am.

21 **THE COURT:** Okay.

22 **MR. CHURDAR:** Yes, ma'am.

23 **THE COURT:** Sustain the objection. Okay. Thank
24 you.

25 Q: All right. So, Mr. Hodge, let's look at the



1 red 1982 vegetation line. And I just want to
2 go through all four of these lines. We've
3 gone over the yellow one, but then the red,
4 the light green, and the dark green. So, the
5 red one is the 1982 vegetation line. And you
6 would reject that as being the most landward
7 point of erosion at anytime during the past
8 four years.

9 A: I don't know -- again, I don't see a
10 photograph of 1982 that shows vegetation.
11 All I see is a 2020 image with an orange
12 looking line that's labeled vegetation line
13 1982. I can't fully evaluate that.

14 Q: Okay. But, again, is it your testimony here
15 today that, with regard to the underlying
16 data for the red 1982 vegetation line, you
17 never received that data from the Department?
18 Your attorney never gave that to you?

19 A: Well, when you say that data, I think you
20 need to be complete. No, we did not get a
21 1982 photograph depicting a vegetation line
22 on it.

23 Q: Okay. What about the raw data?

24 A: Well, what do you mean by raw data?

25 Q: Well, what you're saying is you didn't get a



1 picture, that the underlying data -- that you
2 could then create your own picture. Is it
3 your testimony that you did not get the
4 underlying data for that red line?

5 A: We received a series of shapefiles. I would
6 have to go back and determine whether we
7 received a copy of that shapefile. But that
8 shape file alone is insufficient to make a
9 determination that that, in fact, is an
10 accurate vegetation line.

11 Q: Okay. So, for this line, for the yellow
12 line, for the light green line, and for the
13 dark green line, you're saying you got
14 shapefiles, but that's -- you're saying
15 that's all you got ---

16 A: I would have to ---

17 Q: --- from the Department?

18 A: I would have to look and see what shapefiles
19 received. You know, top of my head I can't
20 tell you right now. But we got a number of
21 shapefiles from the Department. And all that
22 is is a just a digital file. It's a series
23 of lines, what we call polylines that are --
24 you know, that are -- one can reference to
25 some coordinate system. But that doesn't



1 tell me that it's really a vegetation line.

2 Q: Okay. But that's a conclusion. My question
3 is, if you take the underlying data that's in
4 the shapefiles -- and I will just tell you,
5 you know, I am not an expert in this field,
6 so to the extent that I am imprecise, that's
7 not intended to be a trick. I'm just saying,
8 as far as far as the data that you received,
9 is it your testimony that the files that you
10 got, these shapefiles that you're talking
11 about, could not be used to produce by you,
12 in your own analysis, lines that are landward
13 of the 2017 line?

14 A: Well -- and let me -- I'll try to be as
15 comprehensive as possible in my response. We
16 did receive some shape files and we did place
17 those on imagery. And there's no question
18 about that. But I would have to go back and
19 look at the specific years to see what we
20 received from the Department. And the shape
21 file alone is not enough. All that is is an
22 allegation that this is a vegetation line.
23 But then I would expect, if the Department
24 use those shape files, they also used a
25 photograph or a chart or a map or something



1 to justify drawing that shape file.

2 Q: Okay.

3 A: Otherwise, we have to assume that some third
4 party, not the Department, decided this is
5 the shoreline or this is the vegetation line.
6 We don't know who created ultimately that
7 shapefile. If you're staff created the
8 shapefile, then they had to have taken it off
9 of some chart, photograph, something. All I
10 can say, all we're given is a digital file
11 that's a line, and we can't tell what that
12 was derived from.

13 Q: But you could overlay that onto the image and
14 see where the line is located though ---

15 A: Well, here it's overlaid on the 2021 image,
16 but that doesn't really tell us where the
17 vegetation line was.

18 **MR. CHURDAR:** Just a second, Your Honor.

19 Q: Now, you received the data to produce -- from
20 the Department to produce slide 17, correct?

21 **(Petitioner's Exhibit Number 9b was referenced.)**

22 A: Whether that was received from the data --
23 that data was received from the Department or
24 some other source, I can't say. Some of this
25 may have been actually from the Department,



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1 because I know there was some vegetation
2 lines the Department had identified. So,
3 yes. Some of this information, but not all
4 of it, came from information provided by the
5 Department.

6 Q: Okay. So, you did receive that data?

7 A: Well, I think some of this came in a FOIA
8 request. It was long before we ever got
9 involved in this litigation. And actually,
10 this work was done back in 2017.

11 Q: Okay.

12 A: Before the lines -- the proposed lines came
13 out. And so, those were from the -- that was
14 from the information that was provided. But
15 I -- again, I will say one more time, I
16 cannot verify to you today which shapefiles
17 the Department had provided to us. But these
18 were certainly from shape files that I got
19 from a FOIA request.

20 Q: Okay. But whether it's from a FOIA request
21 or a discovery request, you had the data,
22 right? I mean, enough to produce slide 17.

23 A: Well, let's be accurate. I had the data that
24 I used to produce this particular slide. But
25 you're representing that I've had -- you say,



1 you've had the data. I've had some data, but
2 I can't tell you that I've had all the data
3 that you think I may have had.

4 Q: Okay. Well, you have listed on here
5 accretion rates for 1988-'98, 2006, 2015, and
6 2017. And your testimony is that you
7 received data sufficient to produce this
8 file.

9 A: Well, the data that I received -- and I'll
10 tell you right now, Bradley, from this, that
11 we had an '88 vegetation line from the
12 Department, we had a 2006 vegetation line,
13 and we had a -- and the actual '15 and '17
14 was my work of delineating the vegetation
15 lines from the aerial imagery. So, yes,
16 there were two shapefiles that were used for
17 this particular calculation.

18 Q: Okay. And having gotten this data and the
19 FOIA request, did you ever upload it to see
20 if any of those four lines that we have gone
21 over, the -- well, we've only gone over two,
22 the '82 and the '88. But the other two lines
23 as well, the light green and the dark green
24 line, did you ever upload the data that you
25 did receive to see if it would produce a line



1 and where it was in relationship to the 2017
2 escarpment line?

3 A: The data that we had was uploaded. I can't
4 say whether each of those individual lines --
5 sitting here today, I can't tell you whether
6 they were uploaded. I'd have to go back and
7 look. But I will tell you that, you know, we
8 did get shape files from the Department that
9 we ended up, you know, placing on images.
10 Whether we had a shape file that actually
11 matched the photograph, there's some years
12 where, you know, we didn't have a photograph.
13 We may have gotten a shapefile, but the
14 shapefile without a contemporaneous
15 photograph isn't really a lot of help.

16 Q: Okay. So, the -- if -- okay. So, Mr. Hodge,
17 you can see the -- we've talked about the red
18 line and the yellow line. You can see
19 there's two more lines. There's a light
20 green line and a dark green line that are
21 landward of the 2017 dotted line, escarpment
22 line. You can see that?

23 **(Respondent's Exhibit Number 18 was referenced.)**

24 A: I see there's some lines on the photo, yes.

25 Q: Okay. So, my questions for you -- I don't



1 want to repeat the whole line of questions if
2 your answers are all the same. So, my
3 questions for you are for the light green
4 line, that's the 1993 vegetation line, and
5 for the dark green line, which is the 1998
6 vegetation line, I'll just lump those two
7 together. It is your -- well, I don't want
8 to mischaracterize it, but it's your
9 testimony, that you don't recall if you got
10 the data for these lines or you don't recall
11 if -- how it was given to you?

12 A: Now, I know that we had a '98 -- you know,
13 for example, a '98 line. I know that we had
14 an '06 line. But the vegetation lines in and
15 of themselves are not points of erosion.
16 That's just the vegetation line. The -- you
17 know, the -- what we're tasked with doing in
18 terms of the baseline is looking for the most
19 landward point of erosion.

20 Q: Right.

21 A: A vegetation line in and of itself is not a
22 point of erosion.

23 Q: Right. But you're -- I mean, that -- you're
24 concluding that those were not landward
25 points of erosion. And so what I'm asking



1 you for all of these is did you check with
2 regard to each one of these lines -- we've
3 got the '88 line. We've got the '82 line.
4 We've got the '93 line and the '98 line. Did
5 you check to see if there were any erosional
6 events during these years that would be at
7 odds with your opinion?

8 A: Well, the photographs that we had, we looked
9 for evidence of erosion. And while you say
10 erosional events, that -- I mean, that's --
11 if you're referring to something specific.
12 Yes, so we looked at storm tracks and storm
13 histories and we have some idea about some of
14 that. But really, the vegetation lines, you
15 know, from '88 progressed in a seaward
16 direction until '15.

17 Q: Okay.

18 A: And that's based upon the vegetation lines
19 that we were given from OCRM.

20 Q: But can I ask you, did ---

21 A: Yes.

22 Q: --- did those -- you have mentioned that you
23 were aware of erosional events. Did you
24 actually look at those as it relates to where
25 those lines were in, you know, each one of



1 those fours years that are represented by
2 those four lines that are landward of the
3 black dotted line?

4 A: Well, that's kind of a complicated question,
5 but I'll try to answer it. We -- when I
6 looked at the photographs, I certainly looked
7 for any evidence of erosion. I did that on
8 all the photographs. And we know that, from
9 time to time, storms march up the coast.
10 They'll go offshore. Sometimes they go over
11 Georgia. Sometimes they hit North Carolina.
12 You know, we certainly look for any evidence
13 of a landward point of erosion in the earlier
14 photographs.

15 Q: And did you find any evidence? Did you find
16 any specific evidence during those ---

17 A: We -- I didn't find anything specific that I
18 could tie to a particular event. So, again,
19 the -- you know, the -- we looked for
20 evidence of scarps, overwash, things like
21 that. We didn't see it until we got to --
22 you know, the Matthew period and we saw it in
23 Irma particularly. But before that, it --
24 the beach, you know, generally, had a
25 constructive appearance.



1 Q: With any of those four lines, red, yellow,
2 light green, dark green, you mentioned that
3 you -- and I'm not trying to Mischaracterize
4 your words, but you mentioned that there were
5 storm events or erosional events that
6 happened approximately in the same years.
7 And my question -- let me to get my -- my
8 question is then, did you look at those and
9 form an opinion -- or were those erosions
10 episodes, events, whatever, such that they
11 would be at odds with your opinion?

12 A: With all due respect, you sort of butchered
13 my testimony.

14 Q: Okay.

15 A: I didn't testify there were erosional events.

16 Q: Okay.

17 A: I just said that we knew that there were some
18 storms that had come by.

19 Q: Okay.

20 A: And that's just a normal course of business
21 along the coast. And so the examination of
22 the photographs was to see if there was
23 evidence of any kind of erosion in the
24 photographs.

25 Q: Don't you have to use the data that was



1 provided to you and then, I know you dispute
2 that those are -- that those four lines are
3 anything that you would agree to. But I'm
4 saying, don't you have to use the data that
5 was provided to you and know where these four
6 lines are if you're going to render a
7 credible opinion about where the most
8 landward line is?

9 A: We looked at the photographs. We laid out
10 the identified vegetation lines. Those
11 documented an accretional period, then it
12 documented an erosional period. And we
13 marked the most landward point of erosion.
14 And, because there was a vegetation line --
15 and this really goes to the heart of, I
16 think, an error that OCRM has had in its
17 process. In a number of your documents, you
18 -- and actually, in your regulation, you
19 erroneously refer to looking at the most
20 landward shoreline in the last 40 years.

21 Q: I'm sorry. You're saying the regulation is
22 in error?

23 A: It's in your regulation, it's in some of your
24 guidance. And the statute is really clear.
25 It's the most landward point of erosion. And



1 in my deposition I made this very clear, that
2 the problem that I had with the way OCRM, you
3 know, at least had approached this process in
4 the past -- and, again, in the past, so
5 you're going back to '82 lines and '88 lines
6 and things like that -- is that -- and
7 there's guidance that OCRM had back in the
8 2008, 2009 range as well, and prior to that
9 that says, oh, we identified the most
10 landward shoreline. That's not what the
11 statute says. So, ultimately, one of my
12 concerns when I got involved in this project
13 was that OCRM was not looking at the most
14 landward point of erosion as the statute
15 requires. But it had kind of adopted this
16 idea that we look at the most landward
17 shoreline in the last 40 years. And so maybe
18 that answers your questions, that especially
19 in the past, that OCRM was not identifying
20 the most landward point of erosion. They
21 were identifying what they referred to as the
22 most landward shoreline. And there's a
23 conflict between your regulation and your
24 statute. So, it is what it is.

25 Q: Let me move on to the foredune location



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1 point. When you're selecting the foredune
2 location point, you did not use a specific
3 elevation or height above ground; is that
4 correct?

5 A: Well, that's actually interesting. When we
6 used the profile data ---

7 Q: Could you -- before you do your explanation,
8 interesting doesn't tell me if that's yes or
9 no.

10 A: I did use elevation.

11 Q: Okay. You want to explain that?

12 A: Absolutely. I explained it yesterday. We
13 looked at the beach profile and it's on a
14 spreadsheet. We saw the graphs yesterday.
15 We see little peaks for the foredune ridge.
16 And when I started the beach and I went -- I
17 started at basically around sea level and I
18 went up to the very first peak to -- in the
19 profile, in my opinion, was the foredune
20 ridge. And I marked that. And when we did
21 that for both OCRM profiles, we had a slide
22 yesterday that both of the foredune ridges
23 were about 10.2, 10.5 feet. I can't remember
24 the exact number. But we have an exhibit in
25 evidence and there was a slide that show it



1 on the lefthand side of the slide that says
2 the average height of the foredune ridge.
3 So, yes, we did calculate it.

4 Q: Using a specific elevation?

5 A: Correct.

6 Q: Okay.

7 A: We saw the geomorphic expression of the
8 foredune ridge and we measured the elevation.

9 Q: All right. I'd like to talk to you about
10 your shoreline movement study.

11 **MR. CHURDAR:** Can you pull that up? Can you go to
12 slide 25?

13 **(Petitioner's Exhibit Number 9e was referenced.)**

14 Q: Okay. I'd like for you to just look at the
15 foredune ridge location between 2008 and 2018
16 for monument 2620. Do you see that?

17 A: Yes.

18 Q: Okay. There is no difference in the foredune
19 ridge location at this monument over that 10-
20 year period, correct?

21 A: Repeat your question.

22 Q: I said, there's no difference in the foredune
23 ridge location at this monument over that 10-
24 year period, from 2008 to 2018. If you look
25 at 2008 and you look at 2018, it's in the



1 same spot.

2 A: I would disagree.

3 Q: Okay. Are you saying that the location in

4 2008 and the location in 2018 are different?

5 A: The distance from the benchmark in 2007,

6 which is the first measurement ---

7 Q: I'm saying 2008.

8 A: Well, it's -- it actually starts in 2007.

9 Q: That's what you started.

10 A: Where the measurement starts.

11 Q: Right. But what I'm asking you is 2008.

12 A: Well, 2008, actually, it's about 50 feet

13 seaward in 2008 until 2018.

14 Q: Okay. This -- so, look over right here, Mr.

15 Hodge. I'm talking about that right there.

16 A: Okay. So, we'll circle ---

17 Q: That's ---

18 A: I'm going to circle that. Okay.

19 Q: --- 2008. And then 2018.

20 A: Okay. It's about -- okay. Given those two

21 points, it's about the same. And this is

22 kind of the story that we saw. That there

23 was accretion and you see that around 2012,

24 you know, '14, '15. And then, they had a

25 period of storms and it cut back and it's



1 essentially, kind of, leveled off.

2 Q: Right.

3 A: So, yes, we did see accretion. We saw it
4 continue accretion and then it was cut back.
5 And that's the story we've had all along.

6 Q: Right. But the point is, there's no
7 difference if you exclude 2007. And my point
8 is, if you use what you did, an 11-year
9 period starting in 2007, instead of a 10-year
10 period, starting in 2008, you're able to
11 significantly increase the change in the
12 foredune ridge location just by adding one
13 year of data, correct?

14 A: Well, Bradley, let me explain to you
15 succinctly that I used the data that you guys
16 gave us. You gave us your profile data, and
17 it started in 2007. And the data is what it
18 is for better or for worse. I took it -- you
19 know, it's your -- I mean, I took the data
20 you gave me. You guys got to live with it.
21 We have to live with it. And I measured the
22 distance. And it shows that it was somewhere
23 around 175 feet in 2007. It grew to just at
24 almost 250 feet. And then it was cut back
25 with some storms, and now it's down to around



1 200. That's the history. So, you ---

2 Q: Right. But my ---

3 A: You can make what you want of it, but that's
4 your data. It's not my data.

5 Q: Right. But what I'm saying is, 10 of those
6 11 years from the start point to the end
7 point it's roughly the same from 2008 to
8 2018.

9 A: Well, I think that's precisely the story that
10 we -- you know, that these -- this data tells
11 you. You can see that it rises slightly from
12 about 180 or so in 2008. It goes to maybe,
13 let's say, two -- you know, 210, 210. By the
14 time you get to 2014, it's up to 245, and
15 it's 245 again in 2015. And then, it drops
16 off in '16 to around 2,010 (sic) and it goes
17 down to right around -- excuse me, goes to
18 210 and then it goes down to about 200 after
19 that. So, I mean, that's what the data
20 shows. But it shows there was a period of
21 accretion. It shows there was a period of
22 erosion.

23 Q: Let me ask you this: As you compared the
24 foredune ridge between years, did you have
25 standard or a minimum elevation to qualify it



1 as a foredune?

2 A: No, simply because it was based on geomorphic
3 expression. And I think with my experience
4 looking at beaches and shorelines, you can
5 see the first major dune peak that comes off
6 the of the beach. And it just so happens
7 that those averaged out at about 10 and a
8 half feet. So, I have absolutely no doubt
9 that that was a foredune ridge that we were -
10 - we identified.

11 Q: Okay. But I think your -- bottom line, your
12 answer to my question was no; is that right?

13 A: What was your question?

14 Q: My question was, I said, as you compared the
15 foredune ridge between years, did you have a
16 standard or a minimum elevation to qualify it
17 as a foredune?

18 A: Well, if there was a two-foot bump, I
19 would've thrown it out -- yes, I have a
20 standard.

21 Q: And what was that?

22 A: The standard was best professional judgement.
23 In other words, if I saw it come off the
24 beach and it was little slight bump, I'd say,
25 that's not a foredune ridge. But when you've



1 got a clear peak, that was then what we, you
2 know, use a foredune ridge. And again, we're
3 sort of using -- if I could stand up and use
4 this diagram -- is I went up the profile.
5 When you got to this point, where there's a
6 first big peak, that's what I call -- that's
7 where I measured the foredune ridge. And it
8 just so happens it was all about ten feet,
9 plus or minus a foot. So, I have good
10 confidence that it was -- we were looking at
11 the same thing year to year. If there was a
12 little two foot bump down, you know, below
13 that, I would say that's not the foredune
14 ridge. It may be an incipient dune that's
15 forming, but this was -- but the high peak
16 was a foredune ridge. And so when I say best
17 professional judgement, you look at it and
18 you make an assessment.

19 Q: Okay. Now, this is shifting gears quite
20 significantly. I just wanted to ask you, you
21 were -- when you were deposed, you were
22 deposed before you knew that Mr. Chris Jones
23 would be testifying on OCRM's behalf as an
24 expert; is that true?

25 A: Yeah. I don't think the experts had been



1 noticed at that point.

2 Q: Okay.

3 A: From your side.

4 Q: All right.

5 **MR. CHURDAR:** Your Honor, can I have just one
6 moment please?

7 **THE COURT:** Yes.

8 **MR. CHURDAR:** Okay. Your Honor, I have no further
9 questions.

10 **THE COURT:** Mr. Walker, anything on Redirect?

11 **MR. HODGE - REDIRECT EXAMINATION BY MR. WALKER:**

12 Q: Mr. Hodge, you were asked a whole bunch of
13 questions about sea level rise and whether
14 there was any indication of any analysis in
15 your materials. You answered those
16 questions. I'd like to refer to -- did you
17 give materials to us to provide to the
18 Department, including your report, your
19 PowerPoint report?

20 A: Yes. Yes.

21 Q: Let's take a look at that.

22 **MR. WALKER:** If you would please put up
23 Petitioner's Exhibit 9. Go to the face page.
24 **(Petitioner's Exhibit Number 9 was referenced.)**

25 Q: Is that a copy of it?



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1 A: That's the cover page. Yes.

2 **MR. WALKER:** And could we go to page 3?

3 Q: What's the title of that?

4 A: It says Sediment Supply versus Sea Level
5 Rise.

6 Q: What subject do you address there?

7 A: Oh, this is kind of coastal processes 101.
8 And it just -- wanted to introduce the
9 region. And the real purpose of this slide
10 is contained in the last bullet. But I -- in
11 order to explain it, I have to lead with the
12 first two bullets. And so, it's -- while
13 most barrier islands on the coast are
14 migrating landward in response to sea level
15 rise, the retreat is not occurring
16 everywhere. And that's really the point. And
17 we acknowledge the fact that sea level has
18 been rising over the last 18,000 years, but
19 barrier island stability is in this interplay
20 between how much sediment you have and then
21 what the sea level rise is. And I can give
22 you -- you know, give The Court multiple
23 examples where the coastlines -- where you
24 have some source of sediment and you have
25 barrier islands developing where they maybe



1 shouldn't be developing because of either the
2 sea level is either rising or the land is
3 being -- is actually rising up. As the
4 glaciers have melted in places, the land
5 actually rises up. You go out to California
6 -- or actually, you go out to Alaska and you
7 go up into Canada, there are places where we
8 had an Ice Age, there were glaciers, and
9 those glaciers melt, the land actually is
10 rising. People think sea level's rising.
11 Well, it is rising, but sometimes the actual
12 land is rising faster than the sea level too.
13 So, we -- this is an interplay. And so the
14 sediments control, you know, the amount of
15 sediments, whether those islands could exist
16 or not. And that's really the purpose, is to
17 say that not all islands on the coast are
18 eroding. There some that are stable. That
19 are some that are actually accreting. And
20 Kiawah's one of those 15 percent that's
21 accreting.

22 Q: Getting back to Captain Sam's.

23 A: Yeah.

24 Q: You testify to -- that sea level is going up.

25 A: Yes.



1 Q: If the beach is accreting during sea level
2 rise, to a reasonable degree of coastal
3 geological certainty what does that tell you
4 about the sediment supply and how the system
5 is working?

6 A: To a reasonable degree of geological
7 certainty, if you have accretion that's
8 ongoing during a time of sea level rise, that
9 suggests that the sediment supply is -- it
10 kind of offsets the effects of sea level
11 rise.

12 **MR. WALKER:** All right. If you could please go,
13 Alex, to the next page of the report.

14 Q: And in the third bullet, do you talk about
15 sea level rise, and the fourth bullet?

16 A: Yes.

17 Q: All right.

18 **MR. WALKER:** And if you can go to page 6, please.

19 Q: Does this page in your report also analyze
20 sediment supply versus sea level rise?

21 A: Yes, it does.

22 Q: All right. Thank you. Oh, by the way, when
23 you're looking for the most landward point of
24 erosion, is that a forward look or backwards
25 look?



1 A: You look backwards over a 40-year period in
2 the past. And that's what the statute says
3 to do. It's not looking forward. So, that's
4 a good question, because the sea level is
5 rising, you're not looking forward. It's a
6 40-year look back. That's what the
7 requirement is.

8 Q: Big exchange about the data files. You're
9 not disputing that you received data files,
10 are you?

11 A: I received a lot of data files from OCRM.

12 Q: Did you receive any information as to the
13 accuracy or methods used to compile those
14 data files?

15 A: No. Not at all.

16 Q: Is that important to their accuracy?

17 A: It's absolutely important. In essence, it
18 was -- and I think in my deposition I discuss
19 this somewhat as well, that in order to
20 reconstruct what OCRM did, there are a number
21 of assumptions that they had made. And we
22 didn't have those assumptions. All we had
23 was a data file. So, it's sort of like
24 somebody delivers me some lumber and says, I
25 want you to build a house just like the one



1 across the street. Well, in essence, I've
2 got to figure out the details of how that
3 house across the street was built, and I
4 can't do it. All they gave me is a bunch of
5 lumbar, so to speak, in the sense that the
6 data files in and of themselves don't really
7 tell you the whole story. And that's the
8 problem.

9 Q: Is a vegetation line equivalent to a
10 geomorphic expression of erosion?

11 A: No, it's not.

12 Q: Is your -- let's take your August 2020 line.
13 Did you mark a line in August 2020?

14 A: Yes, I did.

15 Q: And what was that line?

16 A: Say again.

17 Q: What was the line you marked in August ---

18 A: Oh, it was a vegetation line. And I used not
19 only the appearance of vegetation, but I also
20 used geomorphology as a means of supporting
21 that line.

22 Q: And is that -- were there -- was there any
23 geomorphic expression of erosion at the
24 seaward limit of that line?

25 A: No. There was none.



1 **MR. WALKER:** That's all, Your Honor.

2 **THE COURT:** Okay. Thank you. Thank you, Mr.
3 Hodge.

4 **THE WITNESS:** Thank you.

5 **THE COURT:** Ms. Phelan, did you have something?

6 **MS. PHELAN:** It's all right.

7 **THE COURT:** Okay. Okay. I think at this point,
8 before you call your next witness, Mr.
9 Walker, why don't we take an early lunch and
10 reconvene at 1:00 o'clock.

11 **MR. WALKER:** Yes, Your Honor. Great.

12 **THE COURT:** Thank you.

13 **(Off the record from 11:46 a.m. until 1:07 p.m.)**

14 **THE COURT:** Okay. If everyone is ready, we are
15 back on the record. Mr. Walker or Mr.
16 Gressette.

17 **MR. GRESSETTE:** Thank you, Your Honor. The
18 Petitioner would call Andrew Tolleson.

19 **THE COURT:** Mr. Tolleson, if you'll face the court
20 reporter, raise your right hand, she will
21 swear you.

22 **COURT REPORTER:** Do you swear that the testimony
23 you give is the truth, the whole truth, and
24 nothing but the truth, so help you God?

25 **MR. TOLLESON:** I do.



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1 **COURT REPORTER:** Please state and spell your first
2 and last name.

3 **MR. TOLLESON:** Andrew Tolleson. A-N-D-R-E-W, T-O-
4 L-L-E-S-O-N.

5 **COURT REPORTER:** Thank you.

6 **ANDREW TOLLESON,** having been duly sworn, testifies
7 as follows:

8 **MR. TOLLESON - DIRECT EXAMINATION BY MR. GRESSETTE:**

9 Q: Good afternoon, Mr. Tolleson.

10 A: Good afternoon.

11 Q: And you've stated your full name for the
12 record. Could you tell us where you live?

13 A: I live here in Columbia, South Carolina.

14 Q: And what do you do here in Columbia?

15 A: I'm a licensed professional engineer,
16 licensed professional GIS surveyor, I own a
17 consulting engineering practice.

18 Q: Okay.

19 **MR. GRESSETTE:** I'd like to put up a document we've
20 pre-marked as Petitioner's Exhibit Number 5.

21 **(Petitioner's Exhibit Number 5 was introduced.)**

22 Q: Have you seen that document?

23 A: I have. And can I take time out for just a
24 moment?

25 Q: Yeah. Sure.



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1 A: Just a matter of order. I have exhibit -- I
2 can read from this deposition.

3 Q: Is that a copy of your current CV?

4 A: It is.

5 Q: All right. And it is current and up to date?

6 A: It is.

7 Q: And does it outline the qualifications you
8 plan to rely on for your testimony here
9 today?

10 A: It does.

11 Q: Okay. To provide The Court some background,
12 would you please summarize your high school -
13 - your education after high school?

14 A: My high school was Lower Richland High
15 School, right here in Columbia. No. I
16 earned a undergraduate degree and a graduate
17 degree in Civil and Environmental Engineering
18 from the University of South Carolina. And
19 those would be the education ---

20 Q: All right.

21 A: --- components.

22 Q: And do you hold any license?

23 A: I do.

24 Q: Can you tell The Court about those?

25 A: Yes. Most notably, I'm a Board licenced



1 civil engineer. I've held licences -- Board
2 licenses in five states, currently in South
3 Carolina. Board licensed professional GIS
4 surveyor, so I'm a dual registrant. Post
5 licensure I hold -- or admitted as a
6 diplomate in the Academy of Geo-
7 Professionals, which is a geotechnical
8 distinction.

9 Q: And when you say you are Board licenced, what
10 board are you referring to?

11 A: It's the South Carolina Engineering and
12 Surveying Board under the LLR.

13 Q: Okay. And have you been asked by that board
14 to perform any special tasks?

15 A: I have at times, yes.

16 Q: Okay. Can you tell us about a couple of
17 those?

18 A: Okay. Most notably I supposed -- or
19 initially, early in my professional career I
20 was recruited by the Engineering Board to
21 represent the overlap of practices between
22 Engineering -- Professional Engineering and
23 Professional Geology, because the
24 Professional Geology was just emerging as a
25 licensed profession at that time. Subsequent



1 to that, as I recall, was again recruited by
2 the Engineering Board to represent their
3 interest in testimony to the legislative
4 committee that was looking at licensure of
5 professional hydrologists under the auspices
6 of the American History of Hydrology.

7 Subsequent to that, the Engineering Board
8 recruited me again. This would have been
9 probably 2010 or '12. For several years, I
10 served on the Engineering Review Board
11 Committee that would address applicants from
12 other disciplines in other states that were
13 non-conformant to the standard model law for
14 licensure.

15 Q: And how long have you been licensed as an
16 engineer in the State of South Carolina?

17 A: I think initially it was like 1991, so I
18 guess 20 years this year. No, 30 years.

19 Q: Okay. And did you have any particular
20 experience or unique experience with taking
21 the engineering exam?

22 A: Well, I didn't pass the first time. That's
23 not uncommon. But the second time, I really
24 did prepare and I scored like in the 97th
25 percentile, which led to the NCEES, which is



1 the -- like the national -- it's the national
2 exam for licensed professional engineers and
3 surveyors. And I was selected as a problem
4 developer, so I would write problems for the
5 exam, and a problem taker, so they would give
6 me sample problems and they would time how
7 long it would take to solve it.

8 Q: All right. And do you hold any other
9 licensors in South Carolina?

10 A: Oh, I do. I do.

11 Q: What are those?

12 A: I'm a -- well, it was a LLR Board, the
13 Contractor's Board. I'm a Board licensed,
14 constructor manager in seven different
15 fields.

16 Q: And can you give us a couple of examples of
17 those fields?

18 A: Earth work, foundations, concrete.
19 Basically, horizontal infrastructure.

20 Q: So, if I understand correctly, you are a
21 licenced engineer, but you're also a licensed
22 professional GIS surveyor?

23 A: That is correct.

24 Q: And so, those are two totally separate
25 distinctions?



1 A: They are. They're under the same board, but,
2 yes, two different sets.

3 Q: Okay. And what qualifications are required
4 to become a licensed professional GIS
5 surveyor in South Carolina?

6 A: You know, my license -- I was one of the
7 first registrants. So, it's changed since
8 then, but a number of the elements are
9 required. They require a fundamental exam
10 for licensure for applicants, working under
11 direct supervision of a surveyor, criteria
12 for I think a four-year degree, sitting for a
13 final proficiency exam, references from
14 licensed professionals in surveying, and
15 maybe one other criteria.

16 Q: And are the perimeters of your practice as a
17 licensed professional GIS surveyor
18 established by the Board?

19 A: They are. They're regulated. Yeah.

20 **MR. GRESSETTE:** Can we take a look at the statute?

21 Q: We're going to look at a statute on the
22 screen. It's an excerpt from South Carolina
23 Code Section 40-22-20. Have you seen that
24 section before?

25 A: Yes, I have.



1 Q: Okay. And what does that section talking
2 about?

3 A: Okay. It's -- it may sound a little
4 convoluted. For example, in the engineering
5 practice, which I am, under the same board,
6 it's recognized that there are different
7 disciplines of engineering. Likewise, in the
8 practice of surveying, surveying is a
9 licensed practice. And the history of it
10 goes very far back, centuries. And the
11 practice of surveying in the current period,
12 we recognize three -- or South Carolina
13 recognizes three major distinctions: A
14 registered land surveyor, sometimes called a
15 PL, a registered GIS surveyor ---

16 Q: Okay.

17 A: --- and then a registered photogrammetric
18 surveyor.

19 Q: Okay.

20 A: So, what they all have in common, is they are
21 all surveyors. It's -- and they're all bound
22 by these regulations in how to become one.

23 Q: Okay. And if we look at subsection © at the
24 bottom, does that describe the scope of the
25 discipline of a Geographic Information



1 Systems surveyor, the GIS surveyor?

2 A: I mean, yeah. I mean, I think probably the
3 correct answer is it's the statutory
4 regulatory, so yes. There could be other
5 definitions, you know, of things, but, yes,
6 this covers it pretty well.

7 Q: Okay. And can you read that section on
8 aloud for everyone?

9 A: All right. The GI -- or the geographic
10 information systems surveyor creates,
11 prepares, or modifies electronic or
12 computerized data including land information
13 systems, which sometime's called LIs, and
14 geographic information systems, referred to
15 as GIS, relative to the performance of the
16 activities described in subitems (a) and (b).

17 Q: Okay. And if we look at subitems (a) and
18 (b), are they land surveying and photometric
19 -- photogrammetric surveying?

20 A: Yes.

21 Q: Okay. So, does a GIS surveyor perform those
22 types of activities in relation to
23 configuring or contouring the earth's
24 surface?

25 A: That would be one element, yes.



1 Q: Okay. Do you perform your work as a GIS
2 systems surveyor relative to the position of
3 fixed objects on the earth's surface by
4 applying principles of mathematics on
5 remotely sensed data, such as photogrammetry?

6 A: Yes. I mean, I think the way this is
7 structured is the professional GIS surveyor
8 routinely and obligatorily would obtain
9 information from, say, a registered land
10 surveyor or from a licensed photogrammetric
11 surveyor. And in the GIS professional
12 surveyor would have the skill set or
13 commensurate skills to operate, manipulate,
14 revise, re-display, measure, you know, those
15 kinds of things. So, really the GIS
16 surveyor, out of those three, is the --
17 actually the newest of the professions or
18 disciplines or sub-disciplines. So, the GIS
19 surveyor is really in the middle. He's using
20 information from both sides.

21 Q: In your work as a licensed professional GIS
22 surveyor, have you used photogrammetry in
23 other projects?

24 A: Yeah. Let's talk about that word for a
25 moment.



1 Q: Okay.

2 A: Photogrammetry. My view would be that the
3 statute that we're looking at here clearly
4 covers surveying. In the modern time, with
5 the electronic or digital tools in analysis
6 and the powerful tool sets that we have,
7 there are all sorts of mathematical skills or
8 tools or analysis that are performed
9 routinely kind of between those three
10 distinctions. In fact, there's even another
11 subset or another division that are not
12 licensed surveyors that use some of the same
13 tools. So, remotely -- what did you read --
14 what was the question again? Was it remotely
15 or photogrammetry?

16 Q: Well, either one. Have you used ---

17 A: Yeah. There -- you know, we talk about this
18 a lot, but photogrammetry would certainly
19 encompass remote sensing. I don't know that
20 there exists a consensus on the narrowness or
21 the confines that remote sensing could be
22 performed under or by. But certainly the
23 PGIS surveyor would work on remotely sensed
24 data and photogrammetric data routine.

25 Q: And the PGIS surveyor, that's the



1 Professional GIS surveyor?

2 A: Correct.

3 Q: Okay. In your work a professional GIS
4 surveyor -- well, let's back up a moment.
5 Tell The Court, if you would, generally what
6 the GIS stands for, what it means.

7 A: It's a geographical information system. So,
8 it's a software package. It's like a
9 platform. Used to be there evolved from a
10 database, became a -- kind of thing as
11 desktop power, you know, increased over the
12 years. Well, the GIS platform -- the
13 geographic information platform really is the
14 tool set to fuse, or put together, both
15 spacial data, most people call aerial or
16 satellite or image data or UAV, like drone
17 data -- that would be a form of data -- with
18 point data or line data. And I think Mr.
19 Hodge opined to polylines, which is the -- a
20 term of art, yes. So, line work. So, here's
21 what really goes on: The land surveyor
22 collects, provides, and signs off and
23 authenticates points and lines. We've seen
24 those when you plat your property, those lines
25 are from a land surveyor. Makes sense.



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1 Aerial programs have existed in this country
2 for decades that were done off of aircraft
3 with cameras, with film, predating the
4 digital age that we're in now. So, as far as
5 like fusing that together, the GIS is a tool
6 to do that. It allows the GIS professional
7 to work in an environment. And there's the
8 software package itself or the tool set it
9 is, very robust. It's used in criminology
10 investigations, wreck investigations. I've
11 used it extensively in biomedical
12 applications. It takes data about data. And
13 we'll -- later we'll be talking about -- or
14 I'm sure it will come up -- a term called
15 metadata, which is information about
16 information or information about the data
17 sets. The GIS does a great job of organizing
18 that and creating a uniform platform so
19 everything displayed is reliable. I'm sorry
20 that was too long, but that was ---

21 Q: That's alright. That was great. Tell me,
22 what are you referring to when you say
23 medical applications in that answer?

24 A: I'll try to be short about it. I became
25 involved with this emerging field that was



1 finding its way into the commercial industry,
2 like engineering that operate, before there
3 was even a GIS survey designation invented.
4 And it lent itself well to the land
5 development work that I've done extensively.
6 The lay of the land, the typography, what
7 areas will flood, road conditions, all sorts
8 of things. And the tool sets that were
9 becoming available, because the computational
10 power at a desktop, you know, was just
11 expanding. The same time so was the like
12 software packages that were becoming a little
13 more efficient. Well, there are -- you know,
14 if we really want to get to the root of it,
15 there's two kinds of data that we'll deal
16 with -- that we've dealt with so far that I'm
17 seeing. We've had point and line data,
18 that's like survey data. And we've had image
19 and satellite data, like Mr. Hodge had put up
20 there. The satellite data is an image.
21 Nowadays, it's digital. And all that means
22 is the -- you know, a bunch of pixels side by
23 side. And when the pixels are organized,
24 they're call a raster. So, here's what
25 happened: The GIS and that whole industry



1 started developing sophisticated tools and
2 manipulating the image itself, the
3 information content. You know, because when
4 you think about it, these sensors that fly
5 over, they're very sophisticated, they came
6 from -- really from NASA. You know, we have
7 been looking at -- I know, Mr. Hodge, you're
8 a planetary expert anyway. When you look at
9 planets, you see the reflected light from
10 them or admitted light from them. Well, that
11 -- there's information content in that image.
12 Well, it's spectral, you chop it up into
13 little pieces. But the software that was
14 imbedded in the GIS, you know, like a common
15 platform is the ArcGIS platform. Well, there
16 are extensions to that that do other things
17 that will produce multi-spectral and things
18 like that. So, that's a long answer. But I
19 use those exact same tools and biomedical
20 applications and file patents for it. You
21 know, where we were manipulating,
22 deconvolving colors and all sorts of things,
23 spectral analysis. So, that's how we worked
24 it.

25 Q: And when you say manipulating the images, do



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1 you mean examining the data included in the
2 images?

3 A: In the images. What I was a really referring
4 to is it is like at a pixel level, like the
5 little smallest dot, there's information.
6 You know, I -- this is such a big field. But
7 there's even techniques to look at a sub-
8 pixel, based on the information that's -- the
9 wavelengths that are imbedded in that pixel
10 from whatever type of sensor you might have.
11 So, in that biomedical, in that context, I
12 was looking for spectral type signatures,
13 which is applied in natural resource work all
14 the time nowadays, you know, not just
15 biomedical. I had to participate on a study
16 where we looked at oyster bed health and
17 condition using multi-spectral data or
18 hyperspectral data.

19 Q: Okay. Before we go onto the oyster beds,
20 tell The Court, if you would, about a couple
21 of the more accessible or interesting
22 patents.

23 A: Okay. Well, the top one. This is boring,
24 but common. Automated Pavement Distress
25 Characterization Using Contextual Learning



1 and Adaptive Learner -- Learning Neural Net
2 Technique. In that particular study, the --
3 the current state of the art for the
4 Department of Transportation. I do a lot of
5 pavement, you know, horizontal infrastructure
6 work. Right now, or up until this, the way
7 that roadway pavements are managed are
8 they're conditioned like how many fractures
9 and potholes. And there are methods that are
10 well established how to do that. It's done
11 manually. I did a study for Richland County,
12 510 road miles, 1100 lane miles. And we
13 detected every single solitary crack and
14 distress feature using manual methods. Well,
15 very time intensive, expensive study. It's
16 call a pavement management system. Pavement
17 management system built in a GIS. I mean,
18 they're integrated in a cloud environment. I
19 didn't even that, but I'm just saying that's
20 the way it's done. So, you see now there's
21 so many examples of how this technology, you
22 know, really works. But I used pattern
23 recognition in crack determination and then I
24 wrote a script to establish the severity of
25 the crack, and then performed another script



1 that would -- usually the cracks would have
2 like a width, so they would have like a
3 aerial extent. Kind of like -- kind of like
4 your swash or whatever you were talking
5 about, the runnels and things like that.
6 That they have shape, you know, like a --
7 they have -- they have area, aerial extents.
8 Well, when -- I noticed that when the length
9 is a lot wider than the width, either the
10 aspect ratio, one or the other. When it gets
11 to a certain threshold, I wrote a script to
12 turn it into a line, because in that
13 industry, the defects are in linear units of
14 measurement. So, that was a bit more down to
15 earth.

16 Q: Okay. So, if I understand you correctly, you
17 engaged in a project analyzing the condition
18 of the roads. And then, once you found
19 common signatures in that data, you wrote a
20 program for the computer to recognize the
21 same thing?

22 A: Yeah. There an automated method to develop.
23 They're called endmembers. I'm trying to
24 keep this on point here. Endmembers. I
25 think an easy way to say it is the principle



1 components. I mean, the analysis called PC
2 or principle component analysis, which is a
3 matrix method, which can tell kind of a
4 matrix, you know, lines and stuff, kind of
5 lends itself to raster type data. So, I
6 would collect those signatures and then,
7 store them. And then, in an automated way, I
8 could take a new image and find the same
9 thing without being there, you know ---

10 Q: Okay.

11 A: --- that's called automate feature
12 extraction. There's software tools that I --
13 you know, I was doing this work early this
14 part of the century. So, they've been out,
15 you know, for 20 years, but that industry is
16 rich, you know, with tools sets, so.

17 Q: What is automated feature extraction?

18 A: Well, for example -- and we'll get it, but we
19 did do that, more or less, in this exercise.
20 And one of the tools I was using to back
21 check vegetation is automated feature
22 extraction. Meaning that, in our industry,
23 when we're looking at like a -- any type of
24 image, you can take a non-aerial, non-digital
25 image, make a additional file out of it, like



1 scan it, which has been one some of the older
2 artifacts that the state has produced, and we
3 can look at those little pixels, and we can
4 find the signature of digital number of the
5 content of those pixels. And without going
6 to too much trouble, when you have a black
7 and white image, in a digital scheme it has
8 256 shades. Now, 256 you'll find is a
9 rudimentary utility number in the computing
10 industry for a lot of reason. It's binary.
11 Anyway, so 256 shades, right? Well, when we
12 have red, green, and blue, like you took a --
13 your smart phone takes pictures and like a
14 JPEG, well, if you take that into any
15 software package that'll like change your
16 face and color and tone, all that kind of
17 stuff, you're operating on what's called
18 color space. And there's three of those
19 colors. There's red, green, and blue. And
20 the human eye is very, very good. The human
21 eye can detect over I think it's 16 or 17
22 million shades of color. I know that because
23 I worked in it in that other work. So, how
24 is it that we display color on these screens
25 that we have? We have red, green, and blue.



1 That's all we have. That's all our eyes can
2 detect. We got two things; we got a cone and
3 a rod. Cones are for color. The tone is
4 designed in our makeup to distinguish these
5 colors for whatever reasons, evolution or
6 whatever. But you take red, green, and blue,
7 256 shades of red, 256 shades of blue, 256
8 shades of green, multiply them together, you
9 create a cube that's 256 cubed. That means
10 red, green, and blue. That equate -- when
11 you get calculator, it's probably about 16.8
12 million colors. Right? So, what that means,
13 if we're doing photo interpretation and we
14 got a good image, we can do it in an
15 automated fashion, leveraging the signature
16 of the combination of the red, green, blue
17 that makes all those colors. We do that in
18 our mind and our vision natively. It's
19 surprising. People -- you know, you go paint
20 your wall and you get it off a little bit,
21 you will see it. You know, I mean a smidgen.
22 You know, very frustrating. Machines can,
23 you know, are designed to do that. So, when
24 you take those colors apart, it's called
25 deconvolution. Deconvolution. And so I use



1 deconvolution -- I didn't have to do it on
2 the pavements, but the biomedical type work I
3 did -- that we did. And I did the same
4 thing, the deconvolution, very simply on one
5 of the aerial or satellite images more
6 recently, like 2020 it was. And what I did
7 is I took the individual pixels and took some
8 statistics on it.

9 Q: Okay. In our discussion today, we'll
10 probably use the term remote sensing. Can
11 you explain what that is?

12 A: Well, it's -- some might would define
13 something by maybe what it produces.
14 Commonly nowadays, we -- in the world level
15 for topography, which is very important with
16 stormwater and runoff, sea level rise, all
17 sorts of things, polar melting, all sort of
18 things, it's important to have the terrain,
19 you know, the elevation. And let me tell you
20 something about terrain. You know,
21 elevation, it's much more difficult to make -
22 - or costly or time consuming to get the
23 terrain mapped by hand or manually by a
24 registered land surveyor, than it is
25 remotely. And that's not just a new thing.



1 In -- back in the pre-digital time, back in
2 the pre-light emitting, you know, lidar type
3 time period, this was done with stereographic
4 pairs and you fly a regular camera with
5 regular film in it, it's on a fixed platform
6 and the aircraft knows it's position in
7 earth, they both take the picture at the same
8 time. And then, when you overlay the
9 pictures, there's a little bit of overlay.
10 And the difference, the offset is called the
11 parallax. The parallax is used if you -- you
12 can dial that in, and if you know your
13 altitude, you can calculate the ground
14 surface. That's how -- what they used to
15 measure mountains and so on. And that's been
16 around for decades, generations.

17 Q: How does it work now?

18 A: Now, it's more efficient. You know, we -- on
19 small parcels, surveyors still go out and
20 shoot a bunch of spots. It's called a grid.
21 It takes a long time, costs money. But now
22 on larger aerial extents, when we do -- I've
23 seen in depositions -- there's going to be
24 some discussion, possibly, of flood
25 elevations and zones and so on. The



1 elevation becomes important, so on a large
2 scale we'll fly a mission. It's called a
3 lidar mission, which is a light emission and
4 take -- essentially, you take a sensor on an
5 aircraft, it will emit electromagnetic
6 energy, which is -- it encounters trees,
7 rooftops, cars, asphalt, soil. And some of
8 the impacts, like raindrops, are caught like
9 in a cloud. But the very, very last one.
10 What they do is they have -- you know, very
11 precise clocks, they know exactly where they
12 are and their relative ground speed, and they
13 corrected for that, and they count the time
14 before the reflection to come back, because
15 it can -- it's sensitive to that wavelength.
16 And with that you can do things like that
17 determine the top of treetops, the bottom of
18 a hill. The last return is called bare
19 earth. We'll probably talk later about
20 something called a digital elevation model,
21 which is distinguished from its cousin, the
22 digital terrain model. Quite often, that's
23 developed from analysis of the -- say, the
24 lidar data set. And so most people would
25 call that work remote sensing, because an



1 aircraft did it. But the GIS analyst, the
2 GIS professional, the GIS surveyor manipulate
3 this data. It's routine, it's built into
4 packages, you know, all the time.

5 Q: Okay. And does that set of analyses you just
6 described also touch on photogrammetry?

7 A: Yeah. I mean, there are overlaps between
8 professions. Even, you know, within the
9 engineering profession, you have the sub-
10 discipline, sub -- geo-technical engineering,
11 which I am one, has overlapped with the
12 structural engineering, which I provide some
13 of those type services too, because their
14 disciplines and their tool sets are the same.
15 In surveying, photogrammetry and, you know,
16 the verb -- adverb describes the verb. The
17 performance of remote sensing, I guess
18 sensing's got an I-N-G -- so, performing the
19 remote sensing would be common in all three
20 of those. It'd be unavoidable. And it's not
21 exclusive. I think what we'll find, if you
22 really examine that model law or what we had,
23 the statute before or the practice area, what
24 you'll find is most of what's driven in the
25 surveying, I think the distinction is in the



1 licensing, is that it's like an -- not just
2 an accountability, but it's an
3 authentication. It's not to say others
4 that might do the very same thing that may
5 not be licenced, it's not to say that they
6 are wrong. It's just that there's not a
7 body, a regulatory statutory governmental
8 body, overseeing the quality of the work,
9 other than a trade group. So, I think things
10 like remote sensing, if a photogrammetrist, a
11 licensed photogrammetric surveyor wanted to
12 plat or record or sell its services flying an
13 aircraft and that sort of thing, he would
14 need to be a licensed surveyor. You know,
15 whereas the land surveyor, Mr. Byrnes, who
16 was here yesterday, gets out there with his -
17 - you know, collects points. He'd need to be
18 a licensed land surveyor. I am not a land
19 surveyor. I am not a licensed
20 photogrammetrist -- photogrammetric surveyor.

21 Q: Okay. You made -- you raise an interesting
22 point. Is there a such thing in South
23 Carolina as a licensed photogrammetrist?

24 A: Not unless you put the word survey after it.

25 Q: Okay.



1 A: Or surveyor.

2 Q: Okay. So, there is a licensed

3 photogrammetric surveyor?

4 A: Correct.

5 Q: But there is no such thing as a licensed

6 photogrammetrist in South Carolina?

7 A: Not that I'm aware of.

8 Q: Okay. And is that the same thing like -- is

9 there such thing as a licensed GIS user in

10 South Carolina?

11 A: Licensed?

12 Q: Yes, sir.

13 A: I would say no. You can have what's common

14 in the industry and a lot of areas is

15 certification, special knowledge, sometimes

16 even examinations, even prerequisites for

17 educational background. Essentially,

18 modeling the licensure, you know, rules or

19 laws. But the certifications are distinct.

20 They're not regulated that way. So, I would

21 say I'm not aware of a separate license, a

22 state-recognized separate license for GIS

23 professionals.

24 Q: Okay. Can you tell The Court, if you would,

25 about the remote sensing project you did



1 related to the oyster beds you mentioned?

2 A: Yeah. My firm -- not The Tolleson Limited
3 Company. My prior firm that I was a partner
4 in, half partner in, Geometrics, was a grant
5 recipient for a -- I guess, it's indirected.
6 It's essentially NOAA funded, but it's a
7 estuarine and environmental nonprofit, I
8 suppose. It's called CICEET. And DHEC and
9 DNR would know all about it. It's the only
10 project I've had, you know, influence with
11 them. But my firm collaborated with -- and
12 I'm certain that we were the prime recipient.
13 And members on our staff were participants of
14 the -- as investigators. I was just part of
15 the research group and named author on it.
16 But on that what we did is we used
17 radiometric -- it's a sensor that can be done
18 on the ground. We looked at sunlight
19 reflectives coming off of oyster beds at the
20 ground versus what we could detect in a
21 hyperspectral sensor. And the area of
22 interest was Winyah Bay. And I want to say
23 this was probably 2000 to 2002 or somewhere
24 in that time frame. The Baruch Institute in
25 Georgetown was a big player in it. The



1 Department of Natural Resources. I don't
2 remember all the players. I could probably
3 name a couple. But what came out of it was
4 that the hyperspectral analysis that we --
5 has promise as a tool in an automated way to
6 detect oyster quality in multiple terrains.
7 You know, oysters, the good ones, are going
8 vertical like this, and their in certain
9 portion of the intertidal prism. You know,
10 they could be on a mud flap. They could be
11 on a sandbank, you know. And distinguishing
12 and classifying that. And what was done in
13 that study was what I just described. It
14 wasn't deconvolution, but it was -- it was
15 spectral analysis. And a spectral library
16 was developed based on the condition of the
17 oysters from oyster shellfish specialist.
18 Not me. Never went out there. And could
19 classify, you know, different kind of
20 conditions, ground conditions and so on. So,
21 we had like a ground troop for a person
22 collecting the true reflectance versus what
23 we reflect here, and that could be corrected.
24 And then, I think I said endmember. Did I
25 say that? Yeah. That would be exactly what



1 information content was reflected back. And
2 that -- for me, that project was sufficient
3 that it led me into a lot of other areas. We
4 used a whole host of different remote sensing
5 tools on that one.

6 Q: Okay. And so, am I correct that these remote
7 sensing efforts you've engaged in are ways to
8 determine the characteristics of things on
9 the ground by virtue of the light that is
10 reflected or some other data that comes back
11 from a remote image?

12 A: Well, what you just described is called
13 feature classification.

14 Q: Okay.

15 A: Feature classes. And what I described, like
16 with the expert on the shellfish could say
17 about, you know, the shellfish, would be
18 attribute data.

19 Q: Okay.

20 A: Attribute data. That's a part of the feature
21 class.

22 **MR. GRESSETTE:** Okay. At this time, Your Honor, we
23 would tender Mr. Tolleson as an expert in
24 civil engineering, professional GIS
25 surveying, and remote sensing.



1 **MR. CHURDAR:** No objection.

2 **THE COURT:** Okay. Okay.

3 **MR. GRESSETTE:** Thank you.

4 **THE COURT:** I will recognize him as an expert in
5 those areas.

6 **MR. GRESSETTE:** Thank you, Your Honor.

7 **Q:** Mr. Tolleson, how'd you become involved in
8 this case?

9 **A:** In 2019, I was contacted I think first by --
10 I'm almost positive by Mr. Hodge. I want to
11 say it was maybe late August 2019, two years
12 ago. I knew nothing of the case, had no
13 background, but I was recruited as a
14 consultant, not an expert, to facilitate or
15 assist Mr. Hodge in his deliberations about -
16 - and forgive me. I am not a coastal process
17 or whatever that problem was yesterday, or
18 coastal geologist, so I might say the wrong
19 word -- but like shoreline position, most
20 landward point of erosion, vegetation lines,
21 that sort of thing.

22 **Q:** Okay. And did you ultimately prepare a
23 series of slides for your work in this case?

24 **A:** I did in that period. We worked prior to the
25 mediation in 2019, which I don't recall



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1 exactly, but I want to say it was maybe late
2 October, so a period of a couple months.

3 Q: Okay.

4 A: And I worked collaboratively with Mr. Hodge.
5 But I think there's a distinction that cannot
6 be emphasized enough, because I think it's
7 relevant, so don't get muddled. Tolleson, or
8 me, served as a facilitator, an asset or
9 resource, to Mr. Hodge, but not the other way
10 around. So, work that I might have deduced
11 or analyzed was thoroughly discussed to what
12 I would call the expert, Mr. Hodge. And then
13 it was like an expert assisted decision on
14 where lines go and that sort of thing.

15 Q: Okay. Is that the cover page for the study
16 you completed in this case?

17 **(Petitioner's Exhibit Number 6a was introduced.)**

18 A: Yes. If you note, that's dated 2021. So, I
19 think it's important to know that the 2019
20 period, we were prepared for a mediation.
21 And I wish I could tell you exactly like what
22 was to come out of that. I -- you know, I
23 was purely, you know, mechanical at that
24 stage. In the more recent period, because of
25 the determination on that, that my view would



1 be that the State's determination, the way
2 they articulated it, you know, drove the team
3 in what we had to satisfy to satisfy the
4 State, you know.

5 Q: Okay. And we also -- this is marked -- what
6 we're showing here now you've identified as
7 your study is marked as 6a. And then there's
8 some additional slides marked as 6b. Are
9 those yours as well?

10 A: They are.

11 Q: Okay. And did provide the slides marked as
12 6b a little later than the study marked as
13 6a?

14 A: All right. I'm a little slow. I'm familiar
15 with the figure number, but is there
16 something that says 6a or 6b that I can see
17 here?

18 Q: Sure.

19 A: I mean, it could be on here somewhere, but I
20 don't see it.

21 Q: Actually, you probably have a copy right
22 there.

23 **MR. GRESSETTE:** May I approach the witness, Your
24 Honor?

25 **THE COURT:** Yes.



1 A: Oh.

2 Q: That's all right. You didn't know it was
3 here. I forgot too. Okay. Mr. Tolleson,
4 I've just handed you the notebook the lawyers
5 prepared with proposed exhibits in it for the
6 case. Do you see what's marked as Exhibit
7 6a?

8 A: I do.

9 Q: All right. And are those the slides you
10 prepared as part of the GIS and
11 photogrammetric study as labeled on the first
12 page?

13 A: Yes.

14 Q: All right. And can you look at 6b?

15 **(Petitioner's Exhibit Number 6b was introduced.)**

16 A: What I would refer to as figure 26.

17 Q: Yes, sir.

18 A: And I have it now.

19 Q: All right. And did you prepare those slides
20 that constitute Exhibit 6b?

21 A: Yes.

22 Q: All right. You generally described your role
23 with Mr. Hodge and your work in this case.
24 Can you be more specific? Let's talk about
25 some of the things you did. What was the



1 first thing you were asked to do?

2 A: Okay. My job was to facilitate or assist Mr.
3 Hodge in his deliberation. So, that's the
4 job. And then the task or the scope really
5 boiled down to two, maybe three major items,
6 first being a, let's just say, map maker
7 largely or almost entirely -- yes, entirely
8 from information provided either in the
9 record or prepared by other professionals.
10 So, I'd be the map maker, that's A.

11 Q: Yes, sir.

12 A: And B would be vegetation assessment or
13 aerial extent determination, presence of
14 vegetation or vegetation classification.
15 Vegetation, B.

16 Q: All right.

17 A: And then, C, there's been some ancillary,
18 just general technical questions that might
19 involve some engineering that Mr. Hodge has
20 asked me particularly in the last three or
21 four months.

22 Q: Okay. Let's start with Exhibit 6b, page 1.
23 Okay. We've got the first Page of Exhibit b
24 up on the screen there. 6b-01. What is
25 that, Mr. Tolleson?



1 A: All right. In the context of what we're
2 doing here today, I would say what you have
3 is an aerial image with an overly of line
4 work or polyline. More specifically, this is
5 south or southwest end, Captain Sam's Spit,
6 Kiawah Island. And overlaid on it are two
7 lines. One, in that legend in the upper
8 lefthand corner, is the -- 1988 OCRM
9 vegetation line unreviewed, unreviewed. And
10 there's some distinguishing factors that I
11 can't say that I've been really tasked with
12 delineating. And that is the process of
13 review, as it might relate to how
14 specifically the line -- this line might have
15 changed once it was reviewed. I have seen
16 the reviewed line. It's very, very, very
17 close, it's two little bumps in it, but I
18 can't tell you kind of like why.

19 Q: Okay.

20 A: But that's -- let's just call that the 1988
21 OCRM vegetation line.

22 Q: Okay.

23 A: All right. And then the yellow line is the
24 1988 continuous line of seaward vegetation,
25 2019.



1 Q: All right.

2 A: And 2019 is important in this case, because
3 it could be confusing later.

4 Q: All right. And were you asked to examine the
5 underling photograph that's shown here in
6 this image?

7 A: Yes. And unless I'm shown a chain of custody
8 otherwise, my understanding is that -- can I
9 say our side? Or I came into possession of
10 this aerial image from 1988 through --
11 ultimately, it's sourced through a FOIA
12 request by consultant to KDP, my
13 understanding, three, four, five years ago,
14 maybe, something like that. And this was
15 provided to that consultant to KDP, and then
16 provided to us. Now, the origin -- the
17 origin of this 1988, we believe to be
18 something called a NAPP image, N-A-P-P, from
19 the geological survey archives.

20 Q: Okay. And in your initial analysis of the
21 black and white ortho 1988 photo, did you
22 utilize any GIS techniques?

23 A: Yeah. I mean, I think I could probably say -
24 - let me think for just a moment. Other than
25 annotating photographs taken during the 2020



1 period in this series of exhibits that
2 express my opinions thus far, everything was
3 done in a GIS environment.

4 Q: Okay.

5 A: At least as far as this presentation. We
6 might have leveraged Excel spreadsheets and
7 computations and so on in the background.
8 But what you see is all GIS related. We used
9 Global Mapper, which is a robust GIS, you
10 know, platform very similar to the Arc Esri
11 products.

12 Q: Okay. I used a word a moment ago and I want
13 to make sure that we're clear with The Court.
14 When you see ortho, does that stand for
15 orthorectified?

16 A: I would like to say it means orthographic.

17 Q: All right. What is orthographic?

18 A: Because rectified is also a process or a
19 technique that we use. Registering is a
20 process or a technique that is used. Ortho;
21 here's the way it works: You know the earth
22 is a spheroid. I mean, it's round. There's
23 different models for the shape of the earth,
24 but, you know, it's round. And when you're
25 real close to the earth and you look down and



1 take a photograph, there's no aberration from
2 the curvature of the earth. But at some
3 point with altitude, with sufficient
4 altitude, that -- any photograph taken -- a
5 photograph's always going to be square. In
6 fact, they call it a digital frame. You
7 know, the sensor that takes it, you know,
8 whether it's on an aircraft, whether it's a
9 satellite, square, square. In fact, this
10 picture would've been a nine inch by nine
11 inch tile, I guess you'd probably call it, or
12 plate maybe. And it was on regular film,
13 like acetate or something. So, with these
14 techniques in that period, things like scale
15 and things -- like if you see down in the
16 lower kind of to the left of the logo there,
17 that's a scale. That's called a graphic
18 scale, a linear scale. If I could do this
19 again, I'd probably say approximate or plus
20 or minus some kind of actually -- the problem
21 we have with this tile is it's not
22 quantitatively accurate. What does that mean
23 or in that sense? There has been -- it looks
24 like a very good effort. You could -- can
25 you see -- how do I turn the -- Mr.



1 Gressette, how do I turn on the editor on
2 this?

3 Q: I do not know.

4 **MR. ROSEN:** Just ---

5 **THE WITNESS:** Touch it?

6 **MR. ROSEN:** Just touch it.

7 **THE WITNESS:** Oh.

8 **MR. WALKER:** Uh-oh, you've turned him loose now.

9 **THE WITNESS:** You messed up. Would it -- Alex,
10 will it expand if I do this?

11 **MR. ROSEN:** No, no. You can't you zoom, but if
12 you'd like to zoom in on a specific place,
13 just let me know.

14 **THE WITNESS:** Oh, okay. Okay. Well, let's look
15 right here.

16 A: You see this little offset right here? Well,
17 yeah. I can't -- let's see if I can -- I bet
18 if I do this -- oh, I am messing this all up.

19 **THE WITNESS:** And how do I clear?

20 **MR. ROSEN:** So, tap the arrow in the top right
21 corner to bring up a little tool thing, and
22 then you'll see -- there you go.

23 **THE WITNESS:** You can teach an old dog a new trick.

24 A: Yeah, you can see right here -- you see how
25 it's kind of offset, you know? How about



1 right here, you know. I mean, they've done a
2 good job --

3 **THE WITNESS:** do you control coming out, Alex, or
4 do -- or can I?

5 **MR. ROSEN:** Zooming? It's better if I do that.
6 What would you like Zoom in on?

7 **THE WITNESS:** Zoom out a little bit.

8 A: So, we see offsets, which means that the
9 horizontal accuracy is not consistent across
10 the whole image. And so, that is -- that one
11 there. You know, sometimes that's just a
12 couple of meters. Sometimes it's more than
13 that. So, the scalability of this, like the
14 positional -- what you can't do with this
15 image is to photo interpret and then develop
16 the coordinates from the photo
17 interpretation, not with this image, not in
18 my professional opinion. What you can do
19 with this image, kind of marginal,
20 qualitatively, in my opinion, you can extract
21 some information out of this imaging.
22 Qualitative would be, like what we can tell
23 here, because we have -- what we have is kind
24 of a bias -- it's called prior knowledge, a
25 priority. We kind of know that this thing



1 right here is the river, those of us that
2 have been there. We know that right about
3 down here is the Atlantic Ocean. We kind of
4 know that that's the beach, you know. So, if
5 we have inferences already, we have certain
6 prior knowledge. If we have certain prior
7 knowledge, in our field that's -- not to be
8 confused with an expert witness, but that's a
9 certain degree of expertise. And that
10 expertise in our field is -- there are
11 systems they call expert systems. And expert
12 systems are like software algorithms that
13 leverage some of the knowledge of an analyst
14 to decide something as well established.
15 Well, what we can tell here are little
16 obvious things, like, because of our prior
17 knowledge, we can tell, for example, that
18 this is some type -- I'm going to use the
19 word heavy vegetation, you know, and that
20 sort of thing.

21 **THE WITNESS:** And come out a little more, please.

22 And you can probably clear it before I can.

23 Did I do that? Let's come out again. I

24 probably made it go in myself. I don't know
25 how.



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1 A: Okay. So, we can see and delineate, you
2 know, vegetation lines. What we can kind of
3 speculate is how -- if we zoomed in on that
4 spot right there. Okay. You can kind of see
5 where we, as humans in photo interpretation,
6 might not be certain what's going on in here,
7 what's in this zone. This zone between this
8 blue line and this yellow line. You know,
9 it's got some black in there. Some of those
10 spot's a little darker than others. I think
11 Mr. Hodge referred to it as the 9:00 o'clock
12 -- 8:00 o'clock shadow or whatever. Yeah.
13 And then also we can see what looks like
14 super heavy, you know, vegetation. And we'd
15 be right. And we know that because we've got
16 some contemporaneous that have the same
17 position, you know, that we could do it. But
18 there could be a way to mine some information
19 out of that little zone seaward of the blue
20 line. The blue line's, the OCRM line. The
21 yellow line is, let's just call it, the 2019
22 mediation line.

23 Q: Okay. Backing up. Is it your opinion that
24 this 1988 photograph is not quantitatively --
25 -



1 A: Scalable?

2 Q: --- scalable?

3 A: Correct.

4 Q: And is it your opinion that, because the
5 photograph is not quantitatively scalable, it
6 is not reliable except for these kinds of ---

7 **MR. CHURDAR:** Your Honor, he's leading the witness.

8 **THE COURT:** So that we can speed things along, I'm
9 going to allow him to. I'm going to get him
10 some levity in leading.

11 **MR. CHURDAR:** Okay.

12 Q: Do you have an opinion about what can
13 reliably be interpreted from the 1988 black
14 and white ortho?

15 A: I'll answer it like this: We've got scaling
16 and precision issues with this particular
17 1988. There is an unacceptable level of
18 spacial precision or accuracy. There -- it's
19 grainy. And in the digital world, we would
20 call that either pixilated or marginal.
21 Gross delineations could be made. Like for
22 example, the class called the river is a
23 class. The Atlantic Ocean could be a class.
24 The line between them could be a -- what's
25 called a break line or a boundary. The heavy



1 vegetation can certainly be delineated here.
2 So, there is qualitative heads up, which
3 means, I'm a human being looking at the
4 screen. I don't have any special tools,
5 other than a stencil, you know, like I'm
6 doing like right now, heads up. We can only
7 go so far and only have a certain amount of
8 confidence with that. So, later in the
9 program, I looked at investigating if there
10 were tools that we might could leverage to
11 mine information out of areas of interest
12 where we have hypothesis.

13 Q: Okay. And your opinion regarding the quality
14 of the 1988 photograph, do you hold that to a
15 reasonable degree of professional GIS
16 surveying certainty?

17 A: I do. I do. It's -- I guess, I'll call it
18 unquality -- or unqualified.

19 Q: Okay.

20 A: It's probably suitable for some feature
21 classifications, but not positional.

22 **MR. GRESSETTE:** Can we zoom back out and maybe
23 clear that off, sir?

24 Q: Okay. If the black and white 1988 ortho is
25 unsuitable, can we rely on the visual



1 appearance of where that yellow line is to
2 any precision?

3 A: Okay. I'll answer it like this: If I had my
4 way -- see if this works. I'd get rid of
5 this. This implies a certain kind of
6 precision. You don't know the plus or minus
7 of it. Here's the way the surveying
8 community deals with it. Back in the day,
9 when we would fly aerial missions, we'd fly
10 like the -- I'm sorry. This particular image
11 would have been flown at, I think it's 20,000
12 feet altitude, you know, consistent, and
13 would produce a scale, it'd be like one on
14 40,000. So, if you look in the surveyors' or
15 the photogrammetric like rules of practice,
16 that I hope we get into today a little bit,
17 they would establish for that altitude -- or
18 no, for that scale, derived from that
19 altitude. Usually, it's like a six inch
20 focal length kind of lens you'd use. And
21 they know all that stuff. Then they would
22 give like a plus or minus. And the higher
23 the scale -- it makes sense. The higher the
24 scale, the larger the plus or minus. For
25 example, you ever wondered when you see one



1 colon 20,000 or 40,000? That means the scale
2 is 1 equals so and so. If little scale bar,
3 like I have in this corner, looks like one
4 inch long, it would mean that one inch on
5 that little -- on our picture, would equate
6 to 40,000 inches, because it's a 40,000
7 scale. So, that's how it's done. The
8 problem with this one is, you know, there's
9 great effort to, in the surveying community
10 anyway, to preserve horizontal trueness. In
11 South Carolina we have State Plane
12 Coordinates. You know, there's a whole art
13 to it. So, this would not meet that.

14 Q: Is the yellow line, assuming it came from an
15 accurate file -- let me say this another way.
16 Sorry. When a line is placed on this, is it
17 a vector? What's it called?

18 A: Okay. Okay. In a mathematical sense, a
19 vector is something that has a magnitude and
20 a sense, and a sense. So what that means is
21 that that's -- in surveying, they -- I don't
22 know if they call it vector or not. But that
23 would mean -- have you ever heard of meets
24 and bounds, like on a survey? You know,
25 they'll be this -- well, I think what the



1 surveyor put up yesterday -- I know he had --
2 I don't recall if he had meets and bounds,
3 but what they'll do is they'll say, you know,
4 point, you turn a bearing, that's the
5 direction in the vector, and then how long it
6 is. So, it's like you can take a compass, go
7 here, go 200 feet this way, and then go north
8 200 feet. And if you do enough, it'll close.
9 It'll close. So, here's the problem with
10 this image, for graphical purposes, for
11 display purposes, there's nothing wrong. You
12 see it all the time. Some -- one of the best
13 images we have in my -- in this collection is
14 satellite image from September the 13th,
15 2017. Right -- like a couple of days after
16 Irma, which coincided with Mr. Hodge's work
17 with the MLPE, which I shouldn't say that
18 word. And -- but it's -- we don't have a
19 scale bar. You'll see that. It doesn't have
20 a scale bar. Why doesn't it have a scale
21 bar? It doesn't have a scale bar because
22 that aircraft was not exactly above the --
23 you know, the ground. So, it's a -- it's
24 what we call oblique or isometric. So, it's
25 a beautiful image and you can determine



1 everything, and you can draw lines on it.
2 But what we can't do with that one is find
3 these little -- I'll show you -- see this
4 little points where they can kind of turn?
5 Here's one. There might even be some in
6 there going on. I don't know. Those are
7 vertices. And if we had that oblique
8 picture, the -- you could classify it.
9 You're asking -- I think your question is,
10 can we rely on these lines, the position of
11 these lines relative to one another? Yes.
12 Spacially, like measurementally? No, we
13 can't do that. We know one's -- we know one
14 is seaward of the other. And you could
15 probably -- I could just about estimate the
16 distance between those. But I can't say it on
17 the 1988 with what we've been provided, like
18 I can on 2000 and anything.

19 Q: Okay. And do you hold that opinion to a
20 reasonable degree of GIS surveying certainty?

21 A: I do.

22 Q: All right. Did you do anything to try to
23 make the black and white 1988 photograph more
24 useable?

25 A: I did in that period. I did.



1 Q: What did you do?

2 A: Okay. I took the image that was available
3 and applied algorithms, mathematical filters,
4 to try to delineate and extract if there was
5 content -- featured content in the vicinity
6 seaward and landward of the 1988 OCRM veg
7 line.

8 Q: And what did you conclude from that exercise?

9 A: That seaward of the blue 1988 vegetation line
10 is vegetated.

11 Q: And how is that represented on this Exhibit
12 6b-08?

13 A: Okay. What you see between the blue and
14 yellow is shades of grey. Shades of grey.
15 And those shades of grey would have digital
16 signature in a black-white domain or spectrum
17 indicative of not barren earth, and more
18 consistent than not with vegetation is
19 probably the way I'd say it.

20 Q: And do you hold that opinion to reasonable
21 degree of GIS surveying certainty?

22 A: Yes. With those qualification, yes.

23 Q: Okay. And what is the darker area shown
24 seaward of that yellow line?

25 A: Okay. Later, when we get to some of the



1 other exhibits, we'll be talking about some
2 things that back check this hypothesis.
3 Okay. So, the reason I was able to say yes
4 to your last question, which is do you hold
5 that -- let see if I have the question, if I
6 understood the question correctly. As I sit
7 here today, do I believe that this analysis
8 more likely than not, to the degree of
9 certainty of a professional GIS surveyor, is
10 vegetated seaward of the blue line and
11 probably inscribed by the yellow line? And
12 the answer is yes. I could say it today, in
13 2021, more so than I could have in 2019.

14 **MR. GRESSETTE:** Okay. At this time, Your Honor, we
15 would move to enter Exhibits 6b-01 and 6b-08.

16 **THE COURT:** Mr. Churdar?

17 **MR. GRESSETTE:** I'm sorry. 6b-01 and 6b-08.

18 **MR. CHURDAR:** No objection.

19 **MR. GRESSETTE:** Thank you.

20 **THE COURT:** They're entered.

21 **(Petitioner's Exhibit Number 6b, pages 001 and 008,**
22 **were entered into evidence.)**

23 **MR. GRESSETTE:** Can we take a minute and look at
24 Joint Exhibit 14?

25 **(Joint Exhibit Number 14 was referenced.)**



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1 Q: So, we put on the screen what has been
2 entered in this case as Joint Exhibit 14. It
3 has, I think, 14-01, maybe 3, and 4. Do you
4 know what is shown in this exhibit?

5 A: Yes. It's a -- the aerial image is 1988. I
6 believe that this '88 -- is there one that
7 shows the entire island?

8 Q: Sure. I think so. Maybe not. Maybe these
9 are just close up. If you look in the front
10 of your notebook. All the way in the front.
11 The first Number 14 you see.

12 A: The CSE report?

13 Q: Yeah. It's Number 13. I apologize. This is
14 Joint Exhibit Number 13.

15 **(Joint Exhibit Number 13 was introduced.)**

16 A: So, it's tab 13?

17 Q: Yes, sir.

18 A: It looks like it has some of the offset tile.
19 You know, when you have -- like a flight
20 mission, the NAPP images that we see were
21 either a collaboration from the U.S.
22 Department of Agriculture and U.S. Geological
23 Survey. But the little nine inch tiles or
24 transparencies -- at least are archived by
25 the U.S. Geological Survey. Anyway, when you



1 have the -- they're physically -- in their
2 original medium, they're like acetate or some
3 kind of plastic. And they're -- great means
4 are taken to place them together and to find
5 as many common fiduciary marks as you can to
6 try to rectify them together against the
7 backdrop image. So, this does have some of
8 the offset similarity to the '88 that I was
9 just showing you. So, there's no legend to
10 the source of this.

11 Q: Okay.

12 A: You know. So, I can't make a lot about it.
13 There's no scale on it and that's -- well,
14 there is a scale. So, yes, I recognize it.
15 And your question?

16 Q: Without further information about the source
17 of those lines, can you offer any reliable
18 opinion about what's shown in the photo?

19 A: Assuming that this source is identical to the
20 source that I have, that I've displayed in
21 6b, the one we just looked at, then they
22 would have the same problems, that limits --
23 limitations that we have on scale and
24 coordinates ---

25 **MR. CHURDAR:** Your Honor, that's speculation.



1 **MR. GRESSETTE:** That's fine.

2 **THE COURT:** Okay. Sustained.

3 Q: You would have to speculate to answer any
4 questions about the accuracy of those colored
5 lines on that exhibit, right?

6 A: Yeah. The position, yes.

7 Q: And that is because that's not enough
8 verifying information about what those
9 colored lines are?

10 **MR. CHURDAR:** Your Honor, he's leading.

11 A: Well, we -- to be fair, we do have a legend
12 of the line color with labeling that ---

13 **THE COURT:** Mr. Tolleson. Could you rephrase your
14 question ---

15 **MR. GRESSETTE:** Sure. Certainly. Certainly.

16 Q: Do you know the source on this exhibit as
17 shown right here for the yellow line?

18 A: And I hate to say this: No, I don't.

19 Q: And do you know the source of the file that
20 created the blue line, if there was one?

21 A: No, I don't.

22 Q: Okay. In addition to the spacial accuracy
23 we've just been talking about, can you talk
24 to The Court a little bit about what you
25 described as vegetation assessment?



1 **MR. GRESSETTE:** And if we can put up to 6a-9.

2 Q: So, we've put up an exhibit marked 6a-9. And
3 if you would, take a look at that and perhaps
4 tell The Court about the vegetative
5 assessment work you did in this case.

6 **(Petitioner's Exhibit Number 6a was referenced.)**

7 A: Okay. This is my Figure 7. Of note is the
8 date in the upper center title block that
9 says November 7 -- I mean, November 16th,
10 2017. You know, we task in this type of an
11 environment with, you know, assisting another
12 professional in maybe a similar, but
13 different discipline to develop displays and
14 maps. The first thing that the GIS analyst
15 or GI surveyor or what I do is try to select
16 and identify the most appropriate or ideal or
17 optimal imagery that's available, you know,
18 credible and a lot of other factors, which I
19 can go into. This particular image, that
20 time period, November 16, 2017, was, in my
21 research, the highest quality or highest
22 reliable aerial collection after the post-
23 Irma event in September of 2017. So, that's
24 kind of like why it was selected or how it's
25 selected. I looked at things like cloud



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1 cover, bit depth, which is the information
2 content in the original collection, whether
3 it's a multi-spectral collection. I look at
4 pixel size, which is resolution. And one of
5 the other elements we look at pretty closely
6 is the nadir value, so that the scalability,
7 you know, is in place. For this particular
8 one, the most important thing, I guess, that
9 we're trying to convey here is that it's
10 color infrared, color infrared. Color
11 infrared is used extensively in vegetation
12 mapping by, you know, agriculture
13 departments, farming. It also has many, many
14 applications. So, this is color infrared.
15 And -- I mean, I can go into how that's done,
16 if you'd like.

17 Q: Sure. How is color infrared analysis
18 performed on this image?

19 A: Okay. So, we're in 2017. And this
20 particular sensor is WorldView, which is like
21 a satellite operator, owner, manufacturer,
22 provider. And WorldView is high quality,
23 it's one of the more recent satellites, so
24 the resolution is very, very high. I can do
25 that, I suppose. I'm looking at these things



1 over her. One thing that you look at --
2 yeah. This means there's a lot of
3 information -- spectral information content,
4 64-bit is a lot. This, 30 centimeters, you
5 know, 30 centimeters is probably about a
6 foot. So, there are 280 or 340 nautical
7 miles into orbit and we're getting pixel
8 sizes of about a foot. That's a pretty good
9 -- so, it's a good image. This right here is
10 really good. Ten degrees for the nadir,
11 which that means that the satellite is nearly
12 vertically over this particular area of
13 interest when this thing was acquired.

14 Q: What is ---

15 A: So, those are the kinds of things that we use
16 in collecting this.

17 Q: What is the importance of nadir?

18 A: Nadir. You know, I talked about the image I
19 really like is that September 13, because
20 it's so close to the Irma, but it's off
21 nadir. That meant that -- and probably, I
22 can -- more than likely the reason that image
23 is in archive is that, whenever there's an
24 event, like a natural event, a force majeure
25 like a volcano or a tsunami or a hurricane or



1 maybe tornado or a forest fire or an
2 earthquake where there's large land change,
3 then the whole constellation tries to capture
4 images. Like 911, you know, we had -- even
5 at that period, we had countless images. So,
6 this whole coastline was being imaged, you
7 know, wherever the path was, you know, from
8 that particular named storm. So, the
9 September 13 was -- just happened to not be
10 above -- you know, it was off nadir. It was
11 off-center. So, when it looked down to image
12 Kiawah Island, it was at -- I think that was
13 about 40 degrees or so. But this is only 10
14 degrees, which means that in November, we
15 were nearly directly over.

16 Q: And so what does it mean when something is
17 off nadir?

18 A: Off center. Isometric. Oblique.

19 Q: Okay. And is nadir measured in degrees?

20 A: It is. It is.

21 Q: Like, you know, if you had a -- those of us
22 that might know what a plumb bob is, if you
23 build a brick wall, a masonry wall, they'll
24 drop a plumb bob. Or a surveyor with the
25 legs and instrument, in the very center under



1 the instrument, right under -- exactly under
2 it, they'll drop the plumb bob. Plumb bob's
3 heavy. It's like a weight that you see in a
4 clock. It's got a point, like a sharp point.
5 And what the surveyor will do is he'll get
6 that plumb bob right over a point that he
7 knows. Now he knows that instrument's dead
8 on it, right. And he'll take, you know,
9 different -- so, that's called -- that'd be
10 zero nadir. If he was off, then that would
11 off nadir, you know.

12 Q: And if we come back out to the full image of
13 6a, b. Did you create this slide?

14 A: One day I'm going to learn how to operate
15 this high tech computer. So, what's the
16 question?

17 Q: Did you create this slide marked as Exhibit
18 6a-9?

19 A: We did, or I did.

20 **MR. GRESSETTE:** At this time, I'd move to enter
21 Exhibit 6a-9.

22 **MR. CHURDAR:** No objection.

23 **THE COURT:** It's entered.

24 **MR. GRESSETTE:** Thank you.

25 **(Petitioner's Exhibit Number 6a, page 009, was**



1 **entered into evidence.)**

2 Q: Did you perform any additional analysis based
3 on this image?

4 A: Based on this image?

5 Q: Or with this image.

6 A: This image stand alone provided heads up,
7 unsupervised, enhanced vegetation mapping or
8 delineation as you see it right here. So, no
9 special tools were operated on this, beyond,
10 I guess, the naked.

11 **MR. GRESSETTE:** Okay. And can we go to 6a-13?

12 Q: All right. This is a slide we marked as
13 Exhibit 6a-13. Can you tell us, first, if
14 you prepared this?

15 A: I did.

16 Q: And what is it?

17 A: Okay. Vegetation mapping, for a lot of the
18 reasons I've cited before, has the utility or
19 importance or significance -- yeah.
20 Vegetation mapping has utility or
21 significance or importance in many
22 communities; so land management, forestry
23 management, agriculture management,
24 livestock, you know, management, drought
25 conditions, all sorts of things. The prior



1 slide showed you a color infrared. We didn't
2 get into it, but remember I talked about red,
3 green, and blue? So, this display we are
4 looking at is tuned to display -- we'll just
5 say a three-dimensions, red, glue, blue. So,
6 the color infrared told us what was
7 vegetation or would give us an indication or
8 significantly enhance our ability to
9 delineate vegetation. This image -- yeah.
10 Let's back out a little bit. This image, see
11 the green? That looks like vegetation. See
12 the magenta line, that kind of purple line?
13 That should the ML -- that's the -- yeah.
14 2017 MLPE, which is the most landward point
15 of erosion as defined by Mr. Hodge.

16 Q: And did you combine that line into this
17 image?

18 A: I did. And there independent of one another.
19 They were done in two different periods.
20 There was no prior knowledge required to put
21 these two together. So, one is a bit of back
22 check on the other. And I think there's
23 something that, you know, we'll probably say
24 it two or three times here. Like what
25 strikes me in this particular image is that



1 that magenta line was captured by a
2 registered land surveyor. So, all the little
3 squiggly points in the -- what's marked as
4 the most landward point of erosion, the MLPE
5 lines, all those little vertices are pin
6 locations where, not the surveyor, but where
7 Mr. Hodge placed pins in that period, at
8 least from his deposition and report, because
9 I wasn't there. And this ---

10 Q: And did you make any -- did you make any
11 conclusions about the kinds of vegetation and
12 their proximity to that magenta line?

13 A: Yes. Let's back out just a little bit.
14 Okay. The electromagnetic spectrum, you
15 know, the human eye's tuned to see red,
16 green, and blue, and there's certain
17 wavelengths that we can see with our native
18 eye. We know that, we've talked about that.
19 Color infrared is a portion of the
20 electromagnetic spectrum. Let's just say to
21 the left of visible light. And they -- you
22 measure wavelengths in units of length, like
23 a meter. So, the color infrared, if I recall
24 correctly, is about 0.7 to 1.0 nanometer.
25 Very small. To the left of color infrared



1 would be things like x-rays and gamma rays,
2 which will hurt people. But we can't see the
3 infrared zone. You can kind of feel, but
4 can't really see it. So, what we know is
5 that plants -- if you look into the origins
6 of the methodology for vegetation mapping,
7 the NDVI is called normalized difference
8 vegetation index, NDVI, NDVI. And it's a
9 very simply equation. There's no -- it's not
10 raised to any -- any special turns in it.
11 Essentially, what you're doing is you're
12 taking what the sensor detected in the color
13 infrared band, minus the red band, divided by
14 the sum of the two. It's like the difference
15 over the sum. That's too much to tell you,
16 but that's what it means.

17 Q: Does that result in the ---

18 A: Yeah.

19 Q: --- bar code over on the left?

20 A: Yeah.

21 Q: Let's zero in on that.

22 A: In math, when you hear the word normalized or
23 in statistics, usually that means like
24 percent. So, the ratio has been normalized.
25 So, it would -- it typically would scale



1 between zero and one, but it can go as low as
2 minus one, plus one. So, see these on this
3 lefthand side? You see a color designation
4 for a particular value. And that acronym,
5 the NDVI, the V is what vegetation. But
6 they're looking for a value, a value. So,
7 let's go to the bottom of that image and
8 you'll see -- yes. That -- this right here.
9 Okay. You'll see three classes. Let's see
10 if I can do this without messing things up.
11 Okay. So, we have three classes. Non-
12 vegetation. In this case that would be like
13 the -- I don't want to see active beach, but
14 let's just call what a beach goer would call
15 beach. It would have no vegetation, no beach
16 grass, no wax myrtle, no vegetation. That's
17 number one.

18 **MR. CHURDAR:** Your Honor, any testimony that he
19 gives that is specific to vegetation is
20 beyond the scope of his qualifications. I
21 mean, just general vegetation, I understand,
22 but he's not been qualified to give any
23 opinions about specific types of vegetation.

24 **THE COURT:** Okay. I am going to sustain your
25 objection to -- well, actually, I'm going to



1 sustain it. He can talk about vegetation,
2 but not specific types of vegetation.

3 **THE WITNESS:** Yes, Your Honor. Happy to do that.

4 A: Well, let's look at that table. It's called
5 Table 1. It's referred to as Low-Vegetation
6 and it uses the terms shrub and grassland,
7 shrub and grassland. Do I know what species
8 that is? But that'd be -- it's a land
9 classification. And that last class, number
10 3, is high vegetation, temperate and
11 tropical. So, if you look to the right of
12 that, there's a column that said NDVI value.
13 That's this one right here. Right? And you
14 see that .199? That's just about .2 and this
15 is just about .5. So, I'm going to clear
16 that -- well, let's do this. Where's the
17 break point -- these colors here. And then
18 where's the zero point? Let's see. Probably
19 right about here. All right. So, let's just
20 use Andy's vernacular. Ocean, possibly ocean
21 or beach, beach, beach, beach or un-
22 vegetated. And now, we're going to call it
23 class 1 -- I mean, I'm sorry, class 2 and
24 then class 3. So, I'm going to -- we kind of
25 got that? All right. So, I want to clear



1 that and then maybe you can zoom out. Okay.
2 So, let's look at it. Can you see this?
3 We've gone through the process of looking at
4 these colors. So, if you notice roughly
5 along here to here is going to be non-
6 vegetated. Oops. All right. Hey. Okay.
7 Well, I'm going to call this ocean. And we
8 don't have the little scale bar over there on
9 the left in view. But -- and I'm going to go
10 right cross this line. You see this line
11 right here? See this line right here? In
12 between you can see kind of a hint shade of
13 green. And you can clearly see it down here.
14 You can see the little spots like these.
15 That's vegetation. That's class one
16 vegetation. This -- the numerical values for
17 this would be that class 3 or very, very
18 close to it. You know, so if you just kind
19 of see that and you kind of recall -- oh, I
20 was going do it. Let's do ---
21 Q: There you go. Have you assigned these terms
22 non-vegetation, low-vegetation, and high-
23 vegetation based on anything?
24 A: Can I take a moment and try to clear this? I
25 guess I have no static electricity in my



1 finger. Okay. Here we go. So, I'm sorry.
2 What is the question?

3 Q: My question is, did you apply these words,
4 non-vegetation here?

5 A: I did. That's just for inference, I guess.

6 Q: Well, why did you apply that term, non-
7 vegetation, in that location?

8 A: All right. We're looking at a display --
9 well, two reasons. When we look at the
10 display, we take our human eye. Our -- all
11 our eyes don't detect color exactly the same,
12 but I'm going to -- I'm going to place it
13 probably marginally in here, kind of the
14 breakpoint between non-vegetated and
15 vegetated. And then I'm going to say this
16 little zone here in my eye, probably in this
17 range here. So, we would say non-vegetated,
18 you know, anywhere from here to here. And
19 then, we would say vegetated with the class
20 2, probably about there. So, I mean, it does
21 what you think it would -- I mean, what your
22 intuition would be. We got, I'll just call
23 it, beach. And you know those runnels that
24 Mr. Hodge was talking about? They'd be right
25 here because they're water. You know, I



1 don't know what a runnel is, but let's just
2 call that long skinny water.

3 **MR. GRESSETTE:** Okay. Can we go to 14b, as well?

4 Q: Is this the same image?

5 A: It is. Just zoomed in in that -- I guess,
6 what we call the neck area where the
7 monuments are. There's a monument here.

8 Q: And have you applied the same techniques here
9 in this image?

10 A: Well, it's the same image, we just zoomed in.

11 Q: Okay. And so ---

12 A: I mean, what you can see is there's
13 consistency with what you saw in the color
14 infrared. And when we look at the red,
15 green, blue, it'll be consistent with that.
16 So, you really have kind of three tools. The
17 true color, which I don't think we looked at
18 yet. The color infrared, which we looked at
19 just a moment ago. And now, the algorithm
20 that's performed on the color infrared and
21 the red, green, blue called -- I know it's
22 confusing -- the NDVI.

23 **MR. GRESSETTE:** Okay. And so, those two exhibits,
24 6a-13 and 14, we'd move those into evidence.

25 **MR. CHURDAR:** No objection.



1 **MR. GRESSETTE:** Thank you.

2 **THE COURT:** Admitted.

3 **(Petitioner's Exhibit Number 6a, pages 013 and 014,**
4 **were entered into evidence.)**

5 Q: Did you do anything to -- well, let me --
6 earlier you described double checking the
7 data for Mr. Hodge or something like that.

8 A: Right.

9 Q: I may have misspoken. What is it that you
10 did?

11 A: Well, with -- you know, the information we
12 were provided with in that earlier epig, the
13 pre-digital epig, the 1988 -- and that's kind
14 of -- you know, that's just what we were
15 given. Subsequent to that, we had, you know,
16 the digital images that I could acquire or
17 locate, which we did. So, if you really want
18 to know what was going on in my mind --
19 because you got to remember, in the context
20 of where I was in 2019, I was a consultant.
21 And so I -- you know, I didn't clearly have a
22 grasp of what success was, other than how Mr.
23 Hodge could describe how I might could help
24 him, you know, with the -- formalizing the
25 mapping, we'll call it that. And the --



1 eventually the delineation of vegetation.
2 The delineation of vegetation came more
3 significant or important, you know, with the
4 things I was tasked with in the 2020 and to
5 the present. So, more recently -- I forgot
6 exactly when we acquired these image. I
7 think it was late last year, maybe the fall -
8 - late fall 2020. We located satellite
9 images that were suitable for other types of
10 examination, like the color infrared and the
11 NDVI. So, we did that. This is what we did:
12 I recall, or I was instructed that there was
13 significance to vegetative conditions,
14 whether they existing or not or whether we
15 could even determine in the 1988 period. I
16 can't tell you legally or whatever why that
17 is. I can just tell you they asked me to
18 look for it. So, later in 2020, let's just
19 say about August in 2020, Mr. Hodge had
20 determined he needed to perform some type of
21 reconnaissance in the field. And he was
22 going to map vegetation, and I was invited or
23 made aware of it. I said, yes, I'd love to
24 go. Had not been to the -- you know, I don't
25 recall -- I probably hadn't been to Kiawah



1 Island in 20 years.

2 Q: And did you go to Captain Sam's Spit in
3 August of 2020?

4 A: We did.

5 Q: And who else was with?

6 A: Yeah. Mr. Hodge, we'll just call him lead,
7 and then Mr. Byrnes, who we'd call follow,
8 and then we had Mr. Andy as observer.

9 Q: Okay.

10 A: I didn't place any pins or influence
11 anything. I did monitor it. And here's why
12 I did that, because -- remember what I said
13 about prior knowledge -- prior knowledge of
14 land classification? And analyst looking at
15 images -- you know, it's established in the
16 field, it has to be done, it's unavoidable.
17 There are many times when it is only
18 appropriate that maybe an analyst not visit a
19 site. Why? It could be dangerous. It could
20 be on fire. It could be inaccessible, or
21 there could be such an area of extent we need
22 the analyst, the image analyst to have some
23 inferences to what the general terrain
24 conditions are. The analyst may not know the
25 species of the tree canopy and all sorts of



1 things, but might know things like terrain
2 height and slope and other things that we can
3 discern. So, let's just call that some prior
4 knowledge. So, by going out there in 2020,
5 then Andy would have firsthand knowledge of
6 the lay of the terrain. Now, knowing that it
7 is accreted and other things that I don't
8 measure, but the general terrain would be
9 static. We know that because we can do
10 comparisons on overlays of images when we co-
11 register them, which we did. So, this is
12 what I did. Mr. Hodge placed pins where you
13 see those red dots. I think there were 25 of
14 them. He carefully located them consistently
15 on, let's just say, established, stable
16 vegetation. I don't what species it is, you
17 know. It's his pin. Numbers were written on
18 them. A ground photograph was taken. And a
19 registered land surveyor -- yes. Here you
20 go. You see that's going to a pin number.
21 And if I had my glasses, I guess that's
22 number 500. This ---

23 Q: So, we're looking at Exhibit 6a-30 (sic).

24 A: So, these are pins that Mr. Hodge placed,
25 took a photograph on the ground ---



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1 Q: 28. 6a-28. I'm sorry.

2 A: Right. And then here you can see -- for
3 example, you can see that number 500, which
4 is this one was taken near the boardwalk, you
5 know. And, you know, I don't know anything
6 about what species this is. Mr. Hodge called
7 this sea oats, I think. I don't know
8 anything about that.

9 Q: Okay. And so, this is a -- sorry. What is
10 ground truthing?

11 A: Sometimes it's called the gold standard.
12 It's when you take an analyst or an expert in
13 something, it could be photomicrographs by a
14 pathologist. It could be a pavement defect
15 specialist. It could be a coastal geologist.
16 It could be a botanist or whatever. But in
17 this particular case, you had a coastal
18 geologist identifying vegetation of some
19 sort. And I'll just use the word dune field.
20 Maybe that's -- you know, I'm not qualified
21 for that. But on the beach.

22 Q: Okay.

23 A: And then we had a surveyor collect the
24 location. So, now we had a precise location,
25 a precise time, and, the most important



1 thing, a classification. We know it's
2 vegetated. So, I'm not an attorney or
3 whatever. So, let -- if we could -- you
4 know, if we could call that factual ---

5 Q: Okay.

6 A: --- then on the basis of those facts, I could
7 take those facts or measurements into other
8 tools and test how well a totally independent
9 methodology might mimic or predict or
10 classify the same phenomena we would call
11 grass.

12 Q: And did you do that?

13 A: I did.

14 Q: All right. And what is that analysis called?

15 A: I've forgotten the slide number. It's the
16 vector extraction.

17 Q: 6a-32. Sorry. I'm going to back up if I
18 could, Mr. Tolleson. You identified 6a-28.

19 **MR. GRESSETTE:** Is this 6a-30?

20 **MR. ROSEN:** It was. Sorry. That's 6a-30.

21 Q: Are -- what do these photograph shows in 6a-
22 30?

23 A: Is that a question directed to me?

24 Q: Yes, sir.

25 A: These are -- and I'm sorry. These are



1 photographs taken on the ground by Mr. Hodge,
2 not me, of the placement of stakes that are
3 consistent with his interpretation of the
4 location of stable emergent vegetation.

5 Q: And do the wooden stakes shown in the
6 photographs correlated to anything in that
7 small square?

8 A: Yeah. That's why I was circling a moment
9 ago. It -- you see like the upper image says
10 Pin Number 505? Some people call that a
11 stake. And that would coincide with the 505
12 next to that red dot. And then the lower one
13 is 506 and that's one in the lower part of
14 the image.

15 Q: Okay. So, if we go back a couple, to 6a-27.
16 So, each of those red dots matches a wooden a
17 stake that was placed by Mr. Hodge?

18 A: Standby, please. I'm sorry. Can you repeat
19 the question?

20 Q: What would each of those red dots represent?

21 A: Yes. Each of those red dots -- I think
22 there's a total of 25, from 500 to 524 or
23 something like that. About 25 points. These
24 are pins or stakes that Mr. Hodge placed in
25 vegetation overlay on an aerial image. This



1 is going to be probably August 12th, 2020. I
2 don't ...

3 Q: And you testified earlier that you wanted to
4 conduct some additional analysis with this
5 information. What did you do?

6 A: I did. Okay. I'll just circle one. Let's
7 just say -- okay. Let's go back one for just
8 a moment. Oh, yeah. Okay. There we go.
9 All right. You see -- you can kind of tell
10 that it looks kind of green in here. Right?
11 Let's just take this one. That red dot --
12 here, I'm just going to draw on the screen.
13 Okay. So, let's pretend that this is a
14 zoomed in aerial view of -- what 505, 506. I
15 guess that's 506. So, let's just call that
16 P506. This is what we did. So, we had a
17 pin. Let's just call this the pin. That's
18 this location right here. And there's --
19 let's just say there's green grass around it.
20 Now, remember we've talked about pixels and I
21 believe -- I don't -- I believe this to be in
22 the period of August 2020, this particular
23 image. And I don't have the legend down
24 here, but I'm going to guess it's probably 30
25 to 50 centimeters.



1 **MR. CHURDAR:** Your Honor, I would object to him
2 guessing.

3 Q: Can you back down the ---

4 A: I will go to it.

5 **MR. GRESSETTE:** The legend's right there, sir.

6 A: Well, this is a scale. Maybe it's my view
7 field. Oh. We don't have to do it this way.
8 Let's go to the subsequent slide with the
9 vector extraction. And I'll show you there.
10 But remember -- let's just call it 506.

11 Q: Okay. So, we're now looking at ---

12 A: I was ---

13 Q: --- 6a-21.

14 A: Okay. I was pretty close. It's August the
15 2nd, 2020. I didn't know the exact date from
16 memory. But let's -- I'm going to let you
17 blow this up. But first, you see all this
18 grey stuff in here and you see this? That
19 grey stuff is -- we just used a grey box, but
20 each one of these -- you'll see if you blow
21 this up. Each one of these is like a -- if
22 we had a box of -- they're like little
23 granules of sand it looks like. They're
24 black. Well, they're only black because
25 they're polygonal. We would call them a



1 polygonal structure, which means it's a
2 polygon and most of them -- they may be kind
3 of rectangular or oval or square, but they're
4 not a uniform shape. And I'll tell you what
5 they are, if I could make this clear. Okay.
6 Where was it, 506 we were talking about? I'm
7 going to say -- I may not see it that well,
8 but let's just say that's right about there.
9 Okay. Let's say we zoomed into that area,
10 right? And we had the same -- yeah. Let me
11 do this. And I apologize for moving around
12 so much. Zoom in a little bit more, if you
13 could, please.

14 Q: Yeah. 6a-22 in the next one I'd look to put
15 up there. Is that better for you, sir?

16 A: Yeah. This one's fine.

17 Q: Okay.

18 A: Okay. So, we'll go and take one. See this
19 little pin? We'll call that pin 500, even
20 though that's not what it is. But here --
21 and so, this is a plan view. This is not
22 part of this image. This is a plan view.
23 So, that's the pin. And then here's the low
24 lying vegetation. We already talked -- if
25 you see -- where's that little -- there we



1 go. 50 centimeters. So, that means each one
2 of the pixels, you know, about like this,
3 about 18 inches, maybe 20 inches, something
4 like that. And, I don't know, some of those
5 bush piles are like this big. Some of are --
6 you know, they're -- they varied in size.
7 So, this is what we did: We went to the
8 pixel that was adjacent to the vegetation and
9 we drew a box around it. And in that box ---

10 Q: Adjacent to the vegetation?

11 A: Yeah. We -- we ---

12 Q: To the ---

13 A: We --

14 **THE WITNESS:** you know what, Alex? Can you zoom it
15 like crazy?

16 A: Okay. You see all that? Some of them are
17 even interconnected.

18 **THE WITNESS:** Let's go even more. Yep. Okay.

19 Q: So, we've ---

20 A: Very granulated. So, this is what we did.
21 So, there's a piece of grass right here in
22 the real image, right next to that pin. And
23 that pin right now is -- as it's shown, is
24 probably 5 meters in diameter, but -- so, we
25 got a piece of grass right here. We inscribe



1 that piece of grass with a grid. And I think
2 we did a three by three. We might have done
3 a four by four. I think it was a three by --
4 yeah, it was. It was three by three. Three
5 by three. So, then -- and you're going to
6 like this word. We deconvolved the colors.
7 I said that before. So, we have red, green,
8 blue. They all scale from, you know, 0 to
9 256. So, we might have had a 124. We might
10 have had a 150. And we might have had a 207.
11 And these -- it's a red, green, blue
12 signature for one little pixel, maybe up in
13 this corner. Then we repeated that over and
14 over again over the entire little matrix to
15 inscribe the grass. Then, we had a sum of
16 the reds, a sum of the greens, and a sum of
17 the blues, and we took an average and a -- I
18 did a standard deviation. I think I did like
19 a 95 percent, a 90 percent. And it would be
20 like color similarity, red, green, blue
21 color. So, this would be an automated red,
22 green, blue, feature extraction of the red
23 dot grass that Mr. Hodge found.

24 Q: And by ---

25 A: And this would be -- and now you can -- I'm



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1 going to kill all this. And it sounds so
2 sophisticated, but it's really not. It's
3 really -- once you know how to do it, it's
4 just not that bad. So, let's come out. What
5 we were after is there had been some
6 discussion about how continuous a vegetative
7 field was. And you know from -- all of us
8 have now seen aerial drones and ground photos
9 and so on. And the computer hadn't seen the
10 aerial. The computer hasn't seen the ground
11 photos. These are the spectral signatures of
12 the red, green, blue, not color infrared, not
13 NDVI, this is good old fashioned eyeballs.
14 This is where the computer would say, or the
15 GIS would say the signature of grass is.
16 Right? So, we could do that math on that and
17 even determine, you know, the percent of the
18 area that's covered and not covered and
19 sparsity and stuff. And that's what it's
20 really built on. So, what do we take away
21 from this? There's lots of grass in here.
22 That's what that means. So, then how can we
23 use that? How can we use that in 1988? So,
24 in 2019, didn't have these, you know, when I
25 was -- that first image we saw with the set



1 theory where we looking at the little grey
2 specklely, going how in the world can we get
3 information out of that? That was not
4 calibrated. Now, it was superior to -- it was
5 additional, a supplemental to what you might
6 could assume, like an analyst trying to say
7 where the vegetation was. But it's an old
8 image. You know, and you don't feel -- like
9 is it or is it not, how do I really know?
10 So, we were looking for a way to say, what
11 makes it -- you know, what I was asked, what
12 makes something more likely than not? That
13 kind of has a legal ring to it, you know,
14 like in your -- as you sit here today and so
15 on. That's not what I'm talking about. In
16 this type of mathematics. In this type of
17 classification, there's something called set
18 theory, set theory. And you'll get a -- and
19 it's kind of -- I mean, I'm -- it's a tool
20 set inherent in your Esri GIS products. They
21 make a good one. Global Mapper has it. But
22 what it does is it allows one to vary filters
23 in the black and white -- because remember
24 '88's black and white -- in the black, and
25 white and depending on the value, it lets you



1 know whether what you're -- what you're
2 sampling is more like belongs to a set or
3 does not. That may be kind of hard to
4 understand. So, what it did do is this:
5 With this fractally looking -- and I don't --
6 6:00 o'clock shadow, whatever Mr. Hodge
7 called it. In 2020. Having some similarity
8 to the set theory method we did in 2019,
9 we're able to have even more confidence --
10 when I say 2019, that's the '08
11 interpretation we did in 2019 prior to having
12 this satellite image. This satellite image
13 helped corroborate what we did in 2008 -- in
14 1988, before 1988. Too many numbers.

15 Q: Let's go back and say that again.

16 A: All right.

17 Q: What corroborated what?

18 A: Okay. In 2019, in the mediation period,
19 Tolleson just arrived on the scene, short of
20 amount of time, can you just tell me what you
21 can do. And so we were looking for
22 relatively rapid ways to feed information to
23 Mr. Hodge for his deliberations, not mine.
24 We did the set theory raster analysis that
25 you saw on -- I've forgotten the -- I've



1 forgotten what number it was. Whatever it
2 was, that little white one that looks wispy,
3 you know. Of 1988. Remember it had the OCRM
4 1988 vegetation unreviewed kind of
5 appearance, you know. And then it had
6 continuous line of vegetation parentheses
7 2019, that image. Right? So, that animal --
8 that instrument was creating in 2019, in
9 2019. Tolleson didn't have these images.
10 Didn't know what they would find. But the
11 case or whatever comes up in mediation and
12 remanded or whatever you do. You know, we
13 had work to do to satisfy the Agency or this
14 Court. And so at that point, we put on a
15 full image analysis, GIS, remote sensing, and
16 all that kind of stuff. So, in 2020 we
17 obtained this and developed it in probably
18 early '21, I guess. But the reason we did
19 that was to determine -- we had hypothesis
20 that the '88 assumption for Tolleson, that
21 the set theory might apply. This pattern
22 tends to corroborate that because it's
23 consistent in pattern and texture, you know.
24 So, if I had a -- if I had had an -- if you
25 had asked me -- if we were here in 2019 with



1 what I've already shown you and that alone,
2 my confidence level would be more likely than
3 not. But with this, we've made it
4 independently even more corroboratable.

5 Q: Okay. And so when you say this, you mean the
6 analysis reflected in Exhibit 6a-21 and 22?

7 A: Right.

8 Q: And that analysis shows in the small black
9 fractals, the presence, you concluded, of
10 vegetation?

11 A: A class of vegetation. Yeah.

12 Q: And what did that conclusion cause you to
13 come to believe with regard to the other work
14 you had done?

15 A: Well, I mean, several things. And I know
16 we're covering a lot of very technical kind
17 of stuff, you know. We haven't talked much
18 about this little purple line right here.

19 Q: Let's go back. Let's go back.

20 A: That's this one, the MLPE.

21 Q: I don't want to get us moved too far. What
22 did this analysis confirm to you?

23 A: That we had vegetation significantly seaward
24 of the 1988 line. That's for sure.

25 Q: And do you hold that opinion to a reasonable



1 degree of ---

2 A: Absolutely.

3 Q: --- GIS surveying ---

4 A: Yes.

5 Q: --- certainty?

6 A: No question.

7 Q: Thank you. Sorry. What did you want to
8 explain to The Court about the magenta line,
9 as wrap up?

10 A: Okay. That magenta line is the second one
11 down. It says 2017 MLPE Post-Irma, which is
12 most landward point of erosion as developed
13 by Hodge, as surveyed by Byrnes, and as
14 displayed by Tolleson. So, what we have
15 here, we have a -- I can just tell you. We
16 have a high degree of confidence that that
17 magenta-looking line is about exactly where
18 we show it. That's A. B, it appears -- if
19 you look at that magenta line, it's almost
20 like what we would call a break line. A
21 break line. In surveys, if you have like a
22 ditch on the side of the road, they'll do
23 like the topography, you'll see a bunch of
24 lines all squiggly together, and that's where
25 the ditch is. They call that a break line.



1 Or if you got an intersection and the road,
2 you know, curves and stuff. The outside of
3 those edges are -- of the road pavement are a
4 break line. Anything that's a -- contrasted
5 with what's adjacent to it. It's call
6 topology. Anyway. So, what I see that is
7 striking is that this purple line was pinned
8 before I had ever been to Kiawah. It was
9 done by Mr. Hodge after a named storm, and
10 collected by Mr. Byrnes at '17. So, then --
11 what we have is purple '17 or magenta '17 on
12 this 2020 image. And then, using an entirely
13 different technique than Mr. Hodge's
14 determination of the MLPE line, we map
15 vegetation. Now, we already -- here is
16 what's consistent to me. We did color
17 infrared, and I said qualitatively, sure
18 looks like there's vegetation in that color
19 scheme. You see some green in the -- the hit
20 to it. Well, we didn't quantify. Then we
21 did the MDVI, which uses some of the same
22 data, but it's a mathematical thing. Shows
23 it at -- in my view, as a clear as bell,
24 right? That even if you said, that's hocus
25 pocus or that's hocus pocus, let's do another



1 method. Let's take red -- just regular
2 aerial satellite images, the red, green,
3 blue, and extract the same thing. And what's
4 -- there's two things that come out of that.
5 One, that they're independent methods.
6 They're independent of one another. Number
7 two, is that -- think about it. That little
8 MLPE line, this thing right here, almost
9 serves as a break line to the vegetation.
10 And I'm not a -- I'm not going to say
11 anything about, you know, the relevance of
12 that, like there might have a coastal
13 process, inference, or whatever. But it's
14 consistent. That we can say. There's
15 something consistent of whatever relationship
16 there might be with vegetation presence and
17 that MLPE. And we didn't invent that.
18 That's just what came out of it.

19 Q: And do you hold those opinions to a
20 reasonable degree of GIS professional
21 surveying certainty?

22 A: I do.

23 **MR. GRESSETTE:** That's all I have, Your Honor.

24 **THE COURT:** Thank you. And we're going to take a
25 break at this point before, Mr. Churdar, you



1 being your Cross.

2 **MR. CHURDAR:** Yes, ma'am.

3 **THE COURT:** Okay. Thank you.

4 **(Off the record from 3:06 p.m. until 3:25 p.m.)**

5 **MR. GRESSETTE:** Your Honor, I neglected to move a
6 couple of exhibits into evidence.

7 **THE COURT:** Okay.

8 **MR. GRESSETTE:** They are 6a-21, 22, 27, 28, and 30.

9 **THE COURT:** Okay. Mr. Churdar.

10 **MR. CHURDAR:** No objection.

11 **THE COURT:** Okay.

12 **MR. GRESSETTE:** Thank you.

13 **THE COURT:** They're entered. Thank you.

14 **MR. GRESSETTE:** My apologies.

15 **(Petitioner's Exhibit Number 6a, pages 021, 022,**
16 **027, 028, and 030, were entered into evidence.)**

17 **THE COURT:** And if you're ready, Mr. Churdar, we're
18 back on the record, and you can begin with
19 your Cross.

20 **MR. CHURDAR:** Yes, ma'am. Thank you, Your Honor.

21 **MR. TOLLESON - CROSS-EXAMINATION BY MR. CHURDAR:**

22 Q: Good afternoon, Mr. Tolleson.

23 A: Good afternoon.

24 Q: So, before I get into some substantive
25 questions, I would like to ask you some



1 questions about your financial relationship
2 with Kiawah as an expert in this case, okay?

3 A: That's fine.

4 Q: So, if you could please pull up that document
5 file. Okay. So, Mr. Tolleson, Mr. Gressette
6 provided the summary -- I mentioned it this
7 morning with -- when I was examining Mr.
8 Hodge -- but a summary of expert witness fees
9 for you, Mr. Byrnes, and Mr. Hodge. And I'd
10 just like to go through those fees with you.
11 You can see up there from what Mr. Gressette
12 provided on October 1st, 2019, Kiawah paid
13 you an initial amount of \$12,058 to work on
14 this case, and the work as described as OCRM
15 (sic) Jurisdictional. Is that accurate?

16 A: Yes, it is.

17 Q: Okay.

18 A: To the best of recollection, yes.

19 Q: Okay. And then on October 16th, 2020 Kiawah
20 paid you \$10,962 to work on -- for your work
21 on this case, and that was described as
22 Captain Sam's Baseline; is that correct?

23 A: Yes, sir.

24 Q: Okay. And again, on October 7th, 2020 Kiawah
25 paid you \$9,900 to work on this case, and the



1 work that you did was described as Captain
2 Sam's; is that correct?

3 A: Correct.

4 Q: Okay. And then, again, November 2nd, 2020,
5 Kiawah paid you \$10,950 for your work on this
6 case; is that correct?

7 A: That's correct.

8 Q: And then on December 28th, 2020 Kiawah paid
9 you \$17,860 for the work that you've done on
10 this case; is that correct?

11 A: Correct. Yes.

12 Q: And then on February 19th, 2021, Kiawah paid
13 you \$14,040 for the work you've done on this
14 case; is that correct?

15 A: Correct.

16 Q: And then, again, on March 29th, 2021 Kiawah
17 paid you \$8,100 for the work that you've done
18 on this case, correct?

19 A: Correct.

20 Q: And, again, on May 22nd -- 27th, 2021 Kiawah
21 paid you \$9700 for work that you've done on
22 this case; is that correct?

23 A: Correct.

24 Q: And then May 14th, 2021 Kiawah paid you
25 \$8,410 for the work that you've done on this



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1 case. And that's correct?

2 A: Correct.

3 Q: Okay. So, I have added that up and that is
4 \$101,000 -- \$101,980. But if you would like
5 to verify that, I'm happy for you to do that,
6 but would you ---

7 A: I did a quick add, and I came up to about
8 100, so that sounds pretty close.

9 Q: Okay. All right. And obviously, you've not
10 stopped for Kiawah since May 27th, 2021.

11 A: Correct.

12 Q: Okay. So, you prepared for your deposition
13 with Sallie Phelan?

14 A: Yes.

15 Q: Okay. And then you were deposed for two days
16 back in June?

17 A: I don't remember which month, but that sounds
18 right. Yes.

19 Q: Okay. And then -- and you've obviously
20 prepared for trial?

21 A: Yes.

22 Q: Okay. And even as you sit here today, you're
23 charging a fee for your services, correct?

24 A: Yes.

25 Q: Okay. And what is your hourly rate?



1 A: I think it -- on this one, it's either 195 or
2 200 an hour.

3 Q: Okay. Have you submitted an invoice for
4 payment since the May 27th, 2021?

5 A: There may be one, you know. There may be one
6 in -- in June there should have been.

7 Q: Okay. Do you recall what that is?

8 A: I may would say Captain Sam's Spit, it would
9 have been the annotation. You mean the
10 dollar amount?

11 Q: Correct.

12 A: Oh. I'm just going to guess. Probably a
13 good guess would be around 10,000, I would
14 guess.

15 Q: Okay. And, I'm sorry, you said that was in
16 June?

17 A: Well, typically we try to invoice monthly.
18 And it looks like the last invoice is May.
19 So, if we -- I'm not aware that we have a
20 July, and I know we don't have an August.
21 So, the -- it stands to reason we should have
22 one for June. And I would guess it would be
23 about 10,000.

24 Q: Okay. Do you have any idea as to
25 approximately how many hours that you have



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1 worked -- or maybe I should just ask it this
2 way: Do you know how much money, in addition
3 to the 101,980, that you have earned from
4 Kiawah in work towards this trial?

5 A: Oh. No, I don't know. I would have to
6 speculate. I mean, if what we've cover here
7 is probably about -- as I recall, I think my
8 initial work would've been late August of
9 2019. And if that's correct, then we have
10 about two years worth of work. So, there may
11 have been a few months that there wasn't
12 work. So, I'm going to guess an average
13 month was about \$10,000 and at a billable
14 rate of 200, it would be about 50 hours a
15 month, something like that.

16 Q: Okay.

17 A: If I did the math right.

18 Q: Okay.

19 A: So, let's -- so, I mean, this all conjecture,
20 but June, July, and August, maybe another 150
21 hours, assuming June has not been invoiced,
22 something like that.

23 Q: Okay. And I'm not good with math. That
24 would be \$30,000, something like that?

25 A: Probably.



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- 1 Q: Okay. Okay. So, we know for billing of
2 \$101,980, and your -- you would estimate
3 probably another \$30,000 since that May 27th
4 invoice?
- 5 A: I think so.
- 6 Q: Okay.
- 7 A: Sounds about reasonable.
- 8 Q: All right. Okay. Now, your role -- you
9 described your role or your -- described
10 yourself as the map maker in this case, using
11 information you were provided, correct?
- 12 A: Correct.
- 13 Q: Okay. And you've also described yourself as
14 an investigator for vegetative position
15 within the three monument stations in that
16 study, correct?
- 17 A: Correct.
- 18 Q: Okay. So, you have shown us, in your direct
19 exam, NDVI analysis from 2017. You didn't do
20 a similar analysis for other photos within
21 the last 40 years, correct?
- 22 A: I don't think so. I don't think so.
- 23 Q: Okay. And ---
- 24 A: Not that I recall.
- 25 Q: And you did not perform vector extraction for



1 vegetation on any photos in the last 40 years
2 besides 2020, correct?

3 A: I didn't -- I mean, that I didn't produce and
4 I did not retain. But in -- and I won't be
5 able to tell you exactly what. Let's just
6 say, as I recall, early -- sometime in the
7 2020 or 2021 time frame, when we -- after we
8 obtained the aerial images that we had, I was
9 investigating whether the process could be
10 repeated for another scene. For example, the
11 1988's black and white, and all the
12 subsequent images are digital and they're
13 color or infrared. We can't do this type of
14 analysis on color or infrared, that set
15 theory using a number between -- about half
16 of the range, so it would be 156 or
17 something. Whatever half of 256 is. So, it
18 has to be black and white. And so, we did
19 experiment with converting some of these
20 images that were color to black and white.
21 And because of the tonal depth and
22 differences, we didn't have one that we could
23 use, so we didn't keep it or use it. So, we
24 did run it. We just didn't use it, is how
25 I'd answer that.



1 Q: Okay. Now, you've indicated that the 1988
2 aerial photograph is not suitable for
3 measurements. In yours and Mr. Hodge's
4 expert evaluation of historical imagery and
5 most landward point of erosion, you did not
6 provide the State with any imagery prior to
7 2017 that you would consider suitable for
8 measurement. So, you're presenting The Court
9 with the most landward point of erosion
10 digitized in 2017 without any information
11 prior to that in the -- that 40-year window?

12 A: I -- if I repeat that -- see if I understand
13 that right. Are you asking that we have not
14 considered in our -- or in my analysis -- I'm
15 not saying Hodge's -- in Hodge's analysis,
16 performance of GIS or other factors prior to
17 '17; is that the gist of the question? Or
18 what did I do prior to 2017?

19 Q: Yeah. Well, -- so, I mean, there were a
20 couple of predicates that I could just read
21 the whole ---

22 A: Okay.

23 Q: --- thing to you again if you'd prefer.

24 A: That's prefect.

25 Q: Okay. So, you had indicated that -- in your



1 deposition that the 1988 aerial photograph is
2 not suitable for measurements. In yours and
3 Mr. Hodge's evaluation of historical imagery
4 in the most landward point of erosion you did
5 not provide the State with any imagery prior
6 to 2017 that you would consider to be
7 suitable for measurements. So, you're
8 presenting The Court here today with the most
9 landward point of erosion digitized in 2017
10 without any information prior to that in the
11 40-year window. Is that true?

12 A: Okay. So, we have -- just so we're clear.
13 We have Tolleson work products, you know, in
14 the exhibits that I provided. In that
15 context, our first image scenes are 2017 and
16 more currently 2020. In Mr. Hodge's work, he
17 did provide to me images from '88 to at least
18 '17. But I -- you know, we didn't perform.
19 So, if you're asking if I or Tolleson
20 performed some type digital analysis in a
21 period after '88 and before '17, the answer
22 would be no, if that answer it.

23 Q: Okay. Okay. Now, one of the things you said
24 on Direct is that your job is to facilitate
25 Mr. Hodge's work, correct?



1 A: That's correct.

2 Q: Okay. And part of facilitating Mr. Hodge's
3 work would include taking GIS shapefiles, the
4 imagery, the metadata and analyzing that
5 information to create maps, correct?

6 A: Yeah. Yes. Yes.

7 Q: Okay.

8 A: If they were available, yeah.

9 Q: Okay. Now, you've performed GIS analysis for
10 this case as well, I think you said.

11 A: Yes.

12 Q: But you're not here to offer an opinion on
13 the position of the most landward point of
14 erosion, isn't that correct?

15 A: Without trying to cross any lines. We had a
16 line that's provided. I -- maybe I would use
17 the word reported. I can report position of
18 the line defined by the expert as the MLPE
19 line. But if your question is more like, can
20 I provide an opinion its position on the
21 basis of what the MLPE is, the answer would
22 be no.

23 Q: Okay. Well, I'll tell you what. Let me --
24 I'm just pulling from your deposition. So,
25 let me ---



1 A: Take your time.

2 Q: Let me just get that.

3 **MR. CHURDAR:** Would you like for just me to open
4 it?

5 **THE COURT:** Yeah, you can open it.

6 Q: If you could turn to page 41.

7 A: And will I need this, you think?

8 Q: I don't think so.

9 A: Okay.

10 Q: Excuse me, I -- yeah. Forty one starting at
11 line 23 on page 41. You there?

12 A: Watch this. We're in the same club.

13 Q: Sure. I understand.

14 A: Don't tell anybody.

15 Q: Okay.

16 A: So, we're at 41, 20 ...

17 Q: Right. Reading -- I'll start at page 41,
18 line 23. Okay. Can you be more specific as
19 to the how the work that you did for -- under
20 the NASA program, the GIS remote sensing, how
21 that was similar to what you did in this
22 case? And your answer was, well, I mean,
23 think of it as tool sets. You know, I'm not
24 going to have an opinion on the shoreline
25 position. So, what I was saying was -- my



1 questions was, you're not here today to offer
2 an opinion on the position of the most
3 landward point of erosion, correct?

4 A: I don't want to be difficult on the
5 semantics. I mean, the answer I'd have to
6 say is maybe we'll determine whether that's a
7 yes or no after I explain. No, I don't have
8 an opinion on the development of a tacit or
9 statutory or regulatory or coastal processing
10 considerations on the MLPE position. But I
11 do have an opinion that the -- because
12 remember we were talking about the satellite
13 image, which is raster, and the polyline. I
14 can report because I obtained the line from
15 the surveyor where it is, but not like why it
16 is. Is that fair?

17 Q: Okay. Okay. Yes. And likewise, you don't
18 originate any lines, other than the
19 investigative vegetational fields, correct?

20 A: That is correct.

21 Q: Now, there was some back and forth between
22 you and Mr. Gressette about -- I don't know
23 if I'm saying this right. Photogrammetry?

24 A: Yes.

25 Q: Photogrammetry> Okay. And photogrammetry is



1 the process of developing and correcting
2 maps; would that be fair to say?

3 A: That's a portion of it.

4 Q: Okay.

5 A: There are -- obviously, there are a number of
6 trade definitions of photogrammetry, but,
7 yes, that's consistent.

8 Q: Okay. And when a licensed photogrammetrist
9 surveyor produces a map using color space,
10 pan sharpening, and other tools, the value of
11 that is someone can rely on the scale and
12 accuracy represented on the map; is that
13 correct?

14 A: That ---

15 Q: Okay.

16 A: That would be correct.

17 Q: Okay. Now, you mentioned that you're not
18 licensed as a photogrammetry surveyor?

19 A: Correct.

20 Q: Okay. And the study that you had captioned
21 GIS Surveying and Photogrammetry Study, that
22 was Exhibit 6a, I didn't see it, but that
23 apparently did not indicate your non-licensor
24 status; is that true?

25 A: I will take exception to that. That's the



1 front page of my exhibits. Maybe sheet one.
2 I don't know what number it is. But in the
3 lower right hand corner, there's a little
4 box.

5 Q: Okay.

6 A: And the box will have the seal and the COA,
7 you know, for the company. Now, in -- for
8 dual -- and people might not -- I mean, this
9 isn't -- it's not necessarily obvious. When
10 you are a dual registrant -- I'm a dual
11 registrant. I mean, I was told once that I
12 am the only licensed professional GIS
13 surveyor that's a licensed professional
14 engineer. Now -- and that's not important.
15 But what is significant in the sense that the
16 Board issued one license number for -- you
17 know, not that I would have three licenses
18 with this one number. So, that seal is
19 attesting that I am able to perform
20 engineering or GIS surveying on that set of
21 exhibits. But I tell you what it doesn't
22 have. It's not marked for platting or for
23 deeding or recording. It was -- in fact, I
24 think it was called a study. Not even a
25 survey. But you would be right, if it was



1 called a survey for platting or whatever,
2 then it would be -- you know, in surveying
3 they require -- we require statements about
4 accuracy and other things. But we don't have
5 that here on this work product.

6 Q: Okay. You've never offered opinion testimony
7 or fact testimony related to the placement of
8 the jurisdictional lines, correct?

9 A: No.

10 Q: And that's beyond the scope of what you're
11 here for?

12 A: Correct.

13 Q: Okay. And you never testified in a case
14 involving mean high water surveys, correct?

15 A: I don't think so.

16 Q: Okay.

17 A: I don't think so.

18 Q: And, again, that would beyond the scope of
19 what you're here to do today?

20 A: Correct.

21 Q: Okay.

22 **MR. CHURDAR:** Your Honor, if I could have just one
23 moment please.

24 **THE COURT:** Sure.

25 **MR. CHURDAR:** I don't have anything more.



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1 **THE COURT:** Okay. Mr. Gressette, do you have
2 anything on Recross -- I'm sorry, Redirect.

3 **MR. GRESSETTE:** No, Your Honor. Thank you.

4 **THE COURT:** Okay. Very good. Do you have any
5 other witnesses for the Petitioner?

6 **MR. WALKER:** Your Honor, that concludes the
7 Petitioner's case in chief.

8 **THE COURT:** Okay.

9 **MR. WALKER:** I think we have all the exhibits,
10 we'll go back and look. But we're resting
11 our case in chief.

12 **THE COURT:** Okay. Before we begin with the -- I
13 think what we'll do is actually begin with
14 the Respondent's case on tomorrow morning,
15 9:00 o'clock, okay, which you can call your
16 first witness, Ms. Phelan or Mr. Churdar.

17 **MS. PHELAN:** I have the first witness, Your Honor.

18 **THE COURT:** You're going to be calling your first
19 witness?

20 **MS. PHELAN:** Yes.

21 **THE COURT:** Okay. We'll begin tomorrow morning at
22 9:00 o'clock.

23 **MS. PHELAN:** Okay.

24 **THE COURT:** And let me just inform everyone, the --
25 Judge Anderson, the Chief Judge, has



1 implemented new protocol for masks that will
2 be effective tomorrow.

3 **MR. WALKER:** And is it something in writing that we
4 can take a look at or is it ---

5 **THE COURT:** Yes.

6 **MR. WALKER:** --- basically masks except when
7 speaking?

8 **THE COURT:** I don't -- Tia is going to print out a
9 copy of the procedures and give it to you
10 before we leave.

11 **MR. WALKER:** Great. Thank you, Your Honor.

12 **THE COURT:** Thank you. Thank you and we'll see you
13 all tomorrow morning.

14 **(There being nothing further, the hearing adjourned**
15 **at 3:47 p.m. on Wednesday, August 25, 2021, and**
16 **reconvened on Thursday, August 26, 2021, at 9:19**
17 **a.m.)**

18 **DAY THREE - THURSDAY, AUGUST 26, 2021**

19 **THE COURT:** If everyone is ready, we're going to go
20 on the record. Petitioners completed their
21 case and we're going to start with the
22 Respondent's case, beginning with Ms. Phelan,
23 you're calling the first witness.

24 **RESPONDENT'S CASE IN CHIEF**

25 **MS. PHELAN:** Yes, Your Honor. I believe Mr. Walker



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1 wanted to address ...

2 **THE COURT:** Okay.

3 **MR. WALKER:** Your Honor, we have a matter for The
4 Court that we would like to raise at this
5 time.

6 **THE COURT:** Okay.

7 **MR. WALKER:** Before the commencement of the
8 Respondent's case, and it's something that we
9 alluded to in Opening Statement, and that is
10 the scope of the issues that we're trying.
11 The reason why I raise this question is that
12 we're getting ready to hear probably anywhere
13 from, with Cross-Examination, four to six
14 hours of testimony, maybe eight, on the
15 question of whether it's likely or unlikely
16 for the shoreline to return to its former
17 position. And that is a question that
18 determines whether the location of the
19 baseline, the unstabilized inlet zone, should
20 be in the most landward point of erosion.
21 And I've taken the liberty of putting the
22 statute up again. And, Alex, if we could go
23 to Section (2), if you could highlight that?
24 And my apologies for the pointer. But the
25 way the statute is written says, the baseline



1 for inlet erosion zone, we're clearly in the
2 unstabilized inlet erosion zone, that are not
3 stabilized by jetties, that's Captain Sam's,
4 terminal groins, or other structures must be
5 determined by the department as the most
6 landward point of erosion at anytime during
7 the past forty years, we're good, unless, the
8 best available scientific and historical data
9 of the inlet and adjacent beaches indicate
10 that the shoreline is unlikely to return to
11 its former position. We did not put up any
12 proof in our case directed to the issue of
13 whether it's likely or unlikely that the
14 shoreline will return or -- will return to
15 its former position. This is only pertinent
16 if the property owner is contending that the
17 baseline should be in a place other than the
18 most landward point of erosion, because it's
19 at the most landward point of erosion, unless
20 it's unlikely the shoreline will return. We
21 are advocating for the most landward point of
22 erosion; therefore, this clause doesn't come
23 into play. The Department has said, well, we
24 need to show it anyway. And they go down to
25 this second sentence, in collecting and



1 utilizing the best scientific and historical
2 data, which refers to the determination of
3 whether the shoreline is likely to return to
4 its former position, Department can consider
5 among -- must consider all these factors,
6 historical inlet migration, inlet stability,
7 channel and ebb tidal delta changes, the
8 effects of sediment bypassing on shorelines
9 adjacent to the inlets, and the effects of
10 nearby beach restoration projects on inlet
11 sediment budgets. The Department has
12 probably no fewer than 10 to 20 articles it
13 wants to admit, all hearsay. They have an
14 expert who's going to talk about all these
15 apocalyptic things that could happen at the
16 spit, that's it's subject to flooding, that a
17 hurricane might hit, all these things. But
18 that doesn't change that the standard for
19 setting the baseline is the most landward
20 point of erosion. That has to do with the
21 question of whether the shoreline is likely
22 or unlikely to return to its former position,
23 which, if it was unlikely, would be a
24 different standard. Statute doesn't say
25 what, but it would be a different standard,



1 but we're not advocating for a different
2 standard. We would ask The Court to limit
3 the proof, only in the sense to find that it
4 is irrelevant whether the shoreline is going
5 to return -- likely to return or unlikely to
6 return, because in this case the Petitioner's
7 advocated, has advocated, and continues to
8 advocate for the shoreline being in the most
9 landward point of erosion. In support of
10 your authority to do so, Your Honor, we would
11 refer to Rule 46 of the ALC, which is the
12 general provision on powers of the
13 Administrative Law Judge that include your
14 power to rule, obviously, on the
15 admissibility of evidence and limit
16 repetitive, immaterial oral statements and
17 questions. Further, we would defer The Court
18 to Rule 401 of Rules of Evidence that are
19 applicable here. Rule 401 says, relevant
20 evidence means evidence having any tendency
21 to make the existence of any fact that is of
22 consequence to the determination of the
23 action more probable or less probable than it
24 would be without the evidence. Here, the
25 operative phrase is, of consequence to the



1 determination of the action. We can go
2 through 48 -- four to eight hours of
3 testimony, but it's not going to change that
4 the baseline should be set at the most
5 landward point of erosion. The statute
6 doesn't say that if it's unlikely to return
7 to its former position, any of these things
8 happen, then there's a different standard.
9 No. The standard is the most landward point
10 of erosion. We aren't fighting about that
11 with the Department. The purpose of it is to
12 load the record with issues about what they
13 contend to be the vulnerability of Captain
14 Sam's. To a storm all the coast is subject
15 to vulnerability of a storm, but particularly
16 Captain Sam's, which has nothing to do with
17 where the baseline is. The legislature
18 didn't say the baseline is not going to be at
19 the landward point of erosion if there's a
20 potential for a hurricane and there might be
21 damage. It's the most landward point of
22 erosion. We'd also rely on Rule 406 -- 403
23 of the Rules of Evidence that allows you
24 discretion. We say it's not relevant,
25 because it's not of consequence to the



1 determination of the action. But even if
2 there were some argument of relevance, under
3 403 The Court can exclude it. Although
4 relevant, evidence may be excluded if its
5 probative value is substantially outweighed
6 by, and then it lists several things, or by
7 considerations of undue delay, waste of time,
8 or needless presentation of cumulative
9 evidence. And we would say all this proof
10 does not move the needle one iota one way or
11 the other as to where the baseline should be
12 set. It's the most landward point of
13 erosion, and that is the question for The
14 Court. And we would ask The Court to
15 consider this, to narrow the issues so that
16 we're not going on what we called in torts a
17 frolic and detour to talk about whether the
18 shoreline is likely or unlikely to return
19 when it has no bearing on the standard for
20 setting the baseline in this case. We agree
21 it should be the most landward part of
22 erosion. Thank you, Your Honor.

23 **THE COURT:** Thank you. Ms. Phelan?

24 **MS. PHELAN:** Your Honor, I think it's important
25 that we have the geographic location of where



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1 we're looking. They -- KDP wants us to look
2 at establishing beachfront jurisdictional
3 lines here, when there's a critical area --
4 another critical area under our jurisdiction
5 for protecting the tide lines right here.
6 And these are running into each other,
7 they're colliding into each other. We -- the
8 Department is mandated to consider the beach
9 dune system and protect the beach dune system
10 as part of implementing their beachfront
11 policy. And so we can't just look at what's
12 going on the ocean side without looking at
13 what's going in the tidelands, because it's
14 affecting all this beach dune system that is
15 protected. And I'll walk you a little bit
16 through the statutory provisions too that
17 show that. Can you pull up 48-39-30, please?
18 Section 48-39-30 -- it's a section. Sorry,
19 Your Honor. But Section 48-39-30 is
20 legislation -- legislative declaration of
21 state policy for Chapter 39, the Coastal
22 Tidelands and Wetlands Act. And it says in
23 (A), the General Assembly declares the basic
24 state policy in the implementation of this
25 chapter is to protect the quality of the



1 coastal environment and to promote the
2 economic and social improvement of the
3 coastal zone and all of the people of the
4 State. And if you'll scroll down to (4),
5 please. Subsection (4) specifically says, to
6 formulate a comprehensive beach erosion and
7 protection policy including the protection of
8 the necessary sand dunes. So the Department
9 has been told to look at the protection of
10 the sand dunes. And this whole area where it
11 touches at that vulnerable place at the neck
12 is the sand dunes. Now, if you go to, if
13 you'll pull up Section 48-39-250, please?
14 Section 48-39-250 contain the legislative
15 findings regarding the coastal beach/dune
16 system. And it sets forth that the
17 beach/dune system along the coast in South
18 Carolina is extremely important to the people
19 of the State and serves the following
20 functions. It protects life and property by
21 serving as a storm barrier which dissipates
22 wave energy and contributes to shoreline
23 stability in an economical and effective
24 manner. And then it provides habitat for
25 numerous species. It also provides basis for



1 tourism. It provides a natural healthy
2 environment for the citizens of South
3 Carolina to spend leisure time. In
4 Subsection (2) it says, beach/dune system
5 vegetation is unique and extremely important
6 to the vitality and preservation of the
7 system. If you look at Subsection (4),
8 please? If you'll scroll. It says Chapter
9 39 of Title 48, Coastal Tidelands and
10 Wetlands, prior to 1988, prior to the
11 Beachfront Management Act, did not provide
12 adequate jurisdiction to the South Carolina
13 Coastal Council, which is now what Office of
14 Ocean and Coastal Resource Management is, to
15 enable it to effectively protect the
16 integrity of the beach/dune system.
17 Consequently, without adequate controls,
18 development unwisely has been sited too close
19 to the system. This type of development has
20 jeopardized the stability of the beach/dune
21 system, accelerated erosion, and endangered
22 adjacent property. It is in both the public
23 and private interests to protect the system
24 from this unwise development. So, the
25 legislature has told us why they are



1 implementing the Beachfront Management Act,
2 is to provide additional protection for the
3 necessary dune system, among other things.
4 If we go specifically to Section 48-39-280,
5 please, which is what Mr. Walker has shown
6 us. The Department has been told to
7 implement this policy, they have to recognize
8 the importance of beach dune system. And if
9 you'll scroll down to (2), please? They're
10 trying to pick one phrase out of one sentence
11 and have the Department read that in
12 isolation to set the baseline. We can't do
13 that. The mandates give us guidance of how
14 we set up and implement the policy that's
15 contained in here. And you can't take just a
16 part of the sentence. The baseline for inlet
17 erosion zones that are not stabilized by
18 jetties, terminal groins, or other structures
19 must be determined by the department as the
20 landward point of erosion at any time during
21 the past forty years, unless the best
22 available scientific and historical data of
23 the inlet and adjacent beaches indicate that
24 the shoreline is unlikely to return to its
25 former position. So they're asking us to not



1 use what we've determined to be the most
2 landward point of erosion. The only way we
3 can -- to get there is to consider the other
4 considerations that the Act tells us to,
5 which is the protection of the beach dunes
6 system, and this phrase of whether the
7 shoreline's unlikely to return to its former
8 position. And that's really what they're
9 arguing with the accretion. What they're
10 saying is the beach is accreting out, so it's
11 unlikely to return to its former position.
12 They're just wordsmithing it and crafting it
13 to try to eliminate any evidence that shows
14 that severe erosion that is colliding with
15 the beachfront -- our beachfront
16 jurisdiction. But we have to keep reading in
17 Subsection to complete (2) as well, because
18 it says, in collecting and utilizing the best
19 scientific and historical data available for
20 the implementation of the beach preservation
21 policy, the department, as part of a the
22 State Comprehensive Beach Management Plan
23 provided for in this chapter, among other
24 factors, must consider historical inlet
25 migration, inlet stability, channel and ebb



1 tidal delta changes, the effects of sediment
2 bypassing on shorelines adjacent to the
3 inlets, and the effects of nearby beach
4 restoration projects on inlet sediment
5 budgets. We will not -- we'll touch on a few
6 of these. We don't intend to address all of
7 these. But really, the big factors in this
8 case is the inlet stability and inlet
9 migration, because the inlet migration goes
10 to, this is not really accreting and growing,
11 it's shrinking and moving, so we have to
12 consider that. Then they're arguing that the
13 accretion should change where we're locating.
14 And the inlet stability is all about that
15 pinch point at the neck and what's going to
16 happen when a storm hits the coast that --
17 and we know it does. We heard Mr. Hodge
18 testify that that's part of the coastal
19 environment, it's going to happen. So for us
20 to not consider what's going to happen when
21 we're putting our jurisdiction lines down to
22 protect the beach dune system, it's just
23 against the mandates of the statute and
24 regulations, Your Honor.

25 **MR. WALKER:** From day one in every filing, every



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1 communication, everything the Department has
2 said about the baseline on Captain Sam's, it
3 said the baseline shall be set at the most
4 landward point of erosion. We agree, we said
5 at the most landward point of erosion.
6 Legislature didn't say it doesn't have to be
7 the most landward part of erosion if these
8 factors are present. It says the most
9 landward part of erosion. That is a strict
10 definition that's applied, that it has to be
11 an erosional point, and that's the issue. We
12 can put all this proof, if Your Honor's to
13 allow this proof. We will spend a lot of
14 time talking about these things, but there's
15 nothing in the Act that says that we go to
16 some other standard than the most landward
17 part of erosion, which is not our test, that
18 was their test that they used. It doesn't
19 say we do anything else. So all this proof,
20 which they want to put in that we're going to
21 have to refute because they want to paint
22 these apocalyptic scenarios with over-the-top
23 descriptions of certain things. We're going
24 to have to put up our case too. Is that
25 going to change anything ultimately? No.



1 It's really a question of law that the
2 statute says -- the first part says, most
3 landward point of erosion, unless. And we're
4 not getting into the unless. There was a
5 contingent that, by proving that the beach
6 was accreting, we were somehow saying the
7 shoreline was not going to return to its
8 former position. We didn't make that
9 statement by our expert. That was important
10 because, if the beach were eroding, the most
11 landward point of erosion might be the most
12 landward shoreline that had erosional
13 characteristics. And an erosional beach, the
14 shoreline is being nibbled away all the time
15 by the tides. Here it's being built, which
16 we had to prove, in order to substantiate to
17 our experts, where our position of the most
18 landward part of erosion was. Not because we
19 were taken the position that the baseline
20 should be anywhere other than the most
21 landward point of erosion. So, we would ask
22 The Court to consider that. The policy were
23 taken into account when the legislature wrote
24 this statute. The most landward part of
25 erosion. It doesn't say it's something else.



1 And we just heard from the Department they're
2 concerned because the two lines are meeting.
3 Well, we're concerned, but our location would
4 have the lines not be the critical line on
5 the river side and the most landward point of
6 erosion. So, we don't think that it's of any
7 consequence, because it's not going to change
8 the question before The Court of where is the
9 most landward point of erosion.

10 **MS. PHELAN:** Your Honor?

11 **THE COURT:** Yes?

12 **MS. PHELAN:** I would just like to add that this
13 position for the first time was relayed to us
14 on Friday, after this whole case had been
15 developed and put together. It is a clever
16 way to try to eliminate any information that
17 is harmful to their case by trying to isolate
18 one phrase and one section of the mandatory -
19 - our mandatory statutory guidance. And I
20 think that a lot of what he is arguing, about
21 whether it's relevant to -- how can we assess
22 accretion and what that means in a coastal
23 management plan if we don't look at erosion
24 and whether the erosion is counteracting that
25 accretion? How can we do that? But I think



1 that a lot of what he has argued goes to
2 things that should be taken as the testimony
3 comes in. If we are being too repetitious,
4 then that is something that Your Honor can
5 rule on if -- when it comes in. If it is --
6 we're planning apocalyptic events and you
7 think it's over the top, then it's your
8 discretion to limit that testimony or to cut
9 it off. But what he's arguing, it's clearly
10 relevant for the Department to consider the
11 vulnerability of the spit when we have to
12 consider inlet stability. It's clearly
13 relevant for the Department to consider the
14 erosion when they're trying to defend against
15 accretion, making -- they're another proper
16 place to determine where those baselines go.
17 And, again, Your Honor, it's all through the
18 Act that we're suppose to protect the beach
19 dune system. And because these lines touch,
20 that area in the neck, the whole thing is the
21 beach dune system now.

22 **THE COURT:** Okay. Mr. Walker, what I am going to
23 do is, I'm going to allow the Department to
24 proceed with their case. You can raise
25 objections as we go along. And I will rule



1 on those objections. But right now, I'm just
2 not going to limit their presentation.

3 **MS. PHELAN:** Thank you, Your Honor. Your Honor,
4 the State would call Ms. Jessica Boynton to
5 the stand.

6 **THE COURT:** Before you take your seat, if you'll
7 raise your right hand, face the court
8 reporter, she will swear you in.

9 **COURT REPORTER:** Do you swear that the testimony
10 you give is the truth, the whole truth, and
11 nothing but the truth so help you God?

12 **MS. BOYNTON:** I do.

13 **COURT REPORTER:** Thank you. Please state and spell
14 your first and last name.

15 **MS. BOYNTON:** Jessica Boynton, J-E-S-S-I-C-A B-O-Y-
16 N-T-O-N.

17 **COURT REPORTER:** Thank you.

18 **JESSICA BOYNTON,** having been duly sworn, testifies
19 as follows:

20 **MS. BOYNTON - DIRECT EXAMINATION BY MS. PHELAN:**

21 Q: Good morning, Ms. Boynton.

22 A: Good morning.

23 Q: Can you tell the Judge what your position is
24 with the Department before we start into your
25 background? Just briefly.



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1 A: Sure. I'm the shoreline specialist within
2 the coastal services section within the Ocean
3 and Coastal Resource Management Office.

4 Q: Could you tell us a little bit about your
5 background?

6 A: Sure. I have a Bachelor's Degree in Biology.
7 And I have a Master's Degree in Biology with
8 an emphasis in Remote Sensing. I -- go
9 ahead.

10 Q: Can you tell us what remote sensing is?

11 A: Sure. Remote Sensing is the process of
12 obtaining information about an object. So,
13 like Earth from a distance. Aerial imagery
14 is a good example of remote sensing.

15 Q: And let's talk about your graduate degree.
16 Can you tell us a little bit about that?

17 A: Sure. I got my graduate degree from Murray
18 State University in Kentucky. And Murray
19 State University has a large remote sensing
20 center. It's called the Mid-America Remote
21 Sensing Center, or MARC. And when I was
22 preparing to go to graduate school, my
23 advisor, who I worked with for a number of
24 years, suggested that we try to write a grant
25 to get some funding to support my educational



1 efforts there. And we wanted to tie together
2 a biological study, because my master's is in
3 biology, with using the technology of GIS and
4 remote sensing. So, we wrote a grant to
5 NASA, in fact, and we were fortunate enough
6 to get that funded. So, my graduate degree
7 sort of tied together multiple fields. In
8 the biology side we were studying
9 salamanders. And on the GIS and remote
10 sensing side we were using satellite imagery
11 to look at land cover and various land cover
12 matrix to see what kind of impact they might
13 have on those salamander communities.

14 Q: Could you explain a little bit more about
15 what geographic information systems are, or
16 GIS?

17 A: Sure. GIS is a software platform that allows
18 the user to bring in various data sets. Some
19 of those data sets are raster, so those are
20 made up of pixels just like a picture would
21 be. And some of those are vector. So, those
22 would be our points and our lines and our
23 polygons. So, you can bring these various
24 data sets into GIS and overlay them for
25 various analysis, making a lot of maps. It



1 has a powerful analysis. There are literally
2 hundreds of tools, maybe more, in the GIS
3 platform.

4 Q: Is that what we've been seeing, these figures
5 that are created with the lines, that's a GIS
6 process where you load the data in and put it
7 in the software?

8 A: That's right. That's right. You can load
9 various data sets into the software program,
10 put them in different layers, turn them on or
11 off, and then you can symbolize them with
12 colors and dash lines and all sorts of
13 different things.

14 Q: That is the same process that Mr. Hodge and
15 Mr. Tolleson did when they portrayed their
16 work yesterday?

17 A: That's right.

18 Q: Okay. Could you tell us a little bit about
19 your post-graduate courses?

20 A: Since graduate school, I continued to take a
21 number of GIS courses. These have been
22 offered in -- some of them virtually and some
23 of them were in person. They covered a
24 variety of topics from sort of a more entry
25 level GIS through advanced processing and



1 analysis, cartography courses. And then
2 gotten into some courses about coding a
3 little bit and gotten into some courses on
4 server management. But so they covered a
5 wide range of GIS and remote topics. I think
6 -- I'd have to double check to see how many
7 courses, but I know it's over a hundred hours
8 of additional course work.

9 Q: Have you had any shoreline change -- courses
10 related to shoreline change?

11 A: I have. I took a two-day in-person course at
12 Georgia Southern University. And that course
13 was specific to the AMBUR shoreline change
14 tool, A-M-B-U-R. It stands for Analyzing
15 Moving Boundaries Using R. But essentially,
16 what that means is that it's a software tool
17 that allows you to look at shorelines and see
18 what kind of change you're having there.
19 That course was taught by Dr. Jackson, who
20 was the creator of that tool. That two-day
21 course covered the use of the tool and some
22 of its features. And then we practiced using
23 it.

24 Q: And is that a tool that you used for some of
25 the shoreline analysis for establishing the



1 baseline and setback line?

2 A: Yes, that's the tool we used in the most
3 recent jurisdictional line cycle.

4 Q: And what about coastal wetland
5 identification? Have you ever had any
6 courses in coastal wetland identification?

7 A: I've had a broad overview course in coastal
8 processes. It was called Beaches 101. It
9 was offered in the Charleston area. It was
10 about a week-long course and it was designed
11 specifically for coastal managers to give
12 them a good basis of understanding of coastal
13 processes, erosion, erosion management, those
14 sort of things.

15 Q: And what about GPS? Do you have any training
16 on GPS and what is GPS?

17 A: I do. GPS stands for Global Positioning
18 System. And GPS is done now with modern
19 units that we take in the field that connect
20 to satellites. Basically they're kind of a
21 high-end version of your phone. Your phone
22 can navigate you around, and the GPS -- the
23 GPS units we use are similar to that in
24 concept, of course, much more accurate.

25 Q: Is the GPS you used for collection of data



1 that we see in this case?

2 A: GPS has been used in some of the data
3 collection for this case.

4 Q: Could you tell us a little bit about your
5 work history?

6 A: Sure. I just want to go back for a minute
7 and finish the GPS certifications that I had.

8 Q: Okay.

9 A: I can just spend just a moment on that. And
10 it ties into my work history, so I'll start -
11 - I'll just merge the two together, that way
12 we can be more efficient. I started working
13 for the Rocky Mountain Biological Laboratory,
14 that was back in 2004. I was their GIS, GPS
15 coordinator. And my responsibilities there
16 included GPS field data collection, so I was
17 working with the researchers out there to
18 collect a variety of data types. And then
19 GIS analysis and data management. While I
20 was there, I was certified on a number of GPS
21 units, including the types of units that
22 we've used for these data collections.

23 Q: And before we go back to your work history,
24 let me ask you on your training and courses,
25 have you had any related to interpreting



1 aerial photographs, photogrammetry?

2 A: So, when I was in graduate school, I took a
3 number of GIS and remote sensing courses,
4 introduction of remote sensing, advanced
5 remote sensing. Those courses involved
6 exactly that, looking at remotely sensed
7 products and interpreting them.

8 Q: Go ahead and tell us about your work history.

9 A: So, I think I was talking about the work that
10 I was doing at the Rocky Mountain Biological
11 Laboratory. As I said, I went in the field
12 with the researchers to collect a variety of
13 data. Many of the researchers there had been
14 doing their studies for 20 or 30 years, so we
15 spent a lot of time mapping study sites.
16 Everything from plants to salamanders to
17 marmots. There was a large variety of
18 things. One example that is specific to
19 imagery interpretation, the laboratory is
20 situated at the base -- it's the Elk
21 mountains in Colorado, and it's situated at
22 the base of a very large mountain. And the
23 laboratory has folks living and working there
24 continuously, so they offer dining
25 facilities. And they wanted to replace their



1 dining facility. And they wanted to make
2 sure that they did it and put in a location
3 that was outside of their avalanche run,
4 because avalanches are a big deal out there.
5 And so I coordinated with one of the staff
6 members who lives on site and is familiar
7 with avalanches and how they work. So, we
8 used some remote -- remotely sensed aerial
9 imagery, pulled that up in GIS and we did
10 some image interpretation. He with his, you
11 know, knowledge of the avalanches and how
12 they work, me with my experience with the
13 imagery and the GIS. And we digitized these
14 avalanche areas so that the laboratory could
15 use that information when they moved forward
16 with the construction of this new facility.
17 And I will say, so far so good. There have
18 been no avalanches, the facility is still
19 intact. So, I think that's a good example of
20 how you can use GIS and remotely sensed
21 imagery.

22 Q: And have you worked for the South Carolina
23 Department of Natural Resources?

24 A: I have. I started working the SCDNR in their
25 marine resources division in 2007.



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1 Q: What did you do for them?

2 A: I was their GIS manager. My responsibilities
3 included providing GIS data, analysis, map
4 making for the researchers, at the marine
5 division primarily. But I also worked with
6 the office of fisheries management and the
7 freshwater department as well. So, I covered
8 -- they didn't have a lot of GIS managers at
9 that time, so I covered a lot of areas that
10 weren't necessarily in the marine division,
11 but that was the primary focus.

12 Q: We heard a little bit about oyster mapping
13 yesterday. Did any of your work involve
14 oyster mapping with the SC Department of
15 Natural Resources?

16 A: It did. The Office of Fisheries Management
17 is required for -- is involved in permitting
18 various oyster leases. And so they wanted to
19 get a better handle on where are the oysters
20 in South Carolina? How many acres do we
21 have? Back when I came on board, they were
22 just trying to figure that out. So, the
23 shellfish research section, they contracted
24 with a company to fly the coast, to collect
25 high resolution aerial imagery. And then



1 they contracted with them to do some
2 automated analysis, some feature
3 classification -- we heard a little bit about
4 feature classification yesterday -- to try to
5 identify those oysters. And when I came on
6 board, they had received those products and
7 were reviewing them. And what we discovered
8 was that the feature classification is. It
9 can be a good first step, but it doesn't
10 replace the manual reviewing of the
11 information. So, a lot of the feature
12 classification identified oysters that were
13 not there or missed oysters that were there.
14 So, I spent a lot of time working with the
15 researchers in the shellfish section and in
16 the Office Of Fishery Management reviewing
17 the aerial imagery and identifying where the
18 oysters were and were not. We further
19 supplemented that with ground control data
20 that we collected from helicopter flights.
21 That was some of my more exciting work on the
22 job, as you might imagine. And all of that
23 remote sensing information came together.
24 Ultimately we were able to get a very
25 accurate oyster/shellfish data layer, so now



1 the State of South Carolina has a good handle
2 on where those oysters are and how many we
3 have.

4 Q: Good. All right. After the Department of
5 Natural Resources, where did you work then?

6 A: I was with the DNR for five years, and then I
7 came over to DHEC to work in their Ocean &
8 Coastal Resource Management Office.

9 Q: What do you do for the Office of Ocean &
10 Coastal Resource Management? And I'll refer
11 it as OCRM or the Department, so I don't have
12 to say all that every time.

13 A: So, as I said at the beginning, my position
14 is shoreline specialist, which encompasses a
15 number of things. I'm just going to
16 highlight some primary items. GIS data
17 analysis and management is one of the main
18 things that I do. GPS data collection is
19 also one of the main things I do. When I
20 came on board at OCRM, they had some GPS
21 capacity, but I worked to expand that by
22 purchasing new units, which I had been
23 qualified at on previous jobs. And then
24 training the staff on how to use those and
25 bringing in outside trainers so we could have



1 professional certifications. So, the GPS
2 world is part of my job. I also have a role
3 in emergency operations, so dealing with any
4 tropical events that might be coming our way
5 and impacting our coast. And then I do a
6 fair amount of project management. They tend
7 to send the projects my way that have a more
8 technical component, so those that have GIS
9 or GPS or a specific hardware that is being
10 used. So, those are the primary areas that I
11 focus on.

12 Q: Are you a member of any professional groups
13 or organizations?

14 A: About four or five years ago I was at a
15 conference and meeting with some fellow GIS
16 professionals. And we realized that we
17 didn't have a -- we would see each other at
18 conferences occasionally, but we really
19 wanted more of an opportunity to share
20 information and collaborate. And so along
21 with a number of colleagues at the DNR that
22 I've known from the DNR and that I knew from
23 NOAA, we established the Coastal GIS Group or
24 User Group. We meet quarterly to discuss GIS
25 issues, share data, that sort of thing. So,



1 I'm a -- I guess I would say I'm refounding
2 number of that group.

3 Q: Okay. Do you have any involvement with the
4 Governor's South Atlantic Alliance hazard,
5 vulnerability assessment technical team?

6 A: I did. The Governor's South Atlantic
7 Alliance was a established back in, I think
8 it was 2009. It was a regional collaboration
9 of all four Southeastern states. And the
10 goal of that was to bring government
11 agencies, so local, state, federal, together
12 with non-profits and private sector groups to
13 address issues associated with -- for coastal
14 issues in the southeast. One of the things
15 that that group was doing -- had funding to
16 do, was to do shoreline change analysis for
17 the southeast. So, at the time we didn't
18 have shoreline change analysis, what's
19 happening with our coast, our rivers, or
20 creeks for the southeast. So, one of the
21 goals of that collaboration was to do
22 shoreline change analysis, and then also to
23 do a vulnerability assessment of the
24 southeast. So, they put together a technical
25 team that had academics from universities and



1 state partners. And I was the state
2 representative for that technical team.

3 Q: In your job responsibilities with OCRM, do
4 you ever give presentations to either the
5 staff or the public?

6 A: I do. I'll start with our internal
7 presentations. I am responsible for running
8 the trainings for our emergency operations.
9 We have a role in preparing for hurricanes
10 and we also have a role in recovery for
11 hurricanes. So, that involves data
12 collection, using GPS units, using data
13 bases. So, I train staff on all of that.
14 Those trainings happen twice a year, usually
15 involving 10 to 20 staff members. I
16 regularly give presentations to other
17 bureaus, to the executive section of DHEC.
18 Outside of DHEC, I've presented data at the
19 Governor's office, to Governor McMaster and
20 his team. I've presented data information at
21 public town halls and at various conferences
22 and webinars throughout the southeast.

23 Q: Okay. Have you received any awards in your
24 position with OCRM?

25 A: I have. I received the Director's Award from



1 DHEC. That award is presented annually to
2 individuals that are sort of meeting -- going
3 above and beyond, I guess I would say. That
4 award was awarded dually to myself and to Mr.
5 Slagel.

6 Q: Now, could you tell The Court a little bit
7 about your familiarity with the South
8 Carolina coast?

9 A: I moved to South Carolina in 2007. So, I've
10 been living here for -- ever since then.
11 Working for the DNR, obviously, I had some
12 familiarity with the coast and the marine
13 resources within. Certainly got my eye full
14 of the coast when we were flying helicopter
15 flights for the oyster project. My awareness
16 and familiarity of what the beachfront looks
17 like has considerably increased since coming
18 to OCRM. When we were doing the last
19 jurisdictional line review cycle, one of my
20 responsibilities was in data collection.
21 Myself, along with Mr. Slagel and a few other
22 staff members, but primarily myself and Mr.
23 Slagel collected data along the South
24 Carolina coast. The developed portions of
25 that is about a hundred miles. And I think



1 it's fair to say that we walked, maybe not
2 every linear foot, but almost all of it. So,
3 we have a really good idea of what the coast
4 looks like out there.

5 Q: So, I would like to turn to specifically talk
6 about the jurisdictional lines.

7 A: Okay.

8 Q: Could you tell us how often does the
9 Department have to establish jurisdictional
10 lines?

11 A: Per statute, the Department is required to
12 review and establish a new jurisdictional
13 lines every seven to ten years.

14 Q: And how many times have they been established
15 now?

16 A: There have been four cycles.

17 Q: During the four cycles has the Department
18 generally used the same procedures in
19 establishing the jurisdictional lines?

20 A: That's right. The Department -- the
21 methodology was laid out in a statute and
22 regulation, and there have been modifications
23 over the years to that. But it was laid out
24 in statute and regulation, and then was laid
25 out additionally in a report in 1988. And we



1 have followed that methodology consistently
2 since then.

3 Q: Okay. Before we get into methodology, let's
4 just talk a little bit about the review
5 process. If you could just give us a quick
6 overview in what the review process is.

7 A: Sure. So, I'm going to keep this pretty high
8 level just to kind of go over the basics of
9 how a jurisdictional line review process
10 happens. And we can get into details later.
11 So, essentially when we kick it off, you
12 know, we identify the beaches and set up a
13 tentative preliminary schedule for the review
14 cycle. Then we begin data collection and
15 gathering the data sets that we already have
16 in house, performing any analysis that we
17 need to do. Once we've got that data
18 collection analysis completed, then we
19 assemble an internal Review Panel made up of
20 staff and managers. And those staff and
21 managers review the data that was collected,
22 the analysis, and we develop proposed
23 baseline and setback lines. Once we have
24 those proposed lines, we have a period of
25 public comments and those lines go -- become



1 available to the public to review. We have a
2 public comment period. We have town halls
3 where we can provide information to the
4 public and get feedback. There's a period
5 where the public can submit additional
6 evidence to the Department to review. We
7 have an opportunity to meet one-on-one with
8 the public as needed. And once we've
9 completed all of that and reviewed any
10 additional evidence, then the final step
11 would be in adopting the final lines.

12 Q: Was this process followed for proposing the
13 lines at Captain Sam's Spit?

14 A: It was followed up to the point of the public
15 comment period and the town halls, all of
16 that the Department completed.

17 Q: And what happened to -- why didn't you follow
18 the rest of the normal procedure when setting
19 these jurisdiction lines?

20 A: So, the legislature had established some new
21 information in the statute that indicated
22 that, after December of 2017, the baselines
23 would not move further seaward. With that
24 in mind, the Department wanted to review all
25 of the beaches to give them an opportunity



1 for seaward movement before that deadline
2 passed. We released the lines in October of
3 2017, the proposed lines, and the -- DHEC
4 ultimately extended the public comment period
5 beyond the 30 days into 2018. Ultimately,
6 the legislature passed Act 173, which
7 established the baselines for this
8 jurisdictional line cycle.

9 Q: Is there any -- let's talk a little bit about
10 the methodology. Is there any written
11 materials related to the establishment of the
12 jurisdictional lines? I believe you cited to
13 a report, and we'll come back to that. But
14 what, if any, written materials, other than
15 the '88 written report, are there relating to
16 the establishment of the jurisdictional
17 lines?

18 A: So, obviously we have the statute and
19 regulation, Statute 48-39 and Regulation 30.
20 And then the Department -- I want to make
21 sure I'm understanding your question here,
22 Sallie. Are you asking what materials the
23 Department makes available?

24 Q: Yes.

25 A: Okay. The Department releases a number of



1 materials associated with the jurisdictional
2 lines. So, for each beach we release a line
3 report, which summarizes its background on
4 how the baseline and setback line are set,
5 provides information about the data, provides
6 erosion rates, that sort of thing.

7 Historically, the department has also
8 released a surveyors packet, which provides
9 information specifically to surveyors who
10 will be going out and using the coordinates
11 provided by the Department to flag a baseline
12 or a setback line on a property. In this
13 last jurisdictional line cycle, we didn't
14 separate those two. We took some of the
15 information from the surveyors packet, and
16 that came in as a line report. And then we
17 sort of moved with the times and we started
18 providing a lot more of this information
19 online, through website, through a video, and
20 through interactive viewer.

21 Q: Before we talk about the website, can I have
22 you look at Exhibit 16, Respondent's Exhibit
23 16, please, in your notebook?

24 A: Okay, I've got it.

25 Q: Okay. Can we identify that document for us?



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1 A: This is the 1988 orthoimagery of Captain
2 Sam's Spit.

3 Q: Oh, I'm sorry, that's the wrong exhibit.

4 A: I was kind of wondering.

5 Q: I imagine we're looking at Joint Exhibit 16.

6 **(Joint Exhibit Number 16 was introduced.)**

7 A: Okay. I'm in the wrong folder. Let me
8 switch over. Here we go.

9 Q: What are we looking at now?

10 A: This is the line report for Kiawah Island for
11 the 2016-'18 jurisdictional line review.

12 Q: And would -- can you kind of just walk us
13 briefly through what information is in the
14 line report that's available to the public?

15 A: Sure. You can see here we've got -- on page
16 one, we've just got the background, let's
17 people know how often we review the position
18 of the lines, provides statutory language of
19 how we set the lines, talks a little bit
20 about activities seaward of our
21 jurisdictional line. And then it goes into
22 an overview of the establishment of the
23 baseline and the setback line positions,
24 that's on pages two and three.

25 Q: And what kind of information do those



1 sections give?

2 A: That gives information about how the baseline
3 is set in the various beach zones and how the
4 setback line is established from the
5 baseline.

6 **MS. PHELAN:** Your Honor, would it be easier if I
7 had it portrayed digitally and let her scroll
8 through the documents, so you could follow
9 without ...

10 **THE COURT:** That's fine.

11 **MS. PHELAN:** Could we pull up Joint Exhibit 16,
12 please? Do you have your clicker that you
13 can scroll? Joint Exhibit 16.

14 Q: So, this is the line report that was revised
15 on February 11, 2020 that you were
16 discussing?

17 A: That's right.

18 Q: Okay. And then you were speaking about the
19 sections on page two and three, explaining
20 generally what kind of information is in
21 there. If you want to just -- you think you
22 can scroll down and you can have Crystal --
23 tell Crystal how you want to do it.

24 **THE WITNESS:** Crystal, if you can just kind of
25 slowly scroll down.



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1 A: So, here we've got the background section
2 that I was talking about earlier, statutory
3 language, some general ideas about activities
4 that can happen in the jurisdictional area.
5 And then this section here we've got
6 information on some of the data that the
7 Department uses for setting the
8 jurisdictional lines. Keep scrolling. So,
9 this section here talks about the process of
10 establishing a baseline position in the
11 various beach zones. Keep going. And then
12 this section talks about establishing the
13 setback line position, how that is done. And
14 then we get into the specifics of each of the
15 beaches. So, each of the beaches has one of
16 these reports. And we have a section here on
17 Kiawah Island, gives a brief description.
18 And then it goes into the zones. And then it
19 talks about the setback line, provides the
20 shoreline change rates. And then we provide
21 sort of a little bit of information about,
22 you know, how the process works here and the
23 final product. We've provided the link to
24 our new viewer that we have. Keep moving.
25 Oh, scroll back -- scroll back up. And then



1 we provide information there for surveyors,
2 letting them know that the coordinates are
3 going to be available on our website. And
4 then you'll notice that we've got a couple of
5 --

6 **THE WITNESS:** Scroll down, Crystal.

7 A: -- got a couple of addendums. So, as things
8 progressed here with the jurisdictional line
9 review cycle, we added the information and
10 updated the line reports on our website. So,
11 we've got the Act 173 update, then we have an
12 update where we had gotten the shoreline
13 change information onto the viewer, and then
14 we had an addendum here in February of 2020.
15 I believe that was the last addendum for the
16 pending litigation.

17 Q: And I'm just going to have you identify three
18 more line reports.

19 A: Okay.

20 Q: And just tell me if there's any special
21 information in them, that generally is the
22 same communication problem -- process of
23 where you're conveying where the lines are
24 set and the procedures; is that correct?

25 A: That's correct.



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1 Q: So, if you would --

2 **MS. PHELAN:** And I'm just going to have her turn to
3 identify, Your Honor, because we're not going
4 to talk in detail about those reports ...

5 Q: If you'll turn to Joint Exhibit 4? Can you
6 identify that document for us, please?

7 **(Joint Exhibit Number 4 was introduced.)**

8 A: That's the Kiawah Island line report from the
9 2009 land review cycle.

10 Q: And is this similar to the document that you
11 just currently went through us?

12 A: There could be some variations, but it's
13 generally similar, yes, in nature, covers
14 similar material.

15 Q: Okay. And how about Joint Exhibit Number 6,
16 please? Did you give us a date on that one?
17 I'm sorry.

18 A: I indicated 2009.

19 Q: Turn it to Number 6, please.

20 **(Joint Exhibit Number 6 was introduced.)**

21 A: This exhibit is the Kiawah Island line report
22 for the 1999 line review.

23 Q: Okay. And Exhibit Number 8, please?

24 **(Joint Exhibit Number 8 was introduced.)**

25 A: And this is the line report for Kiawah Island



1 for the 1990 line review.

2 Q: And do each of these reports contain
3 information about the different lines that
4 were considered in placing the baselines at
5 Captain Sam's Spit?

6 A: They do. I mean, they have different sort of
7 levels of information. But they generally --
8 like I said, they generally contain similar
9 material.

10 **MS. PHELAN:** Your Honor, I'd like to move Exhibit
11 16 -- I'm sorry, Joint Exhibit 16, Joint
12 Exhibit 4, Joint Exhibit 6, and Joint Exhibit
13 8 into evidence.

14 **MR. WALKER:** No objection.

15 **THE COURT:** They're entered.

16 **(Joint Exhibit Numbers 4, 6, 8, and 16 were entered**
17 **into evidence.)**

18 Q: And if you would now turn to Joint Exhibit 3,
19 please? Can you identify that document?

20 **(Joint Exhibit Number 3 was introduced.)**

21 A: This is the surveyor package for Kiawah
22 Island for the 2009 line review.

23 Q: Okay. Is this the document that you told us
24 about that had the coordinates for surveyors
25 and the other information so the surveyors



1 could go out and locate the actual line,
2 position of the lines?

3 A: So, this is the, sort of, overview of that
4 document. The actual coordinates are
5 provided to the surveyors in a digital form.
6 We provide an Excel spreadsheet with the
7 coordinates, like those would be in a state
8 plane, northing, easting, and elevation for
9 the surveyors. We also provide them a
10 surveyor -- a CAD format, which is a software
11 that's used by a lot of the surveyors. So,
12 this surveyor packet, it provides some of the
13 similar information that we saw in the line
14 reports. It gives a little bit of
15 information about the digitization. It also
16 talks about the beach survey monuments. We
17 saw a number of those survey monuments
18 indicated on maps yesterday at Kiawah. And
19 then it provides the erosion rates. And as I
20 said previously, is the monument information
21 is now provided on our interactive web
22 application, our viewer, along with the
23 erosion rates. So, we've kind of
24 consolidated a little bit and made them
25 available through different formats.



1 **MS. PHELAN:** At this time I would like to move
2 Respondent's Exhibit 3 into evidence -- I'm
3 sorry, it's not Respondent's. It's Joint
4 Exhibit 3.

5 **MR. WALKER:** That's fine. No objection, Your
6 Honor.

7 **THE COURT:** Okay. It's admitted.

8 **(Joint Exhibit Number 3 was entered into evidence.)**

9 Q: You've mentioned the web viewer and the
10 information that's on the website.

11 **MS. PHELAN:** Your Honor, with your permission, I
12 would like to have that site pulled up very
13 quickly just to show what's there, since
14 there was testimony yesterday from Mr. Hodge
15 that he didn't have sufficient information.

16 **THE COURT:** Okay.

17 **MS. PHELAN:** So, Crystal, could you pull up the
18 website, please?

19 Q: Ms. Boynton, could you kind of walk us
20 quickly through what the public can access
21 from this website related to the
22 jurisdictional lines?

23 A: Sure.

24 Q: And first tell us what this website is.

25 A: Right. Sure. Absolutely. So, this ---



1 **MR. WALKER:** Your Honor, not to preempt the
2 witness, could we also have some testimony,
3 just the foundation for when this was put on
4 the website and that sort of thing, so we
5 have it in context?

6 **THE COURT:** Sure.

7 **Q:** Ms. Boynton, were you involved in -- have you
8 been participating with the website at all?

9 **A:** I've been involved in creating some of the
10 content for the website. And, I mean, I'm
11 not a website developer, so just working with
12 the website folks at DHEC to develop this.

13 **Q:** Do you know when it was put online to the
14 public?

15 **A:** I don't know the exact date. It would have
16 been, I think, in the fall of 2017.

17 **Q:** Can you tell us a little bit about who has
18 put this together?

19 **A:** This would have been a collaborative effort.
20 I was involved, a number of members of our
21 Review Panel would have been involved.

22 **Q:** And you said Review Panel, the Jurisdictional
23 Line Review Panel?

24 **A:** The Jurisdictional Line Review Panel, that's
25 right. And OCRM's director, Elizabeth von



1 Kolnitz, would have reviewed this prior to it
2 going out.

3 **MS. PHELAN:** Your Honor, do we have permission to
4 continue?

5 **MR. WALKER:** And I'm not objecting to them going
6 into it. I just want to make sure that the
7 content is the same. Could we find out from
8 the witness whether the content that we're
9 seeing here is -- was available in the fall
10 of '17 on the website? She said she believed
11 it was. I don't know if it's been changed or
12 not. But we don't -- thank you.

13 **THE WITNESS:** And as we go through -- if it's
14 acceptable, as we go through this, I will do
15 my best to identify the areas that I think
16 have been available the whole time and what's
17 been updated.

18 **MR. WALKER:** That would work great, that's fine.
19 That's a good way to do it.

20 **THE COURT:** Thank you. Go on.

21 Q: Continue.

22 A: So, just to kind of orient you a little bit,
23 we've got, sort of, text on the main screen
24 here. And then over to the right we've got
25 some downloads and links. So, at the top we



1 just cover some of the basics of the, you
2 know, OCRM, what we're doing with this, the
3 jurisdictional lines, very high level
4 information. We provide information about,
5 you know, what people can do and how they can
6 make repairs or new construction there. Over
7 on the left we have those links to that
8 viewer, to our videos, some background about
9 the coastal zone management program and links
10 to the public notices. If you can scroll
11 down just a little. Here we have our
12 jurisdictional line video, which provides a
13 nice overview of the jurisdictional line
14 process. So, the information to my -- to the
15 best of my knowledge, the information that we
16 just covered at the top in those links were
17 available in the fall of 2017. This video
18 was also released in the fall of 2017. It
19 has since been updated. The content is
20 essentially the same, but we've updated it,
21 you know, to have some new pictures and some
22 new video, sort of changing and updating the
23 look and feel of the video without really
24 changing a lot of the content material. Can
25 you scroll down a little bit more?



1 Q: Can you explain a little bit more about what
2 the content is of the video?

3 A: So, the content gives a nice overview of how
4 the jurisdictional lines are set. And what
5 their implications are for property owners.

6 Q: Okay. Go ahead, continue on ...

7 A: So, this section here clearly was not
8 available in the fall of 2017, because it
9 didn't exist. We didn't have Act 173, so
10 that would have been added subsequent to the
11 passing of the Act. So, this just describes
12 what the -- you know, it gives information to
13 property owners and interested parties as to
14 what that Act means. So, then we have this
15 section specifically for property owners.
16 And I believe that this section was present
17 in the fall of 2017. Just gives the property
18 owners some information, links to the viewer,
19 let's them know that they're going need a
20 property-specific survey if they want that
21 exact position. The section on land
22 surveyors was also available in 2017. It's
23 since been updated. When Act 173 passed, it
24 essentially said that the lines that would
25 then be established would be a combination of



1 the lines that were set in 2009 and the lines
2 that were proposed in 2017. So, sort of
3 overnight the Department had four lines to
4 contend with for the entire state. And so it
5 took us some time to figure out, because the
6 lines, you know, they move down the beach.
7 And so they crossed, you know, this is the
8 old line and the new line, so it took us a
9 little bit of time to, kind of, do the data
10 processing that was required to take the four
11 lines and get them down to two lines. It
12 sounds like it would be easy, but it takes a
13 lot of analysis and processing to do that.
14 So --

15 Q: And that was a result of Act 173, what the
16 legislature said needed to happen with the
17 lines?

18 A: That's exactly right. So, there was a time
19 where we had four lines essentially out
20 there. So, this section on survey -- for
21 surveyors has changed over time to give them
22 the best available information as to which --
23 there was a lot of questions from surveyors;
24 well, which lines do I use, which -- you
25 know, at this property; what do I use at that



1 property. So we were -- you know, I was
2 responding to a lot of those requests. I
3 believe -- and I won't speak for Mr. Slagel.
4 I think he was there. But we did a number of
5 presentations and outreach for surveyors on
6 this exact topic to make sure that they were
7 familiar with the lines and how they could be
8 certain that they were using the right lines
9 and the right coordinates to do their jobs.
10 So, this has since been updated. We now have
11 a single set of lines. We have survey
12 packets for all the surveyors for each of the
13 beaches. So, things are much smoother now.
14 My phone has stopped ringing, which is good.
15 So, and then here at the bottom --

16 **THE WITNESS:** Crystal, if you could just --

17 A: -- we provide, again, the links to the
18 materials I've already talked about. And
19 then just a lot of good background
20 information, the statutes and regulations,
21 the decisions on remand, so they can click
22 through those documents.

23 Q: So, I wanted to talk -- the video that you
24 showed us when you talked about -- did you
25 have any involvement in putting that video



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1 together?

2 A: I did. I was involved in the original video
3 and also this update video.

4 Q: What was your involvement?

5 A: I was involved in helping to write the
6 script, that was, of course, reviewed by the
7 internal Review Panel, the Jurisdictional
8 Review Panel, as well as our director before
9 it was finalized. And then I worked with
10 DHEC's -- sorry, the first jurisdictional
11 line we hired an outside videographer. But I
12 worked with him to put together the maps,
13 which I had made, and the photos, which we
14 gathered, and the script to put together the
15 video. I'm not a videographer, so I worked
16 with him to put that together. And then when
17 we did the update, we were able to work with
18 DHEC's videographer to put that together.
19 And I had a similar role in the revision
20 video.

21 Q: Would this video help you explain how to set
22 the jurisdictional lines?

23 A: It's a very nice overview of the process.

24 **MS. PHELAN:** Your Honor, we have the video ready
25 for you. We have edited it down to -- it's



1 about four minutes. We took out anything
2 that was not related to Captain Sam's Spit,
3 the other zones that we're not arguing, you
4 know, the permitting and what the landowner
5 can and can't do, as that's not an issue.
6 So, it's been edited -- boiled down to just
7 what we're looking at in this case. So, with
8 your indulgence, I'd like to play ---

9 **MR. WALKER:** Objection. It's hearsay. It doesn't
10 make any issue in this case more or less.
11 It's not probated proof of any issue in the
12 case. It is just an informational video. We
13 got into the website, ostensibly because the
14 Department said that Mr. Hodge said he didn't
15 have the information behind the lines that
16 OCRM was referring to and using to set the
17 baseline in 2017. And this video has nothing
18 to do with that. So, it's hearsay, not
19 relevant. She should have testified as to
20 how the process worked. I can cross examine
21 her. I can't cross examine the narrator or
22 ask her questions. So --

23 **THE COURT:** Okay. Your objection is sustained.

24 **MR. WALKER:** Thank you.

25 **MS. PHELAN:** Your Honor, can I be heard about it?



1 **THE COURT:** Okay. Sure.

2 **MS. PHELAN:** I wasn't offering it to counter what
3 Mr. Hodge said. Since she wrote the script
4 and she's here, it provides pictures, it just
5 walks you exactly through the process, and
6 it's very time efficient to help everyone
7 understand how to -- what they do -- exactly
8 what they do in setting the lines.

9 **THE COURT:** And I understand that, but I actually
10 prefer just hearing the testimony.

11 **MS. PHELAN:** Okay. Thank you, Your Honor.

12 **THE COURT:** Thank you.

13 **MS. PHELAN:** And I don't want to argue. I just
14 want to preserve the record. I would suggest
15 that it is not -- it's admissible under the
16 public records and reports exception 803(8),
17 and I'm moving on. Thank you.

18 **THE COURT:** Thank you.

19 Q: Okay. So, could you please explain for us --
20 let me do this. Did you do a presentation on
21 how to set the jurisdictional lines?

22 A: I did. We developed a number of
23 presentations for town halls and for the
24 surveyor's, for various stakeholders.

25 Q: Okay. If you could please turn to Joint



1 Exhibit 12?

2 **(Joint Exhibit Number 12 was introduced.)**

3 A: Okay.

4 Q: Did you do this presentation?

5 A: It's a little bit difficult. I'm used to
6 seeing it in a PowerPoint format and these
7 are just some individual slides. But it
8 looks like these are slides that were taken
9 from one of the jurisdictional line
10 PowerPoints that were developed.

11 Q: Okay. Could you just walk us through these
12 slides?

13 A: Sure.

14 Q: And tell us -- and help us explain and
15 understand how do you set the jurisdictional
16 lines?

17 A: Yes, I can do that. So, this first slide
18 that we're seeing here just gives a brief
19 overview of what they are. So, the
20 jurisdictional lines enable DHEC to implement
21 laws and regulations that protect coastal
22 resources and guide development away from
23 dynamic shorelines. So, they kind of set the
24 framework and the area in which we do that.
25 We've got two lines. We've heard a lot about



1 the two lines. Baseline is more seaward,
2 setback line is more landward.

3 Q: Okay. Continue.

4 **THE WITNESS:** Crystal, if we can go to the next
5 slide. Make sure we're on the same page
6 here.

7 A: So, this is a map that I developed just to
8 give the public a very cursory idea of, you
9 know, what do these lines look like. Again,
10 baseline is in red, setback line in blue.
11 The area to the south is the ocean area. And
12 then, obviously, we've got the areas to the
13 north is landward. In this area here we've
14 got seaward of the red line, we've got a dune
15 area. So, this is just kind of an oriented -
16 - a map to orient you. The next slide was to
17 provide the stakeholders with an
18 understanding of why we were updating these
19 lines. So, we let them know that it's
20 required by law and we establish and review
21 these -- the lines and establish positions
22 every seven to ten years. As we said
23 earlier, there's been four cycles. And the
24 last cycle was in 2008-2010. And then we're
25 also required to review the average long-term



1 shoreline change rate, which is also called
2 the long-term erosion rate. We're saying
3 shoreline change rate here, because shoreline
4 change can be positive or negative. But I
5 think erosion rate is what it says, for all
6 oceanfront land that is or could be
7 developed.

8 Q: And feel -- when you're going through this,
9 feel free, if you've already talked about, to
10 just, you know ...

11 A: To move faster. Okay. Will do. The next
12 one is the same overview map, we've just
13 added the hash marks to let them know where
14 the setback area is between the baseline and
15 setback line.

16 Q: And what is the significance in the setback
17 area, between the baseline and setback line?

18 A: Well, the setback area is the area that is
19 seaward of the setback line in blue. And
20 activities in that area would require at
21 least notification to the Department.

22 Q: So, is it a zone that, does it prohibit all
23 development in that area?

24 A: It does not, no. On the website, I think we
25 indicate that it's not a no-build zone.



1 Q: So, it's just a zone where the public has to
2 go to the Department for authorization, what
3 they're doing, and then the Department
4 reviews?

5 A: That's right. There are a number of
6 activities seaward of the setback line that
7 we regulate, associated with habitable
8 structures, pools, erosion control
9 structures, as well as a large -- a variety
10 of other activities.

11 Q: All right. Next slide, please?

12 A: Okay. This gets into how the baselines are
13 set. So, in a nutshell they're set based on
14 which beach zone you're in. Captain Sam's is
15 in an unstabilized inlet erosion zone. So,
16 that's the one that we're focused on here
17 today.

18 Q: Okay. And next.

19 A: This slide here just gives the definition for
20 unstabilized inlet erosion zone. This is an
21 example at Capers Inlet. So, inlets that
22 have not been stabilized by jetties, terminal
23 groins, or other structures, which would
24 describe Captain Sam's. And then this next
25 slide gets into more of the specifics of



1 setting the baseline in the unstabilized
2 inlet erosion zone. The baseline is set at
3 the most landward point of erosion at any
4 time in the past 40 years. That's kind of a
5 paraphrasing of the statute. And modern and
6 historic shorelines were used to determine
7 the most landward point of erosion in the
8 last 40 years.

9 Q: Okay. Next slide.

10 A: We also used the Trimble GeoXT. We talked
11 about the various GPS units that the
12 Department. And so this was used to collect
13 more modern vegetation lines. So, on this
14 slide here, we moved from the baseline and
15 start talking about the setback line.

16 Q: And let's just do a very brief overview,
17 since there's no challenge to the setback
18 line, for us.

19 A: Absolutely.

20 Q: We don't need to walk one by one ...

21 A: Sure. The setback line is established at a
22 distance from the baseline, which is 40 times
23 the average annual shoreline change rate, or
24 long-term erosion rate. And it's a minimum
25 of 20 feet at least.



1 Q: Would you show The Court -- we have done some
2 AMBUR analysis in this -- we have in this
3 case, correct?

4 A: That's correct.

5 Q: Okay. Do you want to briefly show her the
6 AMBUR and what that's about? And, again,
7 what does AMBUR stand for?

8 A: Again, that's Analyzing Moving Boundaries
9 Using R. R is a statistical package. So,
10 I'm not going to get into all the details of
11 this, as Ms. Phelan said. But essentially we
12 use wet/dry shorelines, which you can see
13 there, are shown in green. The program casts
14 these transects --

15 **THE WITNESS:** Crystal, could you move to the next
16 slide?

17 A: -- casts these transects across those lines
18 from the ocean, towards the land. Next
19 slide. And what you can see here is we have
20 all these intersection points between the
21 transects and the wet/dry shorelines. And so
22 the software program analyzes those
23 intersection points and produces the rate of
24 change. Next slide. And it provides that
25 rate of change for each of the transects



1 here. So, we can get a good detailed view of
2 what's going on at each of these transects.
3 So, that's, I think, just the real just
4 cursory basics of how that works. And,
5 again, this slide here is just reiterating
6 how the shoreline change is used for the
7 setback. Again, at Captain Sam's it's a
8 minimum of 20 feet. And I think that's the
9 last slide.

10 Q: Okay. Great.

11 **MS. PHELAN:** I would move Joint Exhibit 12 into
12 evidence, please?

13 **MR. WALKER:** No objections.

14 **THE COURT:** It's admitted.

15 **(Joint Exhibit Number 12 was entered into**
16 **evidence.)**

17 Q: All right. You have referred to a 1988
18 report when you were talking about the
19 methodology. Can you tell us what the 1988
20 report is? And if you'll look at
21 Respondent's Exhibit 10. Do you recognize
22 that?

23 **(Respondent's Exhibit Number 10 was introduced.)**

24 A: I do.

25 **THE WITNESS:** Crystal, if we could -- yep. Thank



1 you. Just scroll it down a little bit.

2 A: So, this is the final report. As it says,
3 The Calculation of Interim Baselines and 40-
4 Year Setback Lines.

5 Q: Okay. Tell us what is this report?

6 A: So, this was a report from the project that
7 was contracted by the South Carolina Coastal
8 Council. They contracted with Coastal
9 Science and Engineering to perform this
10 calculation of interim baselines and 40-year
11 setback lines and layout the methodology for
12 that.

13 Q: And who was it prepared by?

14 A: There are four people indicated here. We
15 have Christopher P. Jones, who is joining us
16 here in Court today. He's serving as an
17 expert for the Department. David Scaturo,
18 Dr. Timothy Kana, and William Eiser.

19 Q: Are you familiar with these gentleman's
20 backgrounds?

21 A: I'm familiar with Dr. Kana and Bill Eiser.
22 Dr. Kana is the owner of Coastal Science and
23 Engineering. His background, he has a Ph.D.
24 in coastal geology, and he is a professional
25 geologist in South Carolina. Bill Eiser has



1 a background in marine sciences. And
2 subsequently to leaving Coastal Science and
3 Engineering, went on to work for the Coastal
4 Council and OCRM for 20 or 30 years. And he
5 was a lead in several of the jurisdictional
6 line review cycles after this. And Chris
7 Jones, who is with us today, is PE with
8 emphasis in coastal processes.

9 Q: What is a PE?

10 A: Professional engineer.

11 Q: And what is this report -- what is the
12 purpose of this report?

13 A: The purpose of this report -- so this was in
14 1988. So, this was the first line review
15 cycle that the Department was doing for the
16 Coastal Council at the time. So, the purpose
17 of this is to lay out -- to use the data
18 available to lay out a methodology for
19 setting the interim baselines and setback
20 lines.

21 Q: And this was contracted by South Carolina
22 Coastal Council with Coastal Science and
23 Engineering?

24 A: That's right.

25 **THE WITNESS:** If you scroll down, Crystal, just a



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1 little bit. Page one, just right at the top
2 there. I'm wrong, page two. Keep going.
3 There we go.

4 A: The report was prepared under a contract
5 between Coastal Science Engineering and the
6 Coastal Council.

7 Q: Do you know what happened, if anything, with
8 the recommendations contained in this report?

9 A: They were accepted by the Coastal Council, or
10 adopted by the Coastal Council.

11 Q: Does this document establish the methodology
12 that the Department is generally using today
13 in setting the baselines and the setback
14 lines?

15 A: Yes, that's correct.

16 **MS. PHELAN:** Crystal, can you bring up Respondent's
17 -- I'm sorry, Joint Exhibit 9.

18 **(Joint Exhibit Number 9 was referenced.)**

19 Q: What is the first step of establishing a
20 baseline?

21 A: So, the first step to establishing a baseline
22 is to determine which beach zone you're
23 located in.

24 Q: Okay. And how do you know what beach zone
25 you're located in?



1 A: The beach zones were originally established
2 in 1988 and were adopted into regulation in
3 '93 with R-30-21. So, we refer to those.

4 Q: And do you recognize Joint Exhibit 9 that's
5 on the screen?

6 A: I do.

7 Q: What is this?

8 A: Those are the beach zones designations for
9 Kiawah from R-30-21.

10 Q: From the Regulation?

11 A: That's correct.

12 Q: So, the zones are set -- they're maps that
13 set the zones in the Regulation for each
14 beach?

15 A: That's correct.

16 Q: Could you go to page two, please? And what
17 does this photo show?

18 A: This photo shows -- this is Captain Sam's,
19 we've seen this a lot. And you'll see some
20 lines there out in the ocean. Those are
21 indicating the beach zones. So, the beach
22 zones that were in the map that we saw just
23 previously have been digitized into GIS for
24 use within that platform. And we can see
25 here, we've got the unstabilized inlet



1 erosion zone in orange. And the standard
2 zone there in that teal color. The
3 demarcation is there at that yellow monument,
4 2625.

5 **MS. PHELAN:** Respondent moves Exhibit 9 into
6 evidence, please?

7 **MR. WALKER:** No objection to Joint Exhibit 9.

8 **MS. PHELAN:** Joint Exhibit 9.

9 **THE COURT:** It's admitted.

10 **(Joint Exhibit Number 9 was entered into evidence.)**

11 **THE COURT:** And, Ms. Phelan, before you go any
12 further in your questioning, let's take a
13 quick 10-minute break.

14 **(Off the record from 10:53 a.m. until 11:08 a.m.)**

15 **THE COURT:** Continue, Ms. Phelan.

16 **MS. PHELAN:** Your Honor, I wanted to move the
17 Respondent's Exhibit 10 into evidence.

18 **MR. WALKER:** Your Honor, Respondent's Exhibit 10 is
19 the 1988 report from CSE. When we took Mrs.
20 Boynton's deposition, I asked her
21 specifically, on page 99, if the Department
22 had ever adopted any policies or procedures,
23 guidelines relating to establishing the
24 baseline, and she said, she didn't know how
25 formally if anything was adopted. And today



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1 we hear for the first time the Coastal
2 Council, according to the witness, adopted
3 something. And I understand if it's adopted,
4 then that's one thing. If it's not adopted
5 then I would ask for clarification on that,
6 because we understood from her testimony that
7 there was no written guidelines adopted. And
8 if it's adopted, I think it comes in. If
9 not, we'd say it's hearsay.

10 **THE COURT:** Okay.

11 Q: Ms. Boynton, could you explain the
12 relationship between the 1988 report and the
13 methodology that the Department follows
14 today?

15 A: So, the 1988 report lays out the methodology
16 for the baseline in an unstabilized inlet
17 zone to be the most landward shoreline in the
18 40-year window.

19 Q: Has this report been formally adopted by the
20 -- by OCRM or what was formerly the South
21 Carolina Coastal Council?

22 A: Obviously, I was not on the Coastal Council
23 in 1988, so I cannot speak to their sort of
24 administrative procedures in terms of if
25 there was a process for that formally. I can



1 say this document is part of the Department's
2 record.

3 Q: And is it part of the file that the
4 Department has that sets forth how to review
5 the jurisdictional lines?

6 A: That's right. It's within the Department's
7 files.

8 **MR. WALKER:** Your Honor, I withdraw the objection
9 with that clarification that it was not
10 approved by the Coastal Council, that it's
11 just part of the Department's records. I
12 think they can get it under some other
13 exceptions, so I'm not going to waste anymore
14 time on it. Thank you, Your Honor.

15 **THE COURT:** Okay. Thank you. It's admitted.

16 **MS. PHELAN:** Thank you, Your Honor.

17 **(Respondent's Exhibit Number 10 was entered into**
18 **evidence.)**

19 Q: I'd like to talk, we've heard a lot about the
20 statute. And if you would, just tell us,
21 again, what the statutory guidance is for
22 establishing a baseline in a unstabilized --
23 and before we get there, that is the type
24 zone that Captain Sam's Slit is?

25 A: That's correct. In an unstabilized inlet



1 erosion zone, the baseline is to be
2 established at the most landward point of
3 erosion at anytime in the past 40 years,
4 unless the best available scientific and
5 historical data on inlets and adjacent
6 beaches indicate that the shoreline is
7 unlikely to return to its former position.

8 Q: And you were in the courtroom yesterday when
9 Mr. Hodge testified that there was a conflict
10 in language between the Statute and the
11 Regulations?

12 A: I was.

13 Q: Could you explain your understanding of the
14 different terms that he is suggesting was in
15 conflict?

16 A: The Statute in 48-39 and the Regulation in R-
17 30, both use the language the most landward
18 point of erosion in the 40-year window
19 relating to the unstabilized inlet erosion
20 zone. As with many things, the Regulation
21 goes on to provide additional clarification
22 and the Regulation in R-30-21 indicates that
23 it's the most landward shoreline in the last
24 40 years. The Department doesn't view that
25 as a conflict, more of a clarification.



1 **MR. WALKER:** Objection. She's basically testifying
2 to the law now. She's stated the conflict,
3 but now she's interpreting the Regulation,
4 and we would ask that that portion be
5 stricken. We understand she can say her
6 understanding is, here's the conflict, which
7 she did. But now she's going in to trying to
8 explain it, and we object to that portion of
9 her testimony.

10 **MS. PHELAN:** The Department has to follow the
11 mandates of the statute and regulations. And
12 so what they understand those to mean and how
13 they interpret them is relevant to what the
14 Department did in setting the lines. So,
15 we're not trying to get into a legal analysis
16 or conclusion. I'm asking how they
17 understand the Statute and Regulation to
18 mandate what they're required to do.

19 **THE COURT:** Okay. I'm overruling the objection.

20 **Q:** Could you please explain what you understand
21 the Statute and Regulation to -- how it
22 guides the Department in how they set the
23 lines?

24 **A:** So, as I said, the Statute and Regulation
25 indicate a landward point of erosion, and



1 they require that we set a baseline. So,
2 we've got a landward point that we need to
3 identify in order to set the line. So, the
4 Regulation indicating that we're looking for
5 the landward shoreline provides some clarity
6 on that methodology.

7 Q: Would it be difficult to set in line on a
8 single point?

9 A: I mean, we all know that points and lines are
10 different things, so I'm not sure that you
11 could set up a line on a single point.

12 **MS. PHELAN:** Could you bring up Regulation 30-21H,
13 please, Crystal?

14 Q: Is this the regulation you were referring to?

15 A: Yes.

16 Q: Okay. Can you point out where the language
17 related to setting the baseline at the most
18 landward shoreline is in the Regulation?

19 A: Can you scroll down just a little bit? In
20 H(2), the last two sentences. However, in
21 Unstabilized Inlet Erosion Zones the baseline
22 is simply the most landward point of the
23 shoreline in the most recent 40 years. This
24 is determined by the Coastal Council staff
25 using representative aerial photography.



1 Q: And so when the Department evaluates the most
2 landward point of erosion and uses the --
3 does it use the most landward shoreline?

4 A: That's correct. The Department uses
5 vegetation lines as the landward position --
6 the landward shoreline of the -- yes.

7 Q: Do they use anything else besides vegetation
8 as an indicator of the most landward point of
9 erosion on a shoreline?

10 A: The Department looks for two features, the
11 first is the line of stable natural
12 vegetation. And then the second is an
13 escarpment line.

14 Q: And what is an escarpment line?

15 A: An escarpment is, sort of, the dramatic
16 change in slopes. So, just sort of -- it's
17 almost like a vertical or a near vertical
18 change in slope on the beach. Sort of a
19 miniature cliff sort of situation.

20 Q: Is the use of the vegetation line or
21 escarpment line also addressed in the 1988
22 report that was written by CSC and
23 recommended to the Coastal Council to use --
24 methodology was recommended to the Coastal
25 Council to use?



1 A: Yes. Vegetation lines were used in the 1988
2 report.

3 Q: How is the data collected for vegetation
4 lines? How do you find the vegetation lines?

5 A: So, vegetation lines are digitized off of
6 aerial photography. They are also, as we saw
7 in the slides, collected with a GPS unit.

8 Q: Can you pull up Joint Exhibit Joint 10,
9 please?

10 **(Joint Exhibit Number 10 was introduced.)**

11 Q: Do you recognize this document?

12 A: I do.

13 Q: What is it, please?

14 A: This is an internal guidance document on the
15 beachfront jurisdictional line review
16 process. It was developed during the 2016-
17 '18 line review. And it documents the
18 process in detail.

19 Q: What type of information does this contain?
20 Just give us a few examples.

21 A: Similar information as we saw with the line
22 reports, but then provides more detail on the
23 actual, sort of, the GIS and field
24 methodologies.

25 Q: And what was the purpose of this document?



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1 A: It was to capture some of the details of the
2 process. Specifically, you know, capturing
3 any -- you know, improvements that we could,
4 you know, make to the review process, and to
5 capture that for future OCRM staff use.

6 **MS. PHELAN:** Respondent would move Joint Exhibit 10
7 into evidence.

8 **MR. WALKER:** No objection.

9 **THE COURT:** It's admitted.

10 **(Joint Exhibit Number 10 was entered into**
11 **evidence.)**

12 Q: When the Department is collecting vegetation
13 line on the ground, what does the Department
14 do?

15 A: We're looking for a continuous line of stable
16 natural vegetation.

17 Q: And what is the basis for this matter?

18 A: The Department uses the definition of active
19 beach, which is in Statute and Regulation.

20 **MS. PHELAN:** Can you pull up 48-39-270, please.
21 It's the South Carolina ...

22 Q: Is this the statutory provision you were
23 referring to?

24 A: That's correct. Here (13) active beach is
25 that area seaward of the escarpment or the



1 first line of stable natural vegetation,
2 whichever occurs first, measured from the
3 ocean.

4 **MS. PHELAN:** Would you pull up Respondent's Exhibit
5 13, please?

6 **(Respondent's Exhibit Number 13 was introduced.)**

7 Q: Do you recognize this?

8 A: I do.

9 Q: And could you tell us what it is?

10 A: This is a photograph taken at Captain Sam's.
11 And this is just to give sort of a visual
12 overview of the active beach definition. So,
13 we have to the left the ocean obviously. And
14 then we move into the active beach area where
15 we're going to see erosive forces like
16 onshore waves and currents, tides, things
17 that would prevent that line of stable
18 natural vegetation from forming any further
19 seaward.

20 Q: Did you create this document to help explain
21 your testimony?

22 A: That's correct.

23 Q: What does a stable vegetation line indicate?

24 A: Well, a stable line of natural vegetation
25 indicates that that area is not being



1 inundated by high water such that the
2 vegetation can become established.

3 **MR. WALKER:** Your Honor, they've continued to put
4 this exhibit on the screen. It's not in
5 evidence. We have no problem with a portion
6 of it that has the definition or the picture.
7 We object to the commentary below in the
8 bubble that says, Active Beach, Erosive
9 forces: Tides, Currents, Waves. We've
10 already heard that on a normal day Captain
11 Sam's, the tide, currents, and waves are not
12 erosive, they're accretion. So, we object to
13 this exhibit into evidence for the continued
14 presentation of it, even though it's not been
15 admitted into evidence, because the editorial
16 comment, which is wrong.

17 **MS. PHELAN:** I didn't intend to move it into
18 evidence. We can take it off the screen. It
19 was just to help her explain.

20 Q: And could you remind us how the setback line
21 was set again?

22 A: The setback line is established distance
23 landward from the baseline, that's 40 times
24 the average annual erosion rate or no less
25 than 20 feet.



1 Q: Was the minimum distance of the 20 feet from
2 the baseline used for Captain Sam's Spit?

3 A: It was.

4 Q: And has this been challenged in this case?

5 A: It has not.

6 Q: So, let's move on. Let's put up Respondent's
7 Exhibit 18, please. Can you tell us what
8 this is?

9 **(Respondent's Exhibit Number 18 was referenced.)**

10 A: This is a map that I put together. We'll
11 start with the base map. That base map is a
12 drone imagery that was collected earlier this
13 year. And I've overlaid that with vegetation
14 lines from a variety of years. And those
15 different years are indicated by the legend
16 in the lower right-hand corner and by the
17 color on the legend.

18 Q: Okay. And in the review process for the
19 vegetation lines, would you be doing
20 something along the same lines when you're
21 trying to determine which vegetation line is
22 the most landward point of erosion?

23 A: That's correct. We'd be looking at the
24 vegetation lines within that 40-year window
25 to identify which one is most landward.



1 Q: Can you point out to The Court on this figure
2 which lines that you considered to be most
3 landward?

4 A: Starting from ----

5 **MR. WALKER:** Your Honor, before she begins to
6 testify to this exhibit. We need to know if
7 she's offering it into evidence, because
8 she's testifying to it. And at this point we
9 don't have a sufficient foundation, other
10 than she created it. There is no information
11 as to who digitized the lines over all these
12 years. As to the accuracy of whether they
13 depicted correctly the vegetation lines, many
14 of them preceded her and some were just in
15 inventory of veg lines at OCRM. We would
16 object for that reason, that there's not a
17 sufficient foundation to show that the
18 location of all those veg lines is accurate.
19 We're not challenging the relative accuracy
20 of the drone photo, we worked that out. It's
21 the lines that they're superimposing as
22 though they represent the true vegetation
23 lines years before. You don't have that
24 witness who digitized it to say what that
25 witness did and why it's accurate.



1 **MS. PHELAN:** May I?

2 **THE COURT:** Yes.

3 Q: So, can we talk a little bit about the lines
4 that were digitized. First, who digitized
5 these lines?

6 A: So, we've got a number of lines here. If you
7 would like, we can go through them
8 individually.

9 Q: Okay. Let's just talk about the -- that's
10 fine. Let's go through them individually.
11 However, you want to explain it.

12 A: Sure. So, I'm going to start with the lines
13 that Ms. Phelan asked me about previously. I
14 believe she asked me about the most landward
15 vegetation lines. So, on this image the most
16 landward lines that we can see here are the
17 yellow lines. And we're going to start at
18 the far upper right and we're going to head
19 from north to south. The yellow and the
20 orange lines there you can see are just right
21 about on top of each other. So, the yellow
22 line would be the most the landward. And
23 then as we move south, you can see along a
24 section where the orange line is further
25 landward. And then as we continue south, the



1 yellow line becomes landward again. Then we
2 hop over to that dark green line towards the
3 very end, and then end back on the yellow
4 line. I described it in that way because
5 that is a similar method that we would have
6 used where we had the lines and indicated
7 which one was more landward as we moved along
8 a beach. The yellow line, which is the 1988
9 line was part of the Department's inventory.
10 The Department has an inventory of historic
11 shorelines that have been digitized by
12 Department staff over the years. And the
13 yellow line was part of that. During the
14 remand, Mr. Slagel and myself and the line
15 review team reviewed that line on the
16 original imagery, made some modifications
17 using the modern technology and software that
18 we have now to produce this line that we have
19 here. The orange line represents the 1982
20 line. That line was digitized by Mr. Slagel,
21 reviewed by myself on a 1982 ariel image,
22 which has been produced. Moving seaward, we
23 have a '93 and a '98 vegetation line shown
24 there in light and dark green. Those were
25 part of the OCRM inventory that I addressed



1 earlier. And those lines have been overlaid
2 on there source imagery and found by the
3 Department to be reasonably accurate. That
4 information has also been produced. For 2006
5 and -- the 2006, the 2011, and the 2015 data
6 were also overlaid on their source imagery.
7 The 2006 and '11 lines were digitized prior
8 to my coming to OCRM and were, again, part of
9 that inventory, and have been overlaid on
10 their source images and found to be
11 reasonable. The 2015 shoreline was digitized
12 by an OCRM staff member during my time here
13 at OCRM. Again, that has also been overlaid
14 on its source image. The 2016 and 2019 lines
15 were collected with our Trimble GeoXT units,
16 which the data was then post-processed. And
17 we have a high level confidence in it's
18 positional accuracy.

19 Q: Can you explain a little bit more? When you
20 were saying that these lines are overlaid on
21 the source imaging, what that means.

22 A: In the GIS platform that we use, you can
23 bring in a base image. So, in this example
24 we've brought in the drone 2021 image. And
25 you can overlay various other data sets on



1 it. You can overlay other images or you can
2 overlay the vector data sets that I spoke
3 about earlier, in this case we're talking
4 about lines that are overlaid. So, the
5 vegetation line would be overlaid onto the
6 source image.

7 Q: And all of these lines are part of the OCRM
8 imagery inventory?

9 A: That's correct.

10 **MS. PHELAN:** Your Honor, Respondent moves Exhibit
11 18 into evidence.

12 **MR. WALKER:** Based on what the witness said, we
13 have no objection. She laid a foundation.

14 **THE COURT:** It's entered.

15 **MS. PHELAN:** Thank you, Your Honor.

16 **COURT REPORTER:** Court reporter clarification.

17 What exhibit did you say that was?

18 **MS. PHELAN:** It's Respondent's Exhibit 18.

19 **COURT REPORTER:** Thank you.

20 **(Respondent's Exhibit Number 18 was entered into**
21 **evidence.)**

22 Q: So, if you would, please, tell me again,
23 which lines did you identify as most
24 landward?

25 A: There's a combination of the yellow 1988



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1 shoreline and the orange 1982 shoreline.

2 Q: And when you're getting ready to present
3 lines to the Review Panel, could you help us
4 understand how you do that?

5 A: Conceptually it's similar to what I'm sharing
6 with you today. We would not do it with a
7 PDF, because a PDF is a static image. So, I
8 would pull these into the GIS software
9 platform. We have a projector in one of
10 conference rooms, so we can project from the
11 computer. And then the team can see the
12 lines and how they overlay with the -- or we
13 can develop -- look at the lines to determine
14 which ones would be the most landward for
15 developing the proposed baselines.

16 Q: And we haven't talked much about the Review
17 Committee, the Jurisdictional Line Review
18 Committee. Could you just tell us who that's
19 composed of and what's the purpose of that?

20 A: The Review Committee -- or the Review Panel,
21 we call it a couple of different things, but
22 the internal Review Panel was comprised of
23 OCRM staff and managers with a variety of
24 backgrounds.

25 Q: What kind of backgrounds? Could you give us



1 an example?

2 A: The Panel members hold degrees in geology,
3 marine sciences, ocean sciences, biology,
4 environmental science.

5 Q: Are there anyone that are master naturalist
6 on the Panel?

7 A: I believe one of the panelist is a master
8 naturalist. I'm not certain if he was
9 completing that during the Panel. He has ---

10 Q: Fair enough.

11 A: He is a master nationalist today.

12 Q: And do we have a member that has a degree in
13 forest resource management as well?

14 A: Yes, that's correct.

15 Q: So, after the Panel reviewed the data that
16 you portrayed, which would portray something
17 like this, if I understand your testimony
18 correctly, what happened then?

19 A: Once we identified the most landward
20 shorelines, then I would perform the GIS
21 processing necessary to create the proposed
22 baseline.

23 Q: Let's talk a little bit about KDP's argument
24 that the baseline should be put in a
25 different position given the accretion that's



1 occurring, the long-term accretion that's
2 occurring on the ocean side. Does the
3 statute give any guidance as to whether OCRM
4 should place a baseline in a different
5 location if the unstabilized inlet zone is
6 accretional?

7 A: Can you ask that one more time?

8 Q: Sure. Does the statute in Section 48-39-280,
9 give any guidance as to whether OCRM should
10 place the baseline in a different location --
11 -

12 **MR. WALKER:** Objection.

13 Q: --- if the unstabilized inlet zone is
14 accretional?

15 **MR. WALKER:** Objection. She's asking the witness
16 to interpret the statute. She's asking the
17 witness to render an opinion of law.

18 **MS. PHELAN:** Again, I'm asking -- I'm trying to
19 ask the Department how they interpret what
20 the statute says so that they know what
21 procedure that they're following, so as to
22 flush out what procedure or how they take
23 into consideration accretion. The Agency's
24 responsibility is to follow the statutes and
25 regulations, so I'm asking her how they



1 follow it.

2 **THE COURT:** Okay. If you'll just restate your
3 question to ask her that, how -- not for her
4 to interpret the statute.

5 Q: Given KDP's argument, that the baseline
6 should be put in a different way because the
7 ocean side is accreted, how would the
8 Department interpret that consideration in
9 placing the baseline?

10 A: I think I'll say that there is no specific
11 language in the statute referencing accretion
12 and the effect of accretion on the location
13 of the baseline.

14 Q: Are there other areas of the beach that are
15 in an unstabilized inlet zone which have
16 long-term accretion rates?

17 A: There are.

18 Q: Did you look at shoreline change in assessing
19 lines at Captain Sam's Spit?

20 A: We did.

21 Q: Okay. And what was the purpose of that?

22 A: We looked at shoreline change as part of the
23 statutory requirement in setting the setback
24 line.

25 Q: Did you consider what was going on with the



1 narrow section of the spit?

2 A: We looked at shoreline change on the ocean
3 side associated with the setback line, and we
4 also performed similar shoreline change
5 analysis on the neck area where those
6 critical areas are coming together.

7 Q: What was the purpose of doing a shoreline
8 change -- looking at shoreline change on the
9 ocean side, looking at shoreline change on
10 the river side?

11 A: We were looking at the section of statute
12 where it talks about unlikely to return,
13 whether the former -- the position of the
14 shoreline is unlikely to return to its former
15 position. And we were also looking at
16 overall inward stability in the area.

17 **MS. PHELAN:** Could you put up Respondent's Exhibit
18 33, please?

19 **(Respondent's Exhibit Number 33 was introduced.)**

20 Q: Could you tell us -- do you recognize this
21 figure?

22 A: I do.

23 Q: Can you tell us what it is, please?

24 A: These were -- so, we talked about the AMBUR
25 analysis earlier, just briefly. And we



1 looked at transects. And we know that the
2 output from that tool provides a shoreline
3 change rate for each of the transects. So,
4 we're looking at the output from an ocean
5 side shoreline change analysis that was
6 performed by the Department, not just here at
7 Captain Sam's or at Kiawah, but for the
8 entire state.

9 Q: So the transects are the lines --

10 **MR. WALKER:** Again, I apologize for interrupting.
11 There have been a number of shoreline change
12 rate analyses. There's some suggestion here
13 that this was done before the lines were set.
14 Can we get some clarification from the
15 witness as to when this was done, so that we
16 can put it in the frame of the sequence of
17 events, please?

18 **THE COURT:** Certainly.

19 **MR. WALKER:** Because they ran most of the
20 transects on the river side, we understand,
21 well after the baseline and setback line were
22 set.

23 A: Yes, I can give some time line on this. This
24 analysis here was completed prior to the
25 proposed baseline and setback line being



1 released.

2 Q: Okay. So, the transects that you're
3 referring to are the green lines and the
4 orange lines and the red lines that run
5 relatively perpendicular to the ocean?

6 A: That's correct.

7 Q: Okay. And then the numbers written on each
8 transect, what are those?

9 A: Those are the shoreline rates that we talked
10 about.

11 Q: And what is a shoreline rate?

12 A: That's the feet per year of change that we're
13 seeing. If the number is positive, then that
14 is considered an accretion rate. If the
15 number is negative, that's considered an
16 erosion rate.

17 Q: Okay. And what, if anything, did you learn
18 from these shoreline rates?

19 A: So, we were looking at the rates -- I mean,
20 the rates speak for themselves really. You
21 can see if we start at 2625, that's the
22 demarcation of the standard zone to those
23 unstabilized inlet erosion zones. We can see
24 that the rate there in these calculations is
25 between, you know, a half a foot and a foot.



1 And then, as we move down towards the neck,
2 we can see that the rate in the neck area is
3 in the, you know, two and half to four and a
4 half foot range. And then as we down the
5 spit further, we can see that those values
6 increase in the five to seven foot range.

7 Q: Thank you. And I think you mentioned you
8 also did a shoreline change analysis -- yes,
9 a shoreline change analysis on the river
10 side?

11 A: That's correct.

12 Q: Why did you look at the shoreline change on
13 the river side?

14 A: We were looking at the stability of the inlet
15 and of the area and whether or not it was
16 unlikely to return to its former position.

17 **MS. PHELAN:** Did I move Respondent's Exhibit 33
18 into evidence?

19 **COURT REPORTER:** (Shakes head negatively).

20 **MS. PHELAN:** Respondent would like to move
21 Respondent's Exhibit 33 into evidence.

22 **MR. WALKER:** Based on the testimony, no objection,
23 Your Honor.

24 **THE COURT:** Thank you. It's admitted.

25 **(Respondent's Exhibit Number 33 was entered into**



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1 **evidence.)**

2 **MS. PHELAN:** Would you please pull up Respondent's
3 Exhibit 42, please?

4 **(Respondent's Exhibit Number 42 was introduced.)**

5 Q: Can you please identify Respondent's Exhibit
6 42 -- what's been marked as Respondent's
7 Exhibit 42 for us?

8 A: This is -- again, we've got the drones
9 basemaps. So, that's the 2021 imagery that
10 we're looking at there. And, again, we're
11 seeing the similar transects that you saw on
12 the ocean side. Now, we're seeing them on
13 the river side.

14 Q: Okay. And what rate was determined to be --

15 **MR. WALKER:** Your Honor, may we have the
16 foundation as to when this was done, please?

17 **MS. PHELAN:** I thought -- I'm sorry.

18 Q: When was this ...

19 A: Sure. So, we actually did two analyses on
20 the river side. You can see this one says,
21 OCRM Escarpment Data. And if it would
22 possible to pull the other one up. I don't
23 know if it would be possible for us to see
24 the other transect analysis that we did on
25 the river side.



1 **MS. PHELAN:** Would you please pull up 41 -- Could
2 you pull up Respondent's Exhibit 40, please?

3 **(Respondent's Exhibit Number 40 was introduced.)**

4 **MR. WALKER:** Your Honor, while she's retrieving
5 that one, the witness said they only
6 considered the transects for purposes of
7 setting the setback line on the oceanfront.
8 And now we're getting a bunch of transects
9 that -- I don't know when they were done.
10 We'll find out. But supposedly they relate
11 to whether or not the shoreline will or will
12 not return to its former position. And we
13 would renew our objection. I understand Your
14 Honor's ruling. I just don't want to waive
15 my objection on that.

16 **THE COURT:** Okay. Your objection is noted.

17 **MS. PHELAN:** So, Crystal, if we can just leave it
18 here. But just, as I need, sort of flip back
19 and forth between those two. Do you have the
20 other one pulled up still? Perfect. Thank
21 you.

22 **Q:** So, this right here you'll see it's the same
23 basemap. We're looking at the 2021 imagery
24 here. And you can see that this says Byrnes
25 CCL data. So, we received some critical area



1 lines from Mr. Byrnes, who testified earlier
2 this week, on the river side. And so we use
3 that data to do this shoreline change
4 analysis. And we wanted to compare that to
5 data that we collected ourselves, so we look
6 at this data here from Mr. Byrnes. And we
7 can see the years that were involved here at
8 the bottom.

9 **MR. WALKER:** Objection, Your Honor. She still has
10 not identified when these change analyses
11 were done on the river side. We acknowledge
12 the admission of the earlier one, because it
13 was done before the determination of the
14 baseline. And here, I think this was
15 something that was manufactured for trial and
16 wasn't considered by them before they made
17 the determination. If it was not something
18 that they took into account, it would not
19 admissible for that additional reason. So,
20 we'd ask that their foundation be laid for
21 both of them, please?

22 **Q:** Exhibit 40, could you tell us when this
23 analysis was done?

24 **A:** So, the shoreline change analysis on the
25 river side was done after the proposed lines



1 were sent in the fall of 2017. We, obviously
2 with the Petitioner, are still in the process
3 of determining where the baseline and setback
4 line will ultimately be. We received this
5 data from the Petitioner as part of the
6 review of the baseline, in terms of whether
7 or not it's properly set at the most landward
8 point of erosion, as to whether or not it
9 would be unlikely to return. I understand
10 that the Petitioner has waived the unlikely
11 to return. But previously that was not
12 waived and the Department was responding to
13 that assertion, which is why these analyses
14 were performed using the data that was
15 submitted by the Petitioner. I cannot recall
16 exactly when we received this data from Mr.
17 Burns. It was obviously after 2017. So, I
18 want to say it was some time in 2020 or 2021.
19 And then the Department subsequently did its
20 own data collection and analysis to confirm
21 that it was similar to the data that had been
22 submitted.

23 **MR. WALKER:** We'd renew the objection that this
24 was not considered at anytime for the
25 Department issued its baseline, its



1 preliminary line, nor before it did its
2 decision on remand. And this is a lot of
3 backfill going on to try to justify what was
4 done, bringing up this issue of whether or
5 not the shoreline's to return or not return
6 to its former position. We'd renew that
7 objection and we'd renew it also on the
8 grounds that it was never considered by the
9 Department. This is just something that
10 they've created for trial to suggest that
11 they considered it. It wasn't -- nor is it
12 relevant to the most landward point of
13 erosion.

14 **THE COURT:** Ms. Phelan.

15 **MS. PHELAN:** Your Honor, it's -- I'm trying to
16 think of the chronology, but it's been a
17 moving target as to what they're arguing.
18 They started saying that the most landward
19 point was the mean sea level. We then
20 thought that they were doing mean high water,
21 that's where they were saying it, so we
22 assessed that. We had, you know, testimony
23 that didn't support that they converted it to
24 a tidal datum, and so then we changed to, you
25 know, a post Matthew Hurricane that became a



1 post-Irma -- I mean the tropical storm Irma
2 line. And so the Department, as we've gotten
3 information in, has tried their best to keep
4 assessing to see if they're presenting valid
5 information so that they can determine if the
6 baseline is properly placed. And to claim
7 that they can bring new defenses in or new
8 claims of accretion and so now we don't have
9 a most landward point of erosion when we have
10 shorelines that are further back, and drop
11 the unlikely to return two days before trial,
12 the Department has been continually
13 reevaluation these lines all the way through.
14 And it's been a moving target. So to say
15 that, you know, they didn't do it during the
16 remand, it's because those arguments weren't,
17 you know, before us during the remand, I
18 don't think. We were told that it was
19 accretional, but we didn't get this argument
20 that it didn't have anything to do with
21 unlikely to return until very recently.

22 **THE COURT:** Okay. Mr. Walker.

23 **MR. WALKER:** The question is, the Department's
24 locating the line. The Department has said
25 it's the most landward point of erosion. We



1 say it's the most landward point of erosion.
2 Where that is, that has been the football
3 contest, that's the football contest today.
4 But this isn't a football contest. This is
5 the back of the island -- excuse me, the
6 river which has nothing to do with the most
7 landward point of erosion. And so they are
8 bringing this up even though it doesn't have
9 anything to do with the most landward point
10 of erosion, saying that they're responding to
11 our position on the landward point of
12 erosion. It has nothing to do with our
13 position on the most landward point of
14 erosion.

15 **THE COURT:** I agree.

16 **MR. WALKER:** Thank you, Your Honor.

17 **MS. PHELAN:** Your Honor, to say that they can't do
18 an analysis on what the Defense is being
19 presented would handcuffed the Department
20 from being able to defend this case. But --
21 and also there's a statute for the
22 Administrative Law Court procedures that say
23 -- that recognize that the Agency's special
24 knowledge and technical competency can help
25 The Court interpret the evidence. And that's



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1 what we're trying to do.

2 **MR. COURT:** But the Petitioner didn't present any
3 evidence that dealt with any erosion or
4 accretion on the river side.

5 **MS. PHELAN:** Yes, Your Honor. But accretion
6 suggests that it's building out and it's
7 getting bigger. And without looking at the
8 erosion on the river side, we can't --
9 there's no way to put that into any kind of
10 context for Coastal Management -- to
11 implement Coastal Management on the coast
12 line. That -- the erosion is one of many
13 factors that have to be considered under
14 inlet stability in the inlet migration
15 provisions of the chapter.

16 **THE COURT:** But is that something that the
17 Department considered when it established the
18 lines in 2017?

19 **MS. PHELAN:** In 2017 they looked mostly at these
20 lines -- at what lines are the most landward
21 point of erosion and they propose those to
22 public, right? But this case was remanded
23 back to the Department.

24 **THE COURT:** Right.

25 **MS. PHELAN:** And when it was remanded back to the



1 Department and it was challenged that the
2 location should be in another location,
3 that's when the Department started digging
4 down deeper to try to figure out, is there a
5 justification under the statutory language to
6 put it in a different location.

7 **THE COURT:** And you didn't change your position on
8 that.

9 **MS. PHELAN:** I'm sorry?

10 **THE COURT:** I said, you did not change your
11 position on the lines should not be adjusted;
12 is that correct?

13 **MS. PHELAN:** No, Your Honor. After evaluating the
14 different factors, the Department does not
15 think that the line should be different than
16 the -- based on the 1988, 1998 vegetation
17 lines.

18 **THE COURT:** And that was based on your analysis
19 from the ocean side, not from the river side.

20 **MS. PHELAN:** Not during the remand, Your Honor.
21 We considered during the remand that the
22 inlets stability and the -- the inlet
23 stability and the historical migration.

24 **THE COURT:** I'm not admitting it.

25 **MS. PHELAN:** Can I have a minute, please?



1 **THE COURT:** I'm not going to admit it.

2 **MS. PHELAN:** You're what?

3 **THE COURT:** I'm not going to admit this exhibit.

4 **MS. PHELAN:** Okay. Thank you, Your Honor.

5 Q: During the remand process, Ms. Boynton, could
6 you tell us what, if anything, the Department
7 considered to determine if the shoreline was
8 unlikely to return to its former position?

9 A: So, I'd like to state first that, during the
10 general line review, the initial line review,
11 the Department always takes the full language
12 of that statute under consideration. And the
13 statute asks the Department to look whether
14 it's unlikely to return. Not whether it's
15 likely or imminent, but just whether it's
16 unlikely to return. The Department always
17 broadly reviews that language. And the
18 internal Review Panel's knowledge of the
19 beaches and the history of that area gives
20 them a good idea as to whether there are
21 factors that might cause it to be unlikely to
22 return. And we did not find anything that
23 would indicate that it was unlikely to return
24 in this area. Under remand as Ms. Phelan
25 said -- so we did -- I think it's fair to say



1 that we did review that portion of the
2 statute in that the general -- we reviewed
3 that portion of the statute, generally during
4 the original setting of the lines. Then,
5 under the remand, the Department, as Ms.
6 Phelan said, dug deeper into the unlikely to
7 return and looking at inward stability, inlet
8 migration. We reviewed historic images. We
9 looked at the inlet relocation. We looked at
10 shorelines.

11 Q: And I'm sorry, I ---

12 A: I think those were the primary items that we
13 reviewed. There may have been additional
14 data.

15 Q: I apologize. Mr. Walker asked me to get the
16 exhibit down and I got a little distracted.
17 What did you say you reviewed?

18 A: We reviewed historical images. We reviewed
19 the inlet relocation. We reviewed the
20 position of shorelines.

21 Q: Tell me about your review of historical
22 images?

23 A: During the remand, we looked at time lapse
24 that looked at the change at the Spit over
25 time, so a series of images that we reviewed.



1 We also reviewed the 1988 historical imagery.
2 We also reviewed -- I think those are the
3 primary historic images that we reviewed.
4 I'm trying to remember if there were others
5 that -- there may have been a few others.
6 I'm trying to remember all the dates.

7 Q: And tell me about your review of the position
8 of the shorelines.

9 A: We reviewed the position of our -- all the
10 shorelines really in our inventory that are
11 wet/dry shorelines. That's what we reviewed.

12 **MS. PHELAN:** Your Honor, can I take a quick break,
13 please?

14 **THE COURT:** Sure. We'll take 10 minutes.

15 **(Off the record from 12:03 p.m. until 12:14 p.m.)**

16 **THE COURT:** We're back on the record.

17 Q: Ms. Boynton, did you look at the dunes on the
18 ocean side of Captain Sam's Spit?

19 A: Could you be more specific? Like are you
20 talking about a specific time frame or are
21 you ...

22 Q: Did you consider, when placing the baseline
23 and the setback line, the dunes -- the dune
24 area on the beachfront?

25 A: Well, Captain Sam's is an unstabilized inlet



1 erosion zone, so we're looking for that
2 landward shoreline as opposed to a standard
3 zone where we'd be looking for the primary
4 oceanfront sand dune.

5 Q: And during the remand, did you go through
6 aerial imagery to evaluate the condition of
7 the beaches at Captain Sam's?

8 A: I think I indicated earlier that we reviewed
9 some historical aerial imagery, including the
10 '88 and Google Timelapse, which included a
11 number of different dates associated with
12 that.

13 Q: And when you use the Google Timelapse, did
14 you evaluate up to the current position of
15 the shoreline?

16 A: I'd have to look at the exhibit to see the
17 exact date, but I think it goes up to the
18 modern time frame.

19 Q: Are you referring to the time lapse exhibit?

20 A: That's right.

21 Q: And did you do that during the remand?

22 A: That's correct.

23 **MS. PHELAN:** Could you pull up Exhibit 46. If
24 you'd give me a minute, Your Honor. Exhibit
25 46. Let's go to Exhibit 47 first.



1 **(Respondent's Exhibit Number 47 was introduced.)**

2 Q: Do you recognize this document?

3 A: I do.

4 Q: Can you tell us what this document is?

5 A: This document is a time lapse between older
6 historic imagery and more modern imagery.

7 Q: And did you create this exhibit?

8 A: I did.

9 Q: And why did you create this exhibit?

10 A: To look at what was going on at Captain Sam's
11 over time in terms of whether or not the
12 shoreline would be unlikely to return or --
13 and to look at inlet stability and migration.

14 Q: Is this what you did during the remand by
15 bringing up the Google Timelapse and looking
16 at the different changes over time?

17 A: It's very similar in concept.

18 Q: Can you just walk us through this exhibit
19 then, please? Let's -- I'm sorry. Let's
20 start, can you tell us what the aerial
21 photography is that this is based on?

22 A: Sure. This is based on National Park Service
23 imagery that's hosted by the U.S. Geologic
24 Survey. This is an aerial image from 1982.

25 Q: All right. And what did you observe from



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1 this image?

2 A: Well, on the ocean side --

3 **THE WITNESS:** And, Crystal, can you zoom in on
4 that a little?

5 **MR. WALKER:** Sallie, if you don't mind, can we
6 have the context, the foundation as to when
7 she obtained this in relation to the review,
8 the remand, and after remand?

9 Q: When did you obtain this figure?

10 A: I honestly don't remember the exact date when
11 we obtained this figure. This figure was
12 added to the inventory by Mr. Slagel, who
13 uncovered it from the National Park Service.

14 Q: And when you did your review pulling up
15 historical imagery in Google Earth, did you
16 review the historical photos of what the
17 shore looked like?

18 A: That's correct. In the Google Timelapse.

19 Q: Is this an aerial that demonstrates the
20 conditions that you observed when you looked
21 through the historical figures and Google
22 time -- Google Earth time?

23 A: The Google Timelapse, it covers, as I recall,
24 the early '80s to the more modern day
25 shorelines -- or more modern day images.



1 Q: And why did you choose to use an '82 image
2 from the USGS rather than the Google images
3 that you observed back in the remand ...

4 A: A couple of reasons. This image we were able
5 to bring into the GIS platform, and the
6 resolution on this image is quite good.

7 **THE COURT:** I don't know that you've addressed Mr.
8 Walker's objection.

9 **MR. WALKER:** The objection would be that she did
10 testify to doing the Google Timelapse. This
11 is not the Google Timelapse. It still hasn't
12 been shown, and I don't think it will shown,
13 that this was anything they considered on the
14 remand, and so this is something quite
15 different from what they considered on the
16 remand. She was very specific. They did
17 consider aerials, historic aerials, but they
18 didn't have it at the time. So we would
19 object to using this to suggest they
20 considered it on remand for inlet relocation
21 -- whether, excuse me, the shoreline would or
22 would not return to its former position, and
23 renew our objection that it's not relevant at
24 this point. But our objection on this
25 particular exhibit is primarily that they



1 just didn't consider it. This came in in
2 2020. It was not shown in the shoreline
3 review reports. If we look at it, they've
4 never considered it for their jurisdictional
5 line determination.

6 **THE COURT:** Okay. But we've got here is -- Mr.
7 Walker, is a de novo hearing, and I can
8 consider evidence considered by them as well
9 as they may present new evidence at this
10 point. You may proceed.

11 **MS. PHELAN:** I may proceed?

12 Q: Did you want to say something?

13 A: No.

14 Q: All right. Go ahead and explain ...

15 **THE WITNESS:** Crystal, could you zoom in a little
16 bit on this? And then could you slide it
17 over, and then back up? Sorry. Down a
18 little bit and over a little bit, and then we
19 will be there. Thank you. Other direction.
20 Yep, keep going. There you go. Perfect.
21 Thank you.

22 A: So we were looking at -- in review of this,
23 we were looking at the ocean side. And I'm
24 going to use some of these cool little tools
25 here. So the first thing that we noticed was



1 this very clear line, this very clear line of
2 stable natural vegetation. It appears that
3 there may be some evidence of escarpment
4 there. So -- I'll get used to this. We're
5 talking about right here. And I'll clear
6 that so you can see that again. Can you
7 change the thickness of this line? I Don't
8 know how to do that. So that clear line that
9 indicates right here, that's the first thing
10 that we noticed, because we're looking for
11 that active beach area, so that's the
12 escarpment or the first line of stable
13 natural vegetation. It's very clear on this
14 image as you move from the ocean towards the
15 land, that that line is very distinct and
16 easy to see on this image. And then the
17 other side on the river side, we were looking
18 for, again, that -- we were seeing that
19 escarpment line here, which is -- whoops,
20 I've selected the wrong tool. Sorry. We see
21 this escarpment line here, which follows
22 along here. So we were really looking at,
23 you know, what's going on with this
24 escarpment line, this line of stable natural
25 vegetation, and then what's happening here in



1 this beach dune system area.

2 Q: Okay. And during the remand, were you trying
3 to -- did you make any assessment or try to
4 determine whether the inlet was actually
5 migrating or accreting?

6 A: We looked at the inlet migration, we looked
7 at the inlet relocation projects, which are
8 essentially sort of moving the inlet back
9 north, as was described earlier this week.
10 And we also looked to see if -- you know, the
11 inlet is currently in one location, but, you
12 know, this whole area kind of goes through
13 these periodic cycles. So the inlet has been
14 -- over time has been in a number of
15 different locations. So when you're really
16 looking at, you know, the stability and the
17 migration, you have to be taking it really as
18 a whole. So we wanted to see what was
19 happening with this area over time to see if
20 it was remaining stable or if it was moving
21 around.

22 Q: Go ahead and continue on the second page of
23 this, please.

24 **THE WITNESS:** I think you'll have to zoom back
25 out, Crystal. So, if you can just scroll



1 down just a little.

2 A: So, in this image here, what you can see is,
3 I've got two images overlaid. So I think I
4 mentioned earlier, in ArcGIS platform, you
5 can add multiple different data sets on top
6 of one another. Now, you can do that with an
7 image and lines, but you can also have two
8 images on top of one another to see kind of
9 change, what's happening. So what we've got
10 here is the 1982 that we just saw
11 superimposed on a more modern shoreline from
12 2019 and I'm going to draw some lines on here
13 so that you can see, to draw your attention
14 to it. So out here, we have ---

15 **MR. WALKER:** Objection, Your Honor.

16 **THE COURT:** Yes.

17 **MR. WALKER:** We don't have the foundation that the
18 two thousand -- excuse me, the 1982
19 photograph was sufficiently accurate to do
20 measurements. We don't have any proof as to
21 what the nadir is, whether it bore any --
22 whether it's been orthorectified, all the
23 things that would be required in order to
24 make an accurate. It's the same thing as the
25 2019 that she overlaid, we don't have the



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1 foundation on that. If the two are going to
2 be overlaid, in order to say that something's
3 happening, there would need to be a
4 sufficient basis, foundation for the accuracy
5 of both images, and that has not been done.
6 I don't question that it's an accurate
7 photograph. I don't question that she is
8 able to overlay them. But to the extent that
9 she's suggesting it's accurate, then we need
10 to get into the fundamental accuracy of the
11 two aerials. As we heard from Mr. Tolleson
12 yesterday, it may be a great picture, but if
13 the nadir is not correct and it's oblique,
14 then you can't really take measurements or
15 use one over the other and say, this is
16 exactly the way it changed.

17 **MS. PHELAN:** Can I ---

18 **THE COURT:** Yeah.

19 Q: Did you put this exhibit together to
20 illustrate -- to help illustrate what the
21 Department considered about the changes that
22 were occurring at Captain Sam's Spit?

23 A: Yes.

24 Q: And these figures were put together to help
25 you show what you visually observed when you



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1 pulled up historic images and the viewing of
2 the time lapse or the changes that were
3 happening with migration and stability?

4 A: We were looking to see what visual changes we
5 could see on these images.

6 **MS. PHELAN:** Your Honor, what I would do is ask
7 that she be allowed to use them for
8 illustrative purposes and I will not ---

9 **MR. WALKER:** We're fine with that, Your Honor. We
10 just don't -- I'm sorry for interrupting, but
11 we agree that for illustrative purposes, it's
12 fine. It's just that there can't be
13 measurements with precision based on it. So
14 we're okay with that.

15 **THE COURT:** Thank you.

16 Q: And just before we go on, the 1982 image, you
17 had testified that Mr. Slagel has information
18 about?

19 A: That's correct.

20 Q: And what about the 2019 image?

21 A: The 2019 image was obtained -- it's an NAIP
22 image, National Agricultural Imagery Program.
23 This is a federal program operated by the
24 USDA, the Department of Agriculture. They've
25 been operating this program for a long time.



1 I know that they've been collecting data on a
2 regular basis since the '90s. And in South
3 Carolina, at least as far as I'm aware, we
4 get this imagery approximately every two to
5 three years. This is considered -- well, as
6 I said, it's a standard federal product
7 that's released. We have high confidence in
8 its accuracy and positional -- well, its
9 positional accuracy and we obtain this
10 directly from the USDA.

11 Q: So you obtained it directly from a federal
12 agency, it's a federal record?

13 A: That's right.

14 Q: Okay. Go ahead and continue with your
15 testimony.

16 A: I'm going to just clear this and we'll start
17 afresh here. So what we're seeing here is
18 the 1982 image overlaid onto the 2019 image.
19 And the -- what I want to draw your attention
20 to here is this line here. This is the river
21 side escarpment in '82. And then let's
22 compare that to the river side escarpment in
23 2019 ---

24 **MR. WALKER:** Objection to the use of the word
25 escarpment. There is no ability to see the



1 escarpment she describes. There's no problem
2 with saying it's the river side, but she says
3 river side escarpment. It's the river
4 shoreline.

5 **THE WITNESS:** I could say the edge of the dune
6 system.

7 **MR. WALKER:** That's fair.

8 **MS. PHELAN:** Your Honor, he's basically
9 testifying.

10 **Q:** I mean, can you tell us why you call that an
11 escarpment?

12 **MS. PHELAN:** With your permission, Your Honor.

13 **THE COURT:** Yes.

14 **A:** So we have firsthand knowledge that there is
15 an escarpment on the river side at Captain
16 Sam's. We know it's there today and we have
17 -- I should say I have firsthand knowledge
18 that it's there in 2021. I have firsthand
19 knowledge that it was there in 2016. And
20 it's my understanding that that escarpment on
21 the river side has been in place for some
22 time. I was obviously not at Captain Sam's
23 in 1982, but the feature that I see there on
24 the screen is similar to the feature that I
25 see in the modern image, leading me to



1 believe, based on my image interpretation
2 skills, that it is similar in nature in terms
3 of it being an escarpment. It is certainly
4 the edge of a dune field.

5 **MS. PHELAN:** Can she continue with her
6 explanation, Your Honor?

7 **THE COURT:** She can continue and she can call it
8 escarpment.

9 **MS. PHELAN:** Thank you.

10 A: What was that?

11 Q: Go ahead and continue.

12 A: Okay. So let's get this back on here. So we
13 have the edge of that '82 there, and then we
14 have the escarpment edge in 2019. And so I
15 just want to draw your attention to that
16 extremely large change there on the river
17 side, because what we are seeing here is that
18 the entire spit -- and you can see that it
19 continues down here -- is that the entire
20 spit is moving. It's migrating. We're
21 getting water erosion on the back side. We
22 are getting some additional accretion on the
23 front side, but essentially the entire thing
24 is shifting and narrowing.

25 Q: I'm going to go to the next page.



1 A: So now, we've transitioned ---

2 **MS. PHELAN:** This is page three of Respondent's --
3 what's been marked as Respondent's 47.

4 A: So now, we've transitioned fully to the
5 modern shoreline here where we can see that
6 escarpment line on the back side.

7 **THE WITNESS:** If you'll go to the next slide,
8 Crystal.

9 A: And so these next two are zoomed-in examples.
10 So we can see a closeup version -- a closeup
11 -- yeah, a closeup version of what we've got
12 here. Again, on that ocean side, I'll draw
13 your attention to that very distinct line of
14 vegetation there that goes all the way down
15 and, again, to that back side where we have
16 that clear vegetation line on the river side,
17 as well. So, you know, interested, this is
18 our beach dune area in 1982. Next slide. So
19 here, we have a measurement that was taken
20 and performed in the ArcGIS software
21 measuring the distance from that river side
22 escarpment vegetation line to the edge of the
23 vegetation on the ocean side and we have the
24 number of 322 feet for this image. Next
25 slide. So we'll try to keep that 322 ---



1 **MR. WALKER:** Your Honor, I hate to stand up, but
2 just as part of my earlier objection on --
3 they said they were going to use it for
4 illustrative purposes and now they're taking
5 very precise measurements from the image. So
6 we'd renew our objection as to the '82 image
7 being so accurate that they can take
8 measurements to the foot, because there
9 hasn't been a foundation laid as to what the
10 nadir is and the other elements necessary to
11 demonstrate accuracy of measurement.

12 **MS. PHELAN:** Your Honor, we'll move on.

13 Q: From your visual observations and the tools
14 that you used when you were going through and
15 looking at the changes and the historical
16 migration of the spit, did you make any
17 general observations about what was happening
18 to the size of the neck area?

19 A: I did. So we've just seen visually that --
20 we're seeing -- so this is the river side,
21 this is the ocean side. We're seeing a
22 shift, right? So there are situations along
23 the coast where you have, you know, a dune
24 that would go into then upland area. So it's
25 sort of an all -- you know, everything that



1 we're moving forward is landward, right? In
2 this situation, we have the ocean, and then
3 we have dunes, and then we're back in the
4 water again, right? So we have a situation
5 where we have a spit that's moving. It's
6 migrating seaward, which is why we're seeing
7 those ocean shorelines are moving seaward,
8 because it's moving, but it's also narrowing.
9 So it's moving and narrowing. And that's
10 important because we're looking at the
11 stability of the area, we're looking at the
12 unlikely to return. And that narrowing
13 speaks to both of those things.

14 Q: Ms. Boynton, I'd like to ask you -- we've
15 heard some -- we've heard that you are on --
16 you help OCRM with responding to storms and
17 everything, and we've heard some -- Mr. Hodge
18 testified yesterday about storms on the
19 coastal area. Have you -- do you have
20 anything to offer about how often storms hit
21 the South Carolina coast?

22 MR. WALKER: Objection. She's not a
23 meteorologist. She's being asked to render
24 an opinion about storms. She's not qualified
25 as a meteorologist. And it's not relevant to



1 any issue about the most landward point of
2 erosion. If it deals with why the beach
3 suffered a retreat because of storms, that's
4 one thing, but she's projecting into the
5 future, and we're dealing with the basis for
6 the establishment of the baseline in 2017.

7 Q: When the Department is considering how to
8 implement a coastal management plan, are they
9 considering the impact of storms on the
10 system?

11 A: That would certainly play specifically to the
12 baseline on whether or not we thought it
13 would be unlikely to return, if we didn't
14 think there would be any storm impacts.

15 Q: And what determination, if any, did you make
16 about storm impacts?

17 **MR. WALKER:** I'm sorry, but she said three things
18 they considered. She didn't say storm
19 impact. She said on remand they considered
20 aerial photographs, historic shoreline
21 positions, and there was one other thing, and
22 storms was not in the mix. They considered
23 river side -- I mean, excuse me, historical
24 images, inlet relocations, and shoreline
25 positions. They didn't say anything about



1 storms, and that was not considered.

2 **THE COURT:** Okay. Again, Mr. Walker, I'm just
3 going to remind you that this is a de novo
4 hearing and they can present additional
5 evidence at this stage.

6 **MR. WALKER:** Thank you, Your Honor.

7 **THE COURT:** The objection is overruled. Proceed.

8 **MR. WALKER:** And we also object to her giving
9 opinions on how many storms hit South
10 Carolina. She can say she considered storms,
11 but she's not a meteorologist.

12 **THE COURT:** Agreed.

13 Q: Tell us about when you generally set the
14 lines and the baseline and the setback lines
15 as part of the Coastal Management policy, how
16 does your knowledge of storms fit into that
17 determination?

18 A: First, I would say that -- I mentioned the
19 internal Review Panel. I would say all of
20 the members of the Review Panel play a role
21 in our emergency operations. And so have at
22 least a very general, if not a very intimate,
23 awareness of coastal storms, impact of
24 coastal storms. So the impact of coastal
25 storms would play into the baseline and



1 setback line in terms of looking at the
2 unlikely to return and to look at the, you
3 know, stability of the area. There is just
4 sort of an underlining awareness for staff
5 members, particularly those members of the
6 Panel, that storms are a factor along the
7 coast. I think that's pretty general
8 knowledge.

9 Q: And I believe you testified that you were
10 actually on the team that responds to --
11 responds after a storm has hit on the coast,
12 right?

13 A: That's correct.

14 Q: And so what do you determine or what have you
15 observed that would relate to -- or would
16 factor into the considerations when you're
17 determining those jurisdiction lines?

18 A: We would look at imagery, we would look at
19 shorelines. I think those are probably two of
20 the major items that we would consider.

21 Q: From your experience of observing the impacts
22 of coastal storms, what, if anything, do you
23 know about the erosion that could occur from
24 such a storm?

25 A: We observed erosion at Captain Sam's on the



1 ocean side over a two-year period that was in
2 the 100 to 200-plus foot range.

3 Q: If a future storm -- given the current
4 conditions as you know them now of Captain
5 Sam's spit, if a future storm of a similar
6 magnitude of what you just said that you
7 observed, a hundred feet -- a hundred to 150
8 ---

9 A: I think I said in the range of a hundred to
10 200 feet ---

11 Q: A hundred to 200 feet.

12 A: --- depending on where you're measuring.

13 Q: Okay. If a similar storm hit today under the
14 current conditions of Captain Sam's spit,
15 what would that do to the beachfront there?

16 **MR. WALKER:** Objection, Your Honor. She is being
17 asked to speculate. She's not qualified as
18 an expert in any of these categories. And I
19 stand up with reluctance, because I know,
20 Your Honor, is -- it's a de novo hearing, but
21 this deals with this witness' qualification.
22 There is no showing that, just because one
23 storm did one thing, another's going to do
24 another. And I object to -- we object to her
25 rendering an opinion on the effects of a



1 storm with so little information and no
2 qualifications.

3 **THE COURT:** The objection is sustained.

4 Q: You heard Mr. Tolleson testify yesterday
5 about some of the imagery. And so I wanted
6 to walk through some of the imagery the
7 Department has used, because we've had
8 several objections now, to see where this
9 imagery came from that we're asking you to
10 use. And I have handed up some new exhibits.
11 Respondent Exhibit 141 is the first one that
12 we will talk about. Do you have a copy up
13 there? I think it's in your exhibit
14 notebook. It's going to be in exhibit --
15 Respondent's exhibit volume three. Is this -
16 - what's been marked as Respondent's Exhibit
17 141, what year does this imagery ...

18 **(Respondent's Exhibit Number 141 was introduced.)**

19 A: So just to be clear, what we're seeing on the
20 television is not what I'm looking at here?

21 Q: Yeah. I don't think we have these digitally.

22 A: Okay.

23 Q: So, we'll have to do the hard copy.

24 A: This is a map from 1988.

25 Q: And what does Respondent's Exhibit 141 show



1 us? Can you just explain what it is?

2 A: Sure. This is the aerial photography from
3 1988. This is an orthophoto captured by
4 Benatec Associates. We can make out -- it's
5 a little difficult to see, but in the lower
6 left-hand corner, it says, aerial
7 photography, ground control, and orthophoto
8 mapping prepared by, and it says, Benatec
9 Associates. And then underneath of that,
10 there's a date, July 1st, 1988. And this is
11 a map showing the Beachwalker Park and the
12 neck area of Captain Sam's.

13 Q: And what does that mean? What does ground
14 control and orthophoto mapping ...

15 A: That indicates that Benatec Associates set
16 ground control and that this image has been
17 georectified to remove distortions and make
18 it usable for mapping purposes.

19 Q: And I wasn't here when Mr. Tolleson
20 testified. Could you just remind us what
21 ground control is, if he had testified to
22 that? I don't mean to be repetitive. I'm
23 not sure.

24 A: I'm not certain if he testified to ground
25 control. Generally, he testified that the



1 '88 image was not usable for mapping
2 purposes.

3 Q: Okay. And so can you explain what ground
4 control is, what that indication means?

5 A: That's where you're just providing additional
6 horizontal accuracy for the image. And time
7 goes to the image such that, as I said, all
8 of the distortions are removed and it's in
9 the accurate place positionally.

10 Q: Is that phrase, the ground control and
11 orthophoto, is that something that people who
12 deal with mapping and GIS rely on to know
13 that it is a quality that can be used for
14 measurements?

15 A: Yes, I believe it is.

16 Q: Do you know whether Mr. Tolleson had this
17 information in his file?

18 A: I'm not sure that I can testify whether Mr.
19 Tolleson had a specific something in his
20 file.

21 Q: Okay. That's fine. Let's look at Joint
22 Exhibit 7, please. Joint Exhibit 7.

23 **(Joint Exhibit Number 7 was introduced.)**

24 Q: Ms. Boynton, do you recognize this document?

25 A: I do.



1 Q: What is it, please?

2 A: It's a memo from Mr. Eiser on aerial
3 photography.

4 Q: Okay. And what is -- have you seen this memo
5 before?

6 A: I have.

7 Q: It was part of DHEC's records?

8 A: Yes.

9 Q: And does this address the 1988 imagery and
10 other imagery, historical imagery used by the
11 Department?

12 A: It addresses the Department's -- the historic
13 aerial imagery that the Department has in
14 their inventory, and then future photography.

15 Q: Okay. What does this memo -- what did you
16 understand this memo to mean?

17 A: This memo is talking about taking historical
18 aerial photographs and the process by which
19 they would be going from the nine by nine
20 hard copy versions that were delivered back
21 then and the process by which they would be
22 made digital.

23 Q: So the historical aerial photographs were
24 sent out?

25 A: They had contractors that put ground control



1 points, I think they're referred to as pug
2 points in some places, on them. And then
3 those photos were delivered to the GIS lab in
4 Columbia where they were scanned and
5 rectified.

6 Q: And when you say rectified ...

7 A: To create the orthophoto that we talked about
8 earlier.

9 Q: And so if something is rectified, are you
10 able to take measurements from those photos
11 then?

12 A: That's correct.

13 **MS. PHELAN:** Can we please have Petitioner's 6a,
14 page three?

15 Q: We're going to have to look at -- we don't
16 have a digital copy of theirs, so we'll have
17 to look at the notebooks.

18 **MS. PHELAN:** Did you find it, Your Honor? Would
19 you like me to put it on the Elmo?

20 A: So we have this digitally.

21 Q: We have it Petitioner's?

22 A: Yeah, the 135 that we talked about before.

23 Q: Yes, okay.

24 **THE COURT:** So Petitioner's?

25 Q: That's right. So it's Petitioner's 6a, which



1 was --Petitioner's Exhibit 6a, page three.
2 This was the image that Mr. Tolleson was
3 talking about yesterday.

4 A: That's correct.

5 Q: Is that correct? But we do have it in our
6 documents, Respondent's 135.

7 **(Respondent's Exhibit Number 135 was introduced.)**

8 A: Keep going. Keep going.

9 Q: Page three. Did you hear Mr. Tolleson
10 testify about this image yesterday?

11 A: I did.

12 Q: And what was your understanding that he
13 testified to?

14 **MR. WALKER:** Objection, Your Honor. It's not
15 about -- she's pitting one witness against
16 another. She can testify in response, but
17 it's not proper to have her testify as to
18 what somebody else testified to. If she
19 wants to refute something he said, then she
20 can ask her the question without trying to
21 set it up -- him up as a strawman, because
22 she's just commenting on the credibility of
23 somebody else. But she's totally entitled to
24 testify to the fact she wants to get in.

25 **MS. PHELAN:** Your Honor, I'll rephrase. I was



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1 trying to get a footing of why we were
2 talking about this.

3 Q: So, Ms. Boynton, when you look at this image,
4 using your skill and experience of looking at
5 aerial imagery, do you have an opinion as to
6 the accuracy of the '88 image?

7 A: Based on the information that we have, I have
8 a high confidence that the '88 orthophoto is
9 very accurate, particularly for its time when
10 it was taken. I think it is very accurate
11 even for today, but I think it is -- it was
12 particularly accurate for the time. One
13 thing that I wanted to draw your attention to
14 is that, when I initially looked at this, I
15 thought there might be an issue on the upper
16 part of the image, because it appears that
17 there might be some sort of shift happening
18 there. But when I drilled down and zoomed in
19 on that area ---

20 **THE WITNESS:** Can you scroll down just a little
21 bit and zoom in? Sorry. Scroll up. A
22 little bit more. Keep going. All right.
23 Now, just zoom in a little bit. Just a
24 little bit more. Okay.

25 A: Okay. So what I'd like to draw your



1 attention to is, we have the Kiawah River
2 there. And then there is obviously a side
3 creek that's going off to the north. And
4 there's a little marsh island or shoal area
5 there at the mouth. And when you initially
6 look at it, it looks like there might be a
7 shift, but really what we're looking at is a
8 little bit of variability in the coloring and
9 the shading of the imagery, because you can
10 see that little island matches up on both
11 sides of the image, and you're not really
12 seeing a shift there at all. And then if you
13 look at Captain Sam's down below it, you
14 might say, it looks like there's a shift
15 there, too. But, again, really what you're
16 seeing there is, on the right-hand side,
17 you're seeing kind of a reflectance off the
18 water there, and on the left-hand, it's
19 darker, so you're not seeing that. But we're
20 really seeing a continuous line of the
21 coastline. I'd ask to see the exhibit that
22 the Department put together of this
23 orthophoto.

24 **MS. PHELAN:** Let me ask you, Your Honor. Would it
25 be helpful if she approached and pointed out



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1 what she just showed?

2 **THE WITNESS:** Or I could draw it on here.

3 **THE COURT:** Yeah, she can draw it on there.

4 A: So initially -- I'll get this eventually. So
5 what I'm talking about right here is this
6 little island area where it may appear upon
7 initial glance that there is some sort of
8 shift happening there, but we're really
9 looking at sort of a difference in
10 coloration. And then I'm also referring you
11 down to here to this portion of the shoreline
12 where we really see that the marsh shoreline
13 there is really matched quite well and we're
14 not seeing a shift there at all. These
15 images are provided in tile format. And so
16 we have reviewed these images both with the
17 right image overlapped on the left and with
18 the left image overlapped on the right. And
19 in both cases they are lining up very nicely.
20 So, again, with the review of the image and
21 the review of the materials that we have, the
22 department has high confidence in the
23 accuracy and usability of this orthophoto.
24 Q: This line right here that's lighter, how do
25 you interpret that line?



1 A: So that's the water's edge there, what you're
2 seeing. And on the right-hand image, you're
3 seeing -- it's reflecting, so it appears
4 brighter. But it also is lining up very
5 nicely with the water's edge on the left-hand
6 image, which is darker. Let me clear this.

7 **MS. PHELAN:** All right. If you would, pull out
8 Respondent's 16a, please, what's been marked
9 as Respondent's Exhibit 16a.

10 **(Respondent's Exhibit Number 16a was introduced.)**

11 Q: Is this also the 1988 aerial?

12 A: It is.

13 Q: Can you tell me what we're looking at?

14 A: We're looking at a similar situation. The
15 images are just lapped in a different -- you
16 know, they were lapped right over left and
17 now they're left over right. I'll just use
18 this tool again to draw your attention.
19 We've got this -- you know, this water line
20 out here, which is very continuous. We've
21 got the vegetation here, which is very
22 continuous. Again, on the back side we see
23 the marsh line matching nicely between the
24 images. So, as I said, I think this was
25 considered a very high quality product for



1 its time as a historic product, and we still
2 consider this to be very usable today.

3 Q: Where did what's been marked as Respondent's
4 16a come from? Where did the Department
5 obtain it?

6 A: The digital images?

7 Q: Uh-huh.

8 A: Those were scanned and rectified by the GIS
9 department in Columbia.

10 Q: As we've previously discussed?

11 A: Correct.

12 Q: And has overlaid it to show that it lines up
13 nicely, how did that image come about?

14 A: So, as with the other raster images and the
15 vector shorelines that we looked at, I added
16 it into our ArcGIS platform to display this.

17 **MS. PHELAN:** I'd like to move what's been marked
18 as Respondent's Exhibit 135 into evidence.

19 **MR. WALKER:** I'm sorry. 135?

20 **MS. PHELAN:** I'm sorry. Respondent's Exhibit 16a.

21 **MR. WALKER:** We're fine with 16a going in, Your
22 Honor.

23 **THE COURT:** Thank you. It's admitted.

24 **(Respondent's Exhibit Number 16a was entered into**
25 **evidence.)**



1 **COURT REPORTER:** Court reporter clarification.

2 16a or 16b? I'm sorry. Okay. My apologies,
3 Your Honor.

4 **MS. PHELAN:** Can you put up Respondent's Exhibit -
5 - what's been marked as Respondent's Exhibit
6 56, please.

7 **(Respondent's Exhibit Number 56 was introduced)**

8 Q: Ms. Boynton, does what's been marked as
9 Respondent's Exhibit 56 give us additional
10 information about the 1988 photograph?

11 A: This image here and the subsequent image just
12 reiterate, confirm the information that we
13 have so far. It confirms that it is a
14 digital orthophoto. At the bottom, you can
15 see we've got the DHEC logo on the right, and
16 on the left you can see it's the Shared and
17 Integrated Geographic Information Systems.
18 At the point at which this was created, that
19 was the GIS team at the Columbia office.

20 Q: And what are we looking at? Is that a paper
21 document or ...

22 A: That's a CD cover.

23 Q: A CD cover. Okay. Can we go to page two,
24 please? And what does this tell us?

25 A: This is the insert for that. This is just



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1 laying out the -- again, it's saying Ortho
2 Photo, laying out the index map for the
3 photos that are involved here. The source is
4 provided here, along with the coordinate
5 system and feet on the right-hand side. This
6 was -- this states that it was created in
7 August of '98, and then the information for
8 the team -- the DHEC team was provided.

9 **MS. PHELAN:** Okay. I'd like to move what's been
10 marked as Respondent's Exhibit 56 into
11 evidence.

12 **MR. WALKER:** No objection, Your Honor.

13 **THE COURT:** Admitted.

14 **(Respondent's Exhibit Number 56 was entered into**
15 **evidence.)**

16 **MS. PHELAN:** And I'd also, at this time, like to
17 move Respondent's Exhibit 141 in, which was
18 the 1988 photo imagery with the Benatec
19 Associate stamp on it that we talked about.

20 **MR. WALKER:** Petitioner has no objection to the
21 portions of it that show the images. There
22 is a slide or two with distances. There were
23 several pages to this slide -- to this
24 exhibit, I believe.

25 **MS. PHELAN:** There's only one. To Exhibit 141?



1 **MR. WALKER:** Well, I'm on the wrong one. My
2 apologies. 141, no objection.

3 **THE COURT:** 141 is entered.

4 **(Respondent's Exhibit Number 141 was entered into**
5 **evidence.)**

6 **MS. PHELAN:** And then I'd also like to move what's
7 been marked as Joint Exhibit 7 into evidence.

8 **MR. WALKER:** No objection, Your Honor.

9 **THE COURT:** That one's also admitted.

10 **(Joint Exhibit Number 7 was entered into**
11 **evidence.)**

12 **Q:** Is there a difference between
13 orthorectification and what we can do today
14 than what we did in 1988?

15 **A:** Well, I mean, I think the technology for
16 capturing aerial imagery has certainly
17 improved over time. And the tools to take
18 those images and put them into an accurate
19 digital product has certainly improved over
20 time.

21 **Q:** Does the statute give any guidance to the
22 Department about what information that they
23 need to review and what kind of -- what
24 standard they have to use to see if it's
25 accurate enough?



1 A: The statute does give guidance. It indicates
2 in a number of places that the Department is
3 to utilize the best available scientific and
4 historical data.

5 Q: And in the 1988 time period and the --
6 looking through the historical database, was
7 this the best available scientific and
8 historical data in the DHEC database?

9 A: It was.

10 Q: Let's go to Respondent's Exhibit 142, please.
11 And it'd be 142a, b and c. These are paper
12 copies again. So, could you tell us what
13 these are, Ms. Boynton?

14 **(Respondent's Exhibit Number 142a, 142b, and 142c**
15 **were introduced.)**

16 A: You said 142?

17 Q: Yes, Exhibit 142a, b, and c.

18 A: These are similar orthophoto index maps. We
19 saw an example of this for the '88, and we
20 wanted to provide that. One of the
21 vegetation shorelines that we looked at
22 earlier was a 1993. So we wanted to provide
23 similar information for the '93.

24 Q: And what did we learn about the 1993 imagery
25 from this information?



1 A: It was similar to the other one. The look of
2 this is very similar. They provide the
3 location. Although, whoever typed this
4 misspelled Kiawah, but it provides the
5 identification of it as an orthophoto index
6 map, the scale, the coordinate system, and
7 the creation date of the product.

8 **MS. PHELAN:** I'd like to move what's been marked
9 as Respondent's Exhibit 142a, b, and c into
10 evidence.

11 **MR. WALKER:** No objection.

12 **THE COURT:** They're admitted.

13 **(Respondent's Exhibit Number 142a, 142b, and 142c**
14 **was entered into evidence.)**

15 **MS. PHELAN:** If we could go to 143a, b, and c.

16 **(Respondent's Exhibit Number 143a, 143b, and 143c**
17 **were introduced.)**

18 Q: Can you tell me what these documents are?

19 A: 143a is an email. 143b is -- it's a folder
20 that contains -- that was used to contain the
21 nine by nine images. It's just a photograph
22 of the front of the folder. And 143c is a
23 photograph of the 1998 imagery.

24 Q: Are these part of DHEC's records on the --
25 the imagery for 1998?



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1 A: They are.

2 Q: And what do we learn from these documents
3 about the 1998 imagery?

4 A: So, Exhibit 143c confirms the date and scale.
5 And that was a product for OCRM. 143b
6 indicates the third party that we worked
7 with, which was Kucera International. It
8 reconfirms the date and the scale. And 143a
9 confirms the coordinate system and that the
10 '98 was triangulated to control, scanned, and
11 rectified.

12 **MS. PHELAN:** I'd like to move what's been marked
13 as Respondent's Exhibit 143a, b, and c into
14 evidence.

15 **MR. WALKER:** No objection.

16 **THE COURT:** They're entered.

17 **(Respondent's Exhibit 143a, b and c were entered**
18 **into evidence.)**

19 Q: Ms. Boynton, through the course of discovery
20 in this case, and even back in 2017 -- 2015
21 and 2017 when KDP was looking into the
22 jurisdictional lines, did you have occasion
23 to provide them with information?

24 A: I did.

25 Q: Did you provide them with all of the



1 underlying data and data points for the lines
2 that the Department reviewed for the baseline
3 and the setback lines?

4 A: I did.

5 Q: Did you provide them with all of the
6 underlying aerial photographs, historical
7 photographs to go along with those?

8 A: So, as we indicated earlier, some of that
9 data was collected with the Trimble GeoXT and
10 we provided that record data to them.

11 Q: That was when you went on the ground to
12 locate the vegetation, not to inspect the
13 aerial photos?

14 A: That's correct. For the other aerial images
15 that we provided the source data.

16 Q: Can you turn to what's been marked as
17 Respondent's Exhibit 144? Are these part of
18 DHEC's files related to the jurisdictional
19 lines and their communications with KDP?

20 **(Respondent's Exhibit Number 144 was introduced.)**

21 A: Yes.

22 Q: And did you determine from -- what did you
23 determine from reviewing these letters?

24 A: That we have provided a variety of data sets
25 to KDP starting back in 2009.



1 Q: And who is the -- there's a February 27th,
2 2009 letter on this first page and it's to
3 Mr. Walker?

4 A: Correct.

5 Q: And it's signed from William C. Eiser. Can
6 you remind us who that is?

7 A: Mr. Eiser was a project manager at OCRM. He
8 was involved with several of the
9 jurisdictional line review cycles, and he was
10 one of the individuals that prepared that
11 1988 report.

12 Q: In the second two pages of this, what is this
13 document?

14 A: Are you talking about the February 16th?

15 Q: Yes.

16 A: That's a letter to Mr. Eiser from Mr. Walker.

17 Q: And he was requesting this information?

18 A: That's correct.

19 Q: Can you please turn to Respondent's Exhibit
20 145? Did you -- in this discovery of this
21 case, did you provide all of the information
22 that you had, both data and documents, from
23 the jurisdictional line files?

24 **(Respondent's Exhibit Number 145 was introduced.)**

25 A: To the best of my knowledge, we've provided



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1 everything.

2 Q: And looking at Exhibit 145, can you identify
3 this document?

4 A: This is a document that was sent to Mr.
5 Walker and Mr. Gressette, and it was signed
6 by you, Ms. Phelan.

7 Q: And does it identify some of the data and
8 imagery that we were speaking about yesterday
9 with Mr. Hodge?

10 A: It does refer to some of those.

11 Q: And those were taken from your folders and
12 files?

13 A: Yes, that's correct. I mean, they're the
14 Department's, but.

15 Q: Can you point out the references that lead to
16 the underlying information for the
17 jurisdiction lines that were set by DHEC?

18 A: So the source data -- and we're primarily
19 talking about imagery when we're talking
20 about that. I believe towards the end of the
21 page here, we see a bullet that says,
22 Historic Imagery. So that would have been
23 some of the source data. I'll add, on page
24 two, we see a bullet that says, Statewide.
25 Obviously, statewide includes more than just



1 Kiawah and Captain Sam's, but that would have
2 likely contained -- it says, Statewide data
3 veg lines. That would have contained some
4 additional data that we talked about.

5 Q: In the course of this case, have you received
6 -- what, if any, emails have you received
7 related to questions about your data and
8 documents that were forwarded to you from
9 KDP?

10 A: I received a few emails, I believe, from Mr.
11 Gressette just needing clarification on which
12 files were what and if they had complete
13 information.

14 Q: Did you provide information on more than one
15 occasion of where to find certain underlying
16 data images?

17 A: I did.

18 Q: Have you worked and provided any information
19 that you were requested that was forwarded to
20 you from KDP?

21 A: To the best of my knowledge, I think we
22 responded to the requests with clarification
23 or additional information, as needed.

24 Q: To your knowledge, do we have any information
25 for the underlying data or imagery that was



1 used in any way that we have not provided?

2 A: No.

3 **MS. PHELAN:** I'm going to move what's been marked
4 as Exhibit 144 into evidence and ---

5 **MR. WALKER:** Your Honor, Exhibit 144 was a FOIA
6 request 12 years ago associated with the 2009
7 line cycle. The information was whatever it
8 was. I'm not doubting that it wasn't
9 provided. We question the relevance of it,
10 because the documents that were provided in
11 this case were provided in this case. So it
12 involves an entirely different cycle. We
13 don't think it's relevant. As to -- are you
14 also offering 145?

15 **MS. PHELAN:** I hadn't gotten there, but if you
16 want to go ahead and argue it.

17 **MR. WALKER:** Well, in anticipation of 145, I think
18 there's been a fundamental misunderstanding.
19 The Petitioner is not saying that the
20 information was not provided. What the
21 Petitioner is saying is that specific data as
22 to how those points were selected. Yes, we
23 received a group of points. We received the
24 DWG file with certain points in it. But how
25 those points were derived was not provided to



1 us. The Department seems to think we're
2 saying we never received it. We certainly
3 received it. Mr. Hodge testified that he
4 looked at it, but there was no information as
5 to how the veg line was derived, and that was
6 the problem, not that we didn't receive it.
7 So we don't think -- we would submit there's
8 no relevance to 145 either.

9 **THE COURT:** And that actually was my
10 interpretation of the testimony, as well. So
11 do you think there's any necessity of having
12 this document entered?

13 **MS. PHELAN:** Your Honor, if the -- I mean, if it's
14 clear that we provided all of the underlying
15 data, the necessary information for them to
16 do their own assessment, then, no, I don't.
17 But if he's going to argue that he doesn't
18 have sufficient information, then I think we
19 need to show that we -- how much information
20 we provided.

21 **THE COURT:** Okay. We'll enter it, then.

22 **(Respondent's Exhibit Numbers 144 and 145 were**
23 **entered into evidence).**

24 **Q:** So if you would just -- we were talking about
25 Respondent's Exhibit 145. In the discovery



1 request, do you know if the aerial imagery
2 was made available to inspect the originals,
3 for the originals that we have?

4 A: Are you referring to the three by four maps?

5 Q: Yes.

6 A: Yes, it's my understanding that the
7 Department made them available for -- they're
8 hard-copy maps that we have in house, and the
9 Department made them available for inspection
10 or copying.

11 Q: And do you know if KDP ever did that ...

12 A: I'm not aware if they did.

13 **MS. PHELAN:** Your Honor, one minute, please. I'm
14 very close to wrapping up.

15 Q: Ms. Boynton, in your review of all of the
16 materials that KDP has provided, have they
17 provided any information that you reviewed
18 that has gone to supporting the change in the
19 baseline position?

20 A: After reviewing the materials that were
21 additionally submitted, we believe that the
22 Department's location of the baseline, based
23 on the 1988 vegetation line, the 1998
24 vegetation line is accurate.

25 **MS. PHELAN:** No further questions, Your Honor.



1 **THE COURT:** Okay. Before we start with the Cross
2 of this witness, we're going to take an
3 hour's lunch break. So we should be back at
4 2:30.

5 **(Off the record from 1:29 p.m. until 2:43 p.m.)**

6 **THE COURT:** We are back on the record. Ms.
7 Phelan, you can call your next witness. I'm
8 sorry. We have got Cross.

9 **MS. PHELAN:** I'll be glad to, Your Honor.

10 **THE COURT:** I wish we were there, but ---

11 **MR. WALKER:** Your Honor, don't tempt me. That
12 might be an invitation I can't refuse. May I
13 remove my ---

14 **THE COURT:** Sure. You can.

15 **MR. WALKER:** --- remove my mask?

16 **THE COURT:** You can.

17 **MR. WALKER:** Thank you.

18 **MS. BOYNTON - CROSS-EXAMINATION BY MR. WALKER:**

19 Q: Good afternoon.

20 A: Good afternoon.

21 Q: This morning, you mentioned that there was a
22 committee within DHEC that was formed to take
23 a look at the location of the jurisdictional
24 lines for this cycle, the 2017 cycle; is that
25 correct?



1 A: That's correct.

2 Q: And what was the name of that committee?

3 A: It's been called a number of different
4 things. I think in the various things, it's
5 been called the Jurisdictional Line Review
6 Panel, it's been called the Jurisdictional
7 Line Review Committee. But regardless of
8 names, the entity and the function remain the
9 same. They're all one and the same.

10 Q: And is it fair to say that the Committee or
11 Panel was to arrive at a determination on the
12 preliminary lines up and down the South
13 Carolina coast during this delineation cycle?

14 A: That's correct.

15 Q: In this case, you are aware that the
16 Petitioner sought any communications or
17 records related to the Department's
18 establishment of the preliminary lines in
19 2017, correct?

20 A: Yes.

21 Q: To your knowledge, the Department provided
22 all of those, correct?

23 A: To the best of my knowledge, yes.

24 Q: Would you agree that the only documents that
25 were produced that relate to the



1 Jurisdictional Line Review Committee consist
2 of one email from you in the beginning and
3 one agenda? And we can look at them. Why
4 don't you put them up?

5 A: So, I recall those from our deposition. So,
6 I know they were produced, because you showed
7 them to me.

8 Q: Yeah.

9 A: Whether those were the only documents -- we
10 produced a lot of documents, Mr. Walker, so
11 I'm not sure that I could say that those are
12 the only documents.

13 Q: Well, on the left is our Exhibit 31.

14 **MR. WALKER:** If we could blow that up, please.

15 **(Petitioner's Exhibit Number 31 was introduced.)**

16 Q: Do you recognize that as your email?

17 A: Yes.

18 Q: What is the date of that email?

19 A: April 7th, 2015.

20 Q: Were you the person that was basically
21 charged with heading up the line review this
22 cycle? Coordinating it may be a better word

23 ---

24 A: Coordinating it ---

25 Q: --- since you have supervisors.



1 A: That's right. Coordinating is probably a
2 better term. Yes, I was coordinating the
3 meetings, that sort of thing.

4 Q: Is this your email to the group letting them
5 know that you wanted to have a kickoff
6 meeting to start the review?

7 A: Yes.

8 Q: And who were the members of the Committee at
9 that time? Would all of those people in the
10 to line be members?

11 A: Give me just a second to review them. All of
12 the people in the to line, with the exception
13 of Bill Eiser, served on the Review Panel.

14 Q: And I understand Ms. McColmets (phonetic)
15 also was either ex-officio or served on the
16 Panel?

17 A: That's correct.

18 Q: Then if we move to Petitioner's 32, there's
19 an agenda that was produced. This is an
20 agenda that purports to be an agenda of the
21 Jurisdictional Review Committee -- Line
22 Review Committee of July 1, 2016. Did you
23 create that?

24 **(Petitioner's Exhibit Number 32 was introduced.)**

25 A: I believe I did, yes.



1 **MR. WALKER:** All right. Your Honor, at this time,
2 we move into evidence Petitioner's 31 and 32.

3 **MS. PHELAN:** No objection, Your Honor.

4 **THE COURT:** They're entered.

5 **(Petitioner's Exhibit Numbers 31 and 32 were**
6 **entered into evidence.)**

7 **Q:** Ms. Boynton, I will represent to you that the
8 only email that's been produced related to
9 the Jurisdictional Line Committee meetings is
10 Exhibit 31. And the only agenda produced is
11 Exhibit 32 from July 1, '16. Were there any
12 other emails or agendas?

13 **A:** Not to the best of my knowledge. I kept all
14 of the materials for this project in a
15 folder, trying to stay organized. And I kept
16 the emails for this project in a folder. And
17 I produced the items in those folders. So,
18 to my knowledge, we have produced what we
19 have.

20 **Q:** Which would be these two?

21 **A:** Correct. I mean, unless you've found others
22 that you're not showing today.

23 **Q:** This Committee, as I recall, met 15 to 20
24 times?

25 **A:** That sounds right. I think we met once to



1 twice a month through '16 and '17. So, yeah,
2 I think that's probably -- probably closer to
3 the 20 mark.

4 Q: Did you conduct or set these meetings without
5 agendas or were the agendas not saved for
6 your later meetings or other meetings?

7 A: I don't recall there being a lot of agendas.
8 So you can see here on this agenda that we
9 see on the screen, we've got two beaches,
10 Isle of Palms and Hilton Head, that we're
11 showing there. And you can see that the
12 items in the agenda are repetitive. So,
13 review this zone, review this zone, look at
14 the photos. I think we just got into a
15 rhythm of what the Committee was doing and
16 just did it without having a written agenda.

17 Q: And you would schedule emails -- I mean,
18 meetings without sending emails among the
19 Committee members to check their
20 availability?

21 A: I would. I would just send a meeting
22 invitation.

23 Q: You have no record of those?

24 A: Not to my knowledge.

25 Q: This Committee that met to determine the



1 baseline and the setback line, there were no
2 minutes either, were there?

3 A: Not to my knowledge.

4 Q: There were no notes taken at those meetings
5 either that have been produced. Do you know
6 of any notes being taken?

7 A: If there were notes being taken, it wasn't by
8 me. So I can't testify to what other folks
9 have done, but nothing has been provided to
10 me.

11 Q: What I'd like to do next is talk about our
12 understanding of how the line was set at
13 Kiawah and at Captain Sam's in particular.
14 Our understanding is that there was a meeting
15 in the Committee and you or Matt, maybe
16 somebody else, put up on the screen Captain
17 Sam's Spit because it's the unstabilized
18 inlet zone. We aren't looking at the primary
19 dune. And that you took the inventory of
20 shorelines that you had at that time and you
21 projected them on the screen or plotted them
22 on the screen. Is that relatively accurate?

23 A: Yeah, that's the ballpark idea.

24 Q: Yeah. And I also understand that the way the
25 Committee worked, is that you looked at that



1 array of lines and you looked at the most
2 landward of those lines. And if one was more
3 landward than another, then you stitched
4 together those lines, and that there were
5 vegetation lines, and that that became the
6 decision for the preliminary delineation; is
7 that correct?

8 A: Yes, that's the general idea. I mean, some
9 of those terms, you know, are not technical
10 GIS terms, but the concept is accurate.

11 Q: And since we don't have any minutes, it's
12 left to me to try to get in the room based on
13 my understanding. And those lines that,
14 ultimately, you selected were the '98
15 vegetation line and the '88 vegetation line
16 and part of a 1983 wet/dry shoreline that
17 later fell out after remand.

18 A: That's correct.

19 Q: Is that fair?

20 A: Yes.

21 Q: Now, I want to go to -- let's go to Joint
22 Exhibit 10, page 16, please. And what we're
23 going to put up is the Department document
24 that's the compilation of information for
25 setting the beachfront jurisdiction lines in



1 2016 and '17 that you participated in
2 drafting. Do you recognize this page?

3 **(Joint Exhibit Number 10 was referenced.)**

4 A: I do.

5 Q: And would this page be the page where the
6 Department itemized the different shorelines
7 in the 40-year look-back that it considered
8 or had available? Or maybe even farther
9 back. I see earlier dates, but that may be
10 for the setback line. But for purposes of
11 the baseline, does it show the various lines
12 that you've considered?

13 A: So this table was assembled as part of the
14 guidance document that was shown earlier.
15 And this is not specific to Kiawah or Captain
16 Sam's. This is a table that is for the
17 entire state, for the coastal effort for the
18 whole state, and includes -- the purpose of
19 this table was to try to get a table of all
20 of the shorelines that we had to work with.
21 Wet/dry, vegetation, and then to try to get
22 some indication of, you know, where those and
23 how those lines were being utilized.

24 Q: And if we go on the --

25 **MR. WALKER:** On page 16, please, Alex. If you



1 could, go up to the top paragraph.

2 Q: The first sentence says what we've talked
3 about very often here, it's set at the most
4 landward point of erosion in the unstabilized
5 inlet zone. And then halfway through the
6 paragraph -- well, it goes on to say, to
7 determine the baseline position in this zone,
8 the internal review team -- that would be the
9 Jurisdiction Line Review Committee --
10 examined all available vegetation and wet/dry
11 shorelines. Table 2 shows a summary of the
12 shorelines that were reviewed coast-wide, and
13 which were used in setting the baseline.
14 Specifics on which lines were used on
15 specific beaches are available in the
16 individual line reports. So what that tells
17 us is, between the itemization of shorelines
18 in this report and the line report on Kiawah,
19 we would have all of the lines that were
20 considered, correct?

21 A: I think so.

22 Q: I'm not trying to trick you. I just read it
23 that way and understood it that way; is that
24 correct, what you meant?

25 A: So that was the purpose of this table. If



1 every single date got in there -- as you can
2 see, we have a tremendous number of
3 shorelines for the coast. So if a date got
4 left out, that would have been, you know, by
5 accident, not, sort of, purposely. But I
6 think, probably, the dates are all there. I
7 think that's probably fair.

8 **MR. WALKER:** If we can go back to the table
9 itself, Alex. The upper half of it, please,
10 on 16. Or you can go down to 1982.

11 Q: The table does mention a 1982 photograph, but
12 it only says that it has a wet/dry shoreline,
13 right?

14 A: That's what it says.

15 Q: It doesn't mention a veg line, does it?

16 A: It does not.

17 Q: Also, if you go up to 2006, there's a
18 reference to an SCDNR aerial, and it does not
19 refer to the on-the-ground -- it does not
20 refer to -- or does it refer to a veg line
21 for 2006? Is that the one for 2006?

22 A: I think that's the one -- I mean, it says
23 2006, yes.

24 Q: Okay. But we go to 2016, and that's where I
25 meant to go. The 2016 was a wet/dry



1 shoreline and not a veg line, right?

2 Correct?

3 A: So in 2016, the shoreline from an aerial
4 image was a wet/dry shoreline.

5 Q: So let's go to Respondent's Exhibit 18, which
6 is your overlay. So when you look at this
7 overlay, there were a couple lines that the
8 Committee did not consider, right?

9 **(Respondent's Exhibit Number 18 was referenced.)**

10 A: Correct.

11 Q: That are on this?

12 A: Correct.

13 Q: And I think your testimony is that no record
14 was preserved of what you put on the screen
15 as to which lines you projected, right?

16 A: Written record. Correct.

17 Q: So the vegetation line in 2019, that
18 obviously couldn't have been put on the
19 screen in 2017?

20 A: Correct.

21 Q: The vegetation line for 2016 raises a
22 question, because the only line we saw for
23 2016 was a wet/dry shoreline, right?

24 A: That wet/dry shoreline was the shoreline that
25 had been digitized from aerial images. The



1 vegetation line here in 2016, as I indicated
2 earlier, was collected the GeoXT Trimble
3 unit.

4 Q: But this is not mentioned in the line report,
5 is it? The veg line in 2016 is not mentioned
6 in the line report, is it?

7 **MS. PHELAN:** I'm going to object, Your Honor.

8 A: I'd have to see the line report to be sure.

9 **MS. PHELAN:** He's taking her testimony out of
10 context. She testified that it's similar to
11 this. She pulled up lines before the Review
12 Panel to show them which lines they were
13 considering, and this was an example of that.
14 This wasn't created as an illustration for
15 all of the lines we have now. And she did
16 not say that this was what -- the lines that
17 she put up in front of the Review Panel.

18 **MR. WALKER:** I will clarify.

19 Q: This is not what you put up in front of the
20 Review Committee, correct?

21 A: That's correct.

22 Q: And you didn't have a 1982 veg line with the
23 Review Committee, correct?

24 A: That's correct.

25 Q: All right. What you did put up, we won't



1 know, because there's no record of it, right?

2 A: There's no written record.

3 Q: I want to turn your attention to the
4 documents from the 2008/2009 cycle. Those
5 were put in evidence earlier today. That
6 review was headed up by Bill Eiser?

7 A: Yes.

8 Q: Bill Eiser basically, once he came over to
9 OCRM or Coastal Counsel, he was the one who
10 headed up the line review for the cycles for
11 '99, 2008 and '09? He did both of those,
12 correct?

13 A: That's my understanding.

14 Q: He was initially shown as being on your
15 Committee in April of 2015, but he retired at
16 the end of 2015, correct?

17 A: He retired at some point in 2015.

18 Q: Nonetheless, you did talk to him about what
19 process had been used in the past?

20 A: Yes, we talked to Bill about the
21 jurisdictional line process.

22 Q: Did you review the prior memos that had been
23 done, particularly, the memos that had been
24 done on the 2008/2009 review, to get a feel
25 for what you may want to do in 2017?



1 A: Yes, I believe we did.

2 Q: And what I'm going to do is to put up the
3 exhibits that I think were entered this
4 morning. I'm not going to spend a lot of
5 time on them. I'm just going to call out a
6 couple of things, because they would have
7 been consulted by you.

8 **MR. WALKER:** May we have Joint Exhibit 4, please?
9 If you can, just blow up the title a little
10 bit.

11 **(Joint Exhibit Number 4 was referenced.)**

12 Q: That is the line report or the amended line
13 report for Kiawah for the previous cycle; is
14 it not?

15 A: Yes, it appears to be that.

16 Q: And if we go to page three, the bottom of
17 page two -- why don't we first do the bottom
18 of page two?

19 **MR. WALKER:** If you could, cull out that last
20 paragraph so we could see it.

21 Q: It talks about the previous baselines and
22 other lines. And then on the next page there
23 is his discussion of the setting of the
24 baseline in the unstabilized inlet zone,
25 correct?



1 A: Yes.

2 Q: In this paragraph, he says -- and I'm
3 starting with the second sentence. The
4 southwest unstabilized inlet erosion zone
5 extends from the end of the island to
6 monitoring station 2625. In this area the
7 baseline is established at the most landward
8 shoreline during the past 40 years, using
9 historical shoreline positions from 1973,
10 1988, 1993, 1998, and 2006. And after that
11 sentence, he says, no other data available
12 was deemed the best data available or
13 otherwise valid, correct?

14 A: That's what it says.

15 Q: So if there was a shoreline in 2009 that OCRM
16 had in its inventory when Bill Eiser did
17 this, he would have considered it, correct?

18 A: I assume so.

19 Q: And Bill Eiser, who had been there for 20
20 years and also had authored the report that
21 we were looking at earlier, one of the four
22 authors, he checked them for the best
23 historical and scientific accuracy and he
24 found that the ones that met that standard
25 that would apply to this line review are



1 1988, 1993, 1998, and 2006, correct?

2 A: That's what it says.

3 Q: I think we've already covered it, but Bill
4 Eiser was certainly capable and had a deep
5 history with the lines, considering he was
6 one of the authors of the interim report that
7 suggested procedures when the Beachfront
8 Management Act was adopted.

9 A: Sorry, what was the question?

10 Q: You considered him to be knowledgeable, did
11 you not?

12 **MS. PHELAN:** I'm going to object to the form.

13 **MR. WALKER:** I'll rephrase it.

14 **MS. PHELAN:** Assumes facts ---

15 **THE COURT:** Thank you.

16 **MS. PHELAN:** --- facts not in evidence.

17 Q: Did you consider him to be knowledgeable
18 based on all of the experience that you knew
19 he had?

20 A: Yes, Bill had a good deal of experience and
21 knowledge.

22 Q: Now, if we could go to Joint Exhibit 3, which
23 is the Surveyors Package for Kiawah. I think
24 you mentioned it today, the surveyors
25 Package, which gives out the coordinates of



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1 the setback line and the baseline in a given
2 area or -- basically on the website.

3 **(Joint Exhibit Number 3 was referenced.)**

4 A: Correct.

5 Q: But back in the prior cycle, the last cycle
6 in 2009, there was actually a memo called the
7 Surveyors Package. And if we could go to --
8 and this was put into evidence this morning.

9 **MR. WALKER:** If we could go to the next page,
10 please. And if you could, go to the bottom
11 and highlight it where it says, Local Erosion
12 Rates, and down to the table.

13 Q: So in this paragraph, Bill Eiser is referring
14 to the long-term erosion rates and all survey
15 monument locations on Kiawah; is he not?

16 A: Yes.

17 Q: Then he says, these rates were used to
18 establish the location of the setback line,
19 and must also be given on individual plats.
20 For Kiawah Island, the long-term erosion
21 rates for all survey monuments, given in feet
22 per year and with positive indicating
23 accretion and negative indicating erosion,
24 are as follows. So for 2620, which is the
25 station to the left or the immediate



1 southwest of the neck, the long-term
2 accretion rate was eight and a half feet a
3 year, correct?

4 A: That's what it says.

5 Q: And that's what the person with authority who
6 was charged with the review of the lines
7 determined in 2009, correct, that it was
8 eight and a half feet?

9 A: It's my understanding that Mr. Eiser did not
10 calculate these rates.

11 Q: I will rephrase the question. He determined,
12 based on all of the information provided to
13 him, that the long-term accretion rate was
14 eight and a half feet at station 2620?

15 A: My understanding -- and I wasn't here for the
16 2000 line cycle. But my understanding is
17 that, in a similar fashion, in that I was
18 sort of coordinating the 2016, '18 line
19 review, that Bill was in a similar position
20 than I was, and that -- not a similar
21 position, but he was kind of the lead for his
22 -- for the line review, and that he also
23 worked with a team of folks to review the
24 data, and information report was accepted.
25 So I don't know who else reviewed this



1 information to say that Bill was the final
2 word. I don't know that I can testify to
3 that, but he was certainly ---

4 Q: You wouldn't think that he was going rogue
5 here without the authority of the Agency, do
6 you?

7 A: I am not saying that Bill Eiser was going
8 rogue. That is not my testimony.

9 Q: We can assume that he authority to issue the
10 surveyor's package finding that the long-term
11 accretion rate was eight and a half feet a
12 year?

13 A: The way you asked the question made it sound
14 like you were saying that Bill by himself
15 made all of these decisions. And I was just
16 simply clarifying that it was the Department
17 and a larger team of people was involved.

18 Q: Well, even better. So the Department and all
19 of the people involved found that the long-
20 term shoreline change rate at station 2620
21 was eight and a half of accretion a year on
22 average?

23 A: That's what it says, yeah.

24 Q: And then for 2625, that same group of
25 everybody found that the long-term accretion



1 rate at station 2625, right next to
2 Beachwalker Park, a little east, was 5.22
3 feet a year, correct?

4 A: That's what it says.

5 Q: Now, let's turn to the line report for this
6 particular cycle. Bring us back up to the
7 current cycle. And if we could have, I think
8 it's Joint Exhibit 16. We went over this
9 this morning. So I'm not going to plow the
10 same ground again. The first couple of pages
11 are fairly boilerplate and generic, just
12 describing the process, correct?

13 **(Joint Exhibit Number 16 was referenced.)**

14 A: That's correct.

15 **MR. WALKER:** And then if we could go to page two,
16 please.

17 Q: Then we have the Process for Establishing the
18 Baseline. And it starts out with you have to
19 first determine whether it's an unstabilized
20 inlet zone, a stabilized inlet zone, or a
21 standard zone. But down at the bottom of
22 this page, it talks about the unstabilized
23 inlet zone. And as I understand it, you and
24 Matt Slagel were the principal authors of the
25 line report for Kiawah?



1 A: We drafted the reports, and then they were
2 reviewed by the Panel.

3 Q: And we have no record of that review,
4 correct?

5 A: These documents were created, and then they
6 were edited until we had the final version.

7 Q: But we have no emails that show the drafts,
8 your editing, no emails among the Committee
9 members making comments? We have none of
10 those records that have been produced in this
11 case, right?

12 A: Not to my knowledge. The Department utilizes
13 two pieces of technology in managing their
14 materials. The first is a server, which is
15 used in a lot of different places. And all
16 of the staff members have access and editing
17 rights to that server. And then the second
18 is a cloud based platform. And, again, the
19 staff had access to that. And documents are
20 put in those locations and can be accessed by
21 staff. Comments, edits, et cetera can be
22 added and accepted as needed, which provides
23 an organized file management system.

24 Q: Does that system keep any record of drafts?

25 MS. PHELAN: Objection to the form. There's no



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1 foundation. She did -- she does not a server
2 for -- IT server for -- what the records are
3 kept on the server, I don't think.

4 **MR. WALKER:** I will withdraw the question. I
5 understood her to start talking about the
6 server and what was up there and what wasn't
7 on it, but I'll move on.

8 **THE COURT:** Okay. Thank you.

9 Q: Let's go to the bottom where we have the
10 discussion of the unstabilized inlet zone.

11 **MR. WALKER:** If you could, put up what you just
12 had, please, sir.

13 Q: So the report says, in discussing the area in
14 which Captain Sam's is an unstabilized inlet
15 zone, in unstabilized inlet zones, the
16 baseline is established at the most landward
17 shoreline position at any time during the
18 past 40 years, unless the best scientific and
19 historical data of the inlet and adjacent
20 beaches indicate that the shoreline is
21 unlikely to return to its former position.
22 As I understand your testimony, the
23 Department looked at available data and
24 determined that it was not unlikely the
25 shoreline would return to its former



1 position; is that correct?

2 A: Not unlikely, yes.

3 Q: It is a very confusingly-worded statute, but
4 that is what the Department determined. And
5 because of that, the Department then was
6 going to look for the most landward
7 shoreline, according to this memo?

8 A: That's what it says.

9 Q: And the Department, in doing that, was not
10 looking for the most landward point of
11 erosion as stated in the statute, it was
12 looking for the most landward shoreline,
13 correct?

14 A: So a couple of things on this -- on what
15 you're asking here to get a little bit of
16 context. So may I see the first page of this
17 document to see the date? Okay. Thank you.
18 So the section that you had pulled up -- and
19 if you wouldn't mind pulling that up again
20 for me. It's paraphrasing the statute. The
21 statute, we've all heard it a hundred times
22 in this case already. The Department knows
23 that the statute says, the most landward
24 point of erosion at any time in the last 40
25 years. And we've indicated a number of times



1 that we are looking for the most landward
2 point of erosion, we are using vegetation
3 lines as a biological indicator or a proxy
4 for that landward point of erosion, and this
5 is still in line with all of that testimony.

6 Q: We heard a new -- I think a new term. You
7 said that the most landward shoreline is an
8 indicator of the most landward point of
9 erosion?

10 A: That's correct.

11 Q: It's an indicator, which is something
12 different than the actual most landward point
13 of erosion. It's just an indicator, correct?

14 A: As I said in my deposition, it indicates
15 where it is.

16 Q: Are you saying it's in the same location or
17 it is a proxy for where it would be? Let me
18 rephrase that. Are you saying that an
19 indicator of the most landward point of
20 erosion is the most landward point of
21 erosion?

22 A: I think we're wordsmithing here, but what the
23 Department is saying is that the line of
24 stable natural vegetation, let's say it's
25 here, and we're saying that seaward of that



1 there is sufficient inundation and
2 sufficient, you know, erosional influences to
3 prevent that line of stable natural
4 vegetation from moving seaward. So the
5 statute indicates the most landward point of
6 erosion, it indicates a point of erosion.
7 And as I testified earlier, we're looking for
8 that line to establish that baseline. So the
9 landward point of erosion isn't explicitly
10 indicated in statute as to -- it doesn't say,
11 the landward point of erosion, and that
12 feature is X. We have the active beach
13 definition, we have the scientific literature
14 to guide us, we have various reports. And
15 all of those lead us to using that vegetation
16 line as an indicator or a proxy of where that
17 landward point of erosion is located.

18 Q: As we heard yesterday, the line of vegetation
19 is not equivalent to a line of erosion, is
20 it? In other words, the beach could be
21 accreting gradually. And as it is, the line
22 of vegetation is moving seaward too, right?
23 So the line of vegetation on an accreting
24 beach, without an erosional event, is not an
25 indicator of erosion, is it?



1 A: So two things. It is an indicator of the
2 landward position of erosion. We're not
3 saying that at the vegetation line there is
4 erosion happening, because it is a line of
5 stable natural vegetation. We're saying it's
6 the landward -- so I think we're splitting
7 hairs here. We're saying, here we're having
8 erosion and inundation, and here we're
9 having, you know, a stable -- you know,
10 stable vegetation that's landward. I think
11 what you're asking me is, is erosion
12 happening here or here or here? What we're
13 saying is that erosive inundation actions are
14 sufficient on this side of the line to
15 prevent that vegetation from forming, and on
16 this side the vegetation is able to form and
17 become stable and dense and all of that. In
18 addition, there is support in the scientific
19 literature for a vegetation line being an
20 indicator of erosion on the seaward side of
21 that.

22 Q: On an accretional beach though, and that's
23 where I want to go. We're not dealing with a
24 hypothetical where we're on an eroding beach,
25 so that there's a scarp right by the



1 vegetation. We're dealing with an accreting
2 beach. If there is an accreting beach
3 without a scarp and the vegetation is moving
4 seaward, that vegetation is not indicative of
5 erosion, is it?

6 A: There is not ---

7 Q: Yes or no, please.

8 A: There is not -- I'm not trying to argue with
9 you, but I think it's important to say that
10 the statute isn't asking us to go out there
11 today and say, is there erosion at a
12 vegetation line. I think what we're saying -
13 - I think we're saying the same thing. We
14 have a line of stable natural vegetation. Is
15 there erosion happening landward of this
16 line? No. We both said that there's stable
17 vegetation there. Has that line, as of
18 today, moved seaward? No, it hasn't. Why?
19 Because there are erosive forces and
20 inundation that are stopping that line from
21 moving seaward. Now, if, over time, those
22 forces abate or the beach builds out, then
23 the line will move. But at any given time,
24 this is a landward point of inundation and
25 that is why the line of vegetation isn't



1 moving. And as I said, there's scientific
2 peer reviewed literature that supports the
3 vegetation line as an erosive indicator.

4 Q: It's not erosion that prevents the plants
5 from moving seaward. Plants can't exist on
6 the active beach, because of saltwater,
7 correct? It kills them, they can't live
8 there, right?

9 A: Right. They cannot handle the inundation
10 from the high water.

11 Q: So the fact that there's a line of vegetation
12 does not mean necessarily that it stops an
13 erosional feature. It's more indicative that
14 those plants are above the active beach,
15 correct, the ebb and flow of saltwater?

16 A: The stable line of natural vegetation is
17 above active beach.

18 Q: Going back to the line report. If we could
19 go to the next paragraph, please, on page
20 two. And I think it's --

21 **MR. WALKER:** If you would, go down to -- two-
22 thirds of the way down. Keep going.

23 Q: There's something called the Southern
24 Unstabilized Inlet Zone. Is that the
25 paragraph that addresses Captain Sam's Spit



1 in the line report?

2 A: It is.

3 Q: And here's where the line report refers to
4 what you say the Committee determined to be
5 the baseline. And it refers to the -- at
6 least -- going to the last sentence,
7 specifically, the baseline position is
8 comprised of wet/dry shoreline positions from
9 1983 and historical vegetation line positions
10 from '88 -- 1988 and 1999, correct?

11 A: That's correct. That's what it says.

12 Q: And then we find later that, when the
13 Department reviewed and reconsidered its
14 position on remand after the baseline
15 reformat, that the Department abandoned the
16 '83 wet/dry shoreline?

17 A: Yes, we did not use that.

18 Q: And across the neck of Captain Sam's, the
19 principle shoreline used was the 1988
20 shoreline, correct?

21 A: That's correct.

22 Q: And the Department did make an adjustment
23 towards Beachwalker Park of the '88 shoreline
24 upon review, but did not adjust it in the
25 neck; is that fair?



1 A: I believe there were minor modifications in
2 the neck area. I think we reviewed the
3 entire shoreline.

4 Q: What I'd like to do is to go to the '88
5 photograph that was the basis for the '88
6 aerial analysis. And that's at -- the larger
7 one, is it Respondent's Exhibit 13. I've got
8 the wrong one.

9 **MR. WALKER:** Can we go to Joint Exhibit -- let me
10 make sure I've got the correct one. It would
11 be Respondent's Exhibit -- if we'd go to
12 Joint 13, please?

13 **(Joint Exhibit Number 13 was referenced.)**

14 Q: We saw this photograph, I think, a lot this
15 morning. Is this the '88 photograph? Do you
16 recognize that, the aerial?

17 A: Yeah.

18 Q: And Joint 13 also includes some closeups that
19 we looked at yesterday.

20 **MR. WALKER:** And, Alex, if we could go to the next
21 one.

22 **MR. ROSEN:** I'm sorry. Next ---

23 **MR. WALKER:** The next page. It may be the next
24 exhibit. Let's go back to where we were,
25 please. Yeah, this is what -- what is this



1 one?

2 **MR. ROSEN:** This is Joint 14.

3 **MR. WALKER:** Joint 14. Thank you.

4 **(Joint Exhibit Number 14 was referenced.)**

5 Q: So we're looking at Joint 14. Do you
6 recognize this as the enlargement of the '88
7 area?

8 A: Yes.

9 **MR. WALKER:** If we could go to the next slide
10 please on this -- I mean, the next page.

11 Q: And this is the area that is approaching the
12 neck on the '88 aerial; is that correct?

13 A: Correct.

14 Q: And I believe you testified that the
15 Department was trying to locate the baseline
16 at the upper edge of the landward side of the
17 active beach.

18 A: That's correct.

19 Q: So, according to the Department, the active
20 beach, according to its interpretation, the
21 edge of it is that blue line?

22 A: Correct.

23 Q: All right. And you would agree, we talked
24 about this in your deposition, that if there
25 were a continuous line of stable vegetation



1 seaward of that, then that would be where the
2 vegetation line should be?

3 A: I recall that section of the testimony in the
4 deposition. I think what I said was that we
5 would be looking to if there were any other
6 vegetation lines that were landward to see if
7 those would be appropriate to use.

8 Q: Well, I will rephrase the question.

9 A: Okay.

10 Q: If the fact finder were to determine that
11 there were a line -- there was a line of
12 continuous stable vegetation seaward of the
13 line picked by OCRM, then that would be a
14 line that would be above the active beach,
15 correct?

16 A: Can you say that one more time? I'm sorry.

17 Q: I was afraid you were going to ask me to do
18 that.

19 A: You said the fact finder found ---

20 Q: If the fact finder finds that there is a line
21 of stable vegetation that is seaward of the
22 line that OCRM picked, then that line would
23 be the demarcation of the active beach?

24 A: It would be the line of stable natural
25 vegetation. That's what you're saying.



1 They're finding a line of stable natural
2 vegetation.

3 Q: I'm just trying to invoke the definition of
4 active beach.

5 A: Right.

6 Q: Which is the most landward line of stable
7 vegetation?

8 A: Correct.

9 Q: Or an escarpment?

10 A: Correct.

11 Q: And here, we're not looking at scarp
12 features, but there is testimony about
13 vegetation, fair?

14 A: I believe I said in my deposition that in
15 this area there was some evidence of
16 scarping. But to answer your question in
17 terms of the vegetation, I think that's
18 correct.

19 Q: If this shaded area on this photograph is
20 determined to be stable vegetation, then it
21 cannot, in any way, be on the active beach,
22 can it? Because vegetation can't exist where
23 there is daily or periodic salt water
24 innundation

25 A: So let's be careful to not forget the key



1 word in the active beach definition, which is
2 line. A line, by its definition, is
3 continuous. Something that is continuous is
4 not interrupted, unbroken. It's continuous.
5 So we're arguing that ---

6 **MR. WALKER:** Your Honor, I would object to her
7 making an argument to The Court. My question
8 was, if there are living plants in that zone,
9 then they cannot be on the active beach,
10 because they would be subject to saltwater
11 inundation that would kill them. And now
12 she's talking about -- making an argument
13 about what the definition of active beach
14 means and not talking about whether plants
15 can survive in the intertidal zone.

16 A: I'm not talking about the intertidal zone.
17 What I'm saying is that it doesn't tell us to
18 look for a single plant here or a single
19 plant there. There are areas in the active
20 beach that are not inundated on a daily
21 basis. And so in those areas, plants may be
22 able to sprout up temporarily because they're
23 not being inundated twice a day by the
24 intertidal zone. We're not suggesting that
25 the active beach is only the intertidal zone.



1 So again, I refer back to the statute simply
2 because that's providing the guidance to the
3 Department and we're looking for that line of
4 stable natural vegetation. It doesn't say
5 the first clump, it doesn't say the first
6 piece of stable natural vegetation. It tells
7 us to look for a continuous line. And so
8 that's what we're looking for.

9 Q: Going back to the photograph. What would you
10 identify these very dark images as being?

11 A: They're vegetation.

12 Q: These are full grown shrubs, correct?

13 A: That's right.

14 Q: And would you hazard that there may be --
15 they may be wax myrtle bushes?

16 A: I wouldn't hazard a guess.

17 Q: But would you agree they've been there for
18 some time to be of that size?

19 A: I can't indicate how long they've been there.
20 I'm not familiar with the vegetation's life
21 cycle, but they look like they're
22 established.

23 Q: They're very well established, aren't they?

24 A: I would agree that they're established.

25 Q: And before you get to plants like this, you



1 have smaller plants, and then you have medium
2 plants, there's a succession of plants,
3 correct?

4 A: Correct.

5 Q: And there's nothing in the regulations that
6 says a plant has to be of a particular
7 elevation before it can be considered, it
8 just has to be stable.

9 A: Correct.

10 **MR. WALKER:** One moment. Could you please put up
11 48-39-270(13)? Thank you.

12 Q: A minute ago, you said that the regulatory
13 criteria was that the vegetation had to be a
14 continuous line. Does vegetation grow in a
15 continuous line like a military formation?

16 A: I did not mention the military in my
17 testimony.

18 Q: Plants grow kind of randomly, right?

19 A: Plants along the beaches in South Carolina
20 generally have shore -- parallel shorelines,
21 which are obviously not completely parallel
22 in the inlet zone, but -- and they have that
23 because the ocean is coming in and they're
24 getting inundated by this line of water
25 coming in every day. So I think that is what



1 they are referencing when they're talking
2 about a first line, because they know that
3 you're not going to have vegetation popping
4 up here and here and here and here, certainly
5 not in areas where you're getting regular
6 inundation from the high water.

7 Q: When you talk about the active beach, do you
8 mean to be referring to the definition of
9 active beach that's in the Code?

10 A: That we're looking at right now?

11 Q: Yes.

12 A: That's the definition.

13 Q: Can you show me in this definition where it
14 says continuous?

15 A: I thought you might say that. It doesn't say
16 continuous. It says first line. And a line
17 is continuous. I mean, I think we can all
18 agree to that.

19 Q: If I did a line like this, are you saying
20 that's not a line because -- you're saying a
21 straight line? A line is a two dimensional -
22 --

23 A: Sure.

24 Q: There's a book we read in school called
25 Flatland about two dimensions. So a line



1 doesn't have to be straight, does it?

2 A: No, it doesn't.

3 Q: This is a line, isn't it, if it's just in two
4 dimensions connected?

5 A: It is.

6 Q: All right.

7 A: Would you mind pulling up -- sorry. Would
8 you mind ---

9 Q: I was going to change subjects, but if ---

10 A: Okay. I just was going to add something
11 else, but if you want to change subjects.

12 Q: Moving along. This morning we looked at your
13 overlay of the '82 imagery and the -- was it
14 the 2019 imagery that you overlaid?

15 A: That's right.

16 Q: And in that image, when you overlaid the two,
17 not only -- I think you mentioned this, but I
18 just want to make sure I heard it, because I
19 think I saw it. You mentioned that the
20 entirety of Captain Sam's Spit is moving
21 seaward.

22 A: The portion that we had on the screen. The
23 portion that we've looked at, yes.

24 Q: Including the portion that is away from the
25 curve that is now marsh, part of that is



1 moving seaward too, correct?

2 A: We can see that in the image.

3 Q: So it's not just the neck that is moving
4 seaward, other parts of Captain Sam's are
5 migrating seaward geologically, correct? Let
6 me just say they're migrating seaward.

7 A: Yes, they're moving in this direction, yes.

8 Q: People don't think of it, but it is moving
9 seaward with the accretion?

10 A: So I think it's important to point out that
11 the example that I gave earlier was, we had a
12 shoreline along, you know, a beach. And we
13 had the active beach, we had the dune system.
14 And in some places that moves into, you know,
15 the land, whether it's developed or it's
16 natural maritime force, what have you. This
17 situation is different because what Mr.
18 Walker is saying is that we're getting
19 accretion on the ocean side. But we're
20 really moving ---

21 **MR. WALKER:** Your Honor, I would object to her
22 characterizing my testimony and making a
23 speech to The Court rather than answering my
24 question. She just turned to The Court and
25 said what I was saying and what she really



1 meant, and I had a specific question dealing
2 with the migration of the shoreline of the
3 whole spit seaward.

4 **THE COURT:** Now, if you would, just answer the
5 question that's being posed to you.

6 **THE WITNESS:** Yes, Your Honor.

7 **THE COURT:** If you need to explain it further, I
8 will give you the opportunity to do that.

9 **THE WITNESS:** Thank you, Your Honor.

10 Q: There was also testimony from you about the
11 reduction in width of the dune field on
12 Captain Sam's from 1982 to 2021, correct?

13 A: That's correct.

14 Q: You, in this case, did some calculations for
15 your expert, Mr. Jones, about the width of
16 the dune field; did you not?

17 A: That's correct.

18 Q: From, I think, 1982 to 2021, something like
19 that?

20 A: I'd have to look at the table to be certain.

21 Q: And the dune field that you were measuring
22 was the neck dune field?

23 A: That's correct.

24 Q: And as I understand your measurements,
25 without getting -- I'm going to use some



1 approximations. But the starting point in
2 1982, based on your read of that paragraph,
3 was it was approximately 320 feet wide, that
4 dune field?

5 A: That's correct.

6 Q: And in 2015 when you measured that dune
7 field, it was actually 350 feet wide
8 approximately, right?

9 A: I'd have to check the table, but ---

10 Q: It did grow slightly to 2015 -- by 2015, the
11 width?

12 A: Again, without looking at the table, I would
13 have to guess. But my recollection of -- or
14 estimate. But my recollection of the width
15 was that it -- there was some increases and
16 decreases over time. And then if you
17 compared the '82 to the 2015, there was an
18 increase.

19 Q: So the decrease in the width of the neck
20 occurred as a result of the two hurricanes
21 that hit in successive years?

22 A: Not entirely.

23 Q: Can we say principally ---

24 A: There was ---

25 Q: --- along with the -- you're right. Let me



1 rephrase that. Fair enough. That the
2 reduction in width was due to two things,
3 there had been corrosion on the river side
4 and the two storms had reduced the ocean
5 side?

6 A: That's fair.

7 Q: Okay. Ms. Phelan also asked you about the
8 baseline and setback line, and there was some
9 comment, maybe, that it was not a no build
10 zone between the setback line and the
11 baseline, but one could not build -- there's
12 no exception, that you know of, that allows
13 somebody to build a dirt road between the
14 setback line and the baseline, is there?

15 A: I'm not a permitting manager. I don't think
16 I can answer that to the best of my
17 knowledge.

18 Q: Even though you're not the permitting
19 manager, you were an author of this manual we
20 looked at earlier that explained what you
21 could and could not do in relation to the
22 setback line and baseline. Are you now
23 saying you don't know what you can and cannot
24 do between the setback line and the baseline,
25 despite referring to it in your report?



1 A: Can you be specific about the document that
2 you're talking about?

3 Q: It could have been in your slide show. I
4 think it would be Joint Exhibit 12.

5 A: Okay.

6 Q: Unfortunately, we don't have the whole
7 report. Well, I will compress it by saying
8 that the materials that were released by the
9 Department, and in particularly the full
10 version of that report, did say that the line
11 -- or the area between the baseline and the
12 setback line was not a no build zone or
13 something like that.

14 A: That's correct.

15 Q: And I think you said in response to Ms.
16 Phelan's questions that you could build a
17 swimming pool and some other things, right?
18 Didn't you say that or did I ---

19 A: I said that there are limitations to the
20 activities that you can do for things like
21 habitable structures, pools, and erosion
22 control structures. But it's us saying that
23 it's not a no build zone, the reason we put
24 that language in is because there is a
25 misconception that you can't do anything. So



1 that is kind of a broad statement that we
2 provide to the public to let them know that
3 there are activities that can occur seaward
4 of the setback line.

5 Q: Among the activities that cannot occur is
6 that a property owner can't construct a road
7 in the area between the baseline and the
8 setback line, correct?

9 A: I can't provide testimony to that. I'm
10 familiar with the -- I am more familiar with
11 the activities associated with habitable
12 structures, pools, and erosion control
13 structures. But there is a long series of
14 activities that can occur seaward of the
15 setback line, and I, not being a permitting
16 manager, don't feel comfortable to testify to
17 each of those activities.

18 Q: We touched on this this morning too about
19 policies and procedures. I think we
20 clarified it, but let me ask you. You know
21 of no formal action by the Board of DHEC
22 adopting any policies, procedures, or
23 guidelines for the implementation of the
24 jurisdictional lines, do you?

25 A: I'm not aware of anything that's been adopted



1 by the Board.

2 Q: And the reports that we have looked at or the
3 documents we've looked at have been generated
4 by staff, correct?

5 A: Specifically which document?

6 Q: Well, the 2016-'17 jurisdictional line.

7 A: Correct.

8 Q: The slide show that you showed.

9 A: Correct.

10 Q: All of the memos from the 2008-2009
11 delineation cycle for Kiawah by Mr. Eiser.

12 A: Correct.

13 Q: The line report for Kiawah for this
14 delineation cycle.

15 A: Correct.

16 Q: I have not seen anything that represented a
17 formal policy adopted by the DHEC Board for
18 the implementation and determination of the
19 jurisdictional lines on this -- when you have
20 to do so when the cycle comes around. Do you
21 know of any?

22 A: I'm not aware of something that's been
23 adopted by the DHEC Board.

24 **THE WITNESS:** Excuse me, Your Honor. Is there any
25 way I could have a short restroom break?



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1 **MR. WALKER:** That's fine. Very good.

2 **THE WITNESS:** Thank you very much.

3 **THE COURT:** Ten.

4 **(Off the record from 3:49 p.m. until 4:12 p.m.)**

5 **THE COURT:** We're back on the record. You can
6 continue, Mr. Walker.

7 **Q:** Ms. Boynton, when the Department extended the
8 comment period beyond December 31st, 2017,
9 there were a number of appeals, correct?

10 **A:** That's correct.

11 **Q:** And would you say there were probably 40 or
12 50 appeals? Or if you have a better
13 estimate, that's fine. That's what I
14 understood. If you have a better estimate,
15 we'll go with that.

16 **A:** I don't have a better estimate.

17 **Q:** At this time, is this the only baseline
18 appeal the department has not resolved?

19 **A:** To my knowledge, that's the case.

20 **Q:** Is it your recollection that, when Captain
21 Sam's Spit came up in the Jurisdictional Line
22 Review Committee, that nobody made any
23 comment about the potential development of
24 Captain Sam's to the west of the neck?

25 **A:** Towards the inlet?



1 Q: Right.

2 A: That's my recollection.

3 Q: So it's your recollection that nobody said,
4 if the baseline remained where you set it,
5 that it would, in effect, inhibit or stop any
6 development of the subdivision, the 20 acres?
7 Is that your recollection?

8 A: Yes, that's my recollection.

9 **MR. WALKER:** No further questions.

10 **MS. BOYNTON - REDIRECT EXAMINATION BY MS. PHELAN:**

11 Q: Ms. Boynton, Mr. Walker asked you a whole
12 series of questions about documents related
13 to the Jurisdictional Line Review Panel. And
14 I just have one question for you. Are you
15 aware of any document that was substantive
16 about Captain Sam's Spit and the placement of
17 the jurisdictional lines that has not been
18 produced in this case?

19 A: I am not aware of any.

20 Q: Do you recall anything happening in the
21 Jurisdictional Line Review Panel related to
22 Captain Sam's Spit lines that stands out in
23 your memory?

24 A: No. Kiawah -- so we would have assessed
25 Captain Sam's along with the rest of Kiawah.



1 And Kiawah Island was assessed in the same
2 manner as the other beaches along -- in the
3 state.

4 Q: Do you recall whether any -- there was any
5 variation of what procedure was followed
6 during the Panel Committee for Captain Sam's
7 Spit?

8 A: No.

9 **MS. PHELAN:** Can you pull up Respondent's Exhibit
10 44?

11 **(Respondent's Exhibit Number 44b was introduced.)**

12 Q: Do you recall -- Mr. Walker just asked you
13 about the measurements that you performed at
14 the neck. I'm showing you what's been marked
15 as 44. And I'm going to mark this as 44b.
16 It's the second page. So this will be 44b.
17 Do you recognize this document?

18 A: I do.

19 Q: Can you tell me what it is?

20 A: This is the 2021 drone imagery. We've seen
21 this previously. And there are two
22 measurements on the screen here. We have ---

23 Q: Before you testify, just let me ask you about
24 the drone imagery.

25 A: Yes, okay. Sorry.



1 Q: How was this imagery taken?

2 A: It was collected with the Department's drone.

3 Q: And who collected the line -- I mean, who
4 collected the imagery?

5 A: The drone was flown by OCRM staff.

6 Q: And can you tell me just about how many
7 flights there were in making this drone
8 image?

9 A: Captain Sam's Spit -- so in making this
10 image, there was one flight.

11 Q: One flight. Okay. And were you there the
12 day that it was flown?

13 A: Yes.

14 Q: Was there anything done to ensure the
15 accuracy of this drone photo?

16 A: Yes, we placed ground control points out in
17 the field and collected those with a survey
18 grade GPS unit.

19 **MS. PHELAN:** Respondent would move Exhibit 44(b)
20 into evidence.

21 **MR. WALKER:** One moment, Your Honor. No
22 objection.

23 **THE COURT:** It's admitted.

24 **MR. WALKER:** Late in the day. I've run out of
25 objections.



1 **(Respondent's Exhibit Number 44b was marked and**
2 **entered into evidence).**

3 Q: Now, can you tell us about this figure?

4 A: Earlier, we saw a 1982 aerial image that
5 showed that distance measurement of 322 feet
6 at the neck from the river side to the ocean
7 side. And this is simply the same type of
8 measurement taken on the most recent aerial
9 imagery, this drone imagery. And we're
10 showing the two different widths and the two
11 different measurements between 1982 and 2021.
12 We can see that the width of the dune field
13 has gone from 322 to 235 feet.

14 Q: What does the end of the 322 line segment
15 indicate at the top of the page?

16 A: That's the edge of the river side. That's
17 the escarpment on the river side.

18 Q: And the measurement was taken from the
19 escarpment on the river side to what
20 position?

21 A: To the edge of the dune field on the ocean
22 side.

23 Q: And what about the 235 measurement that
24 you've shown here?

25 A: The same measurements were taken.



1 Q: But that was for what time period?

2 A: 2021.

3 Q: So the 322 measurement was taken from a 1988?

4 A: '82.

5 Q: I'm sorry. '82. And the 235 was taken from
6 the 2021 drone measurement?

7 A: That's correct.

8 Q: And so what do we know about the position of
9 the neck area?

10 A: This tells us that the neck area has narrowed
11 by 80 to 90 feet.

12 **MS. PHELAN:** That's all, Your Honor. Thank you.

13 No further questions.

14 **MR. WALKER:** Is that 44b?

15 **MR. ROSEN:** Yes, sir. I think so.

16 **MS. BOYNTON - RECROSS-EXAMINATION BY MR. WALKER:**

17 Q: Just a few questions about this. So the
18 black line was what you measured to be the
19 distance from the river to the edge of the
20 dune field in 1982?

21 A: That's correct.

22 Q: Three hundred and twenty two feet. And as we
23 talked about earlier, in 2015 before the
24 storms hit, the width of the dune field had
25 actually gotten up to 350 feet, right?



1 A: I think I had indicated that the dune field
2 had -- between 1982 and 2015, there had been
3 variable measurements of the dune width. But
4 at the 2015 point, it was more than, I
5 believe, 322. I'd have to look at the table
6 to be certain.

7 Q: All right. And there is an overlap here. So
8 that's not 322 from that imaginary point,
9 which is the river shoreline in '82. It
10 actually extends some distance to about here?

11 A: To the end of the black line.

12 Q: Yeah. And when measuring the dune field in
13 2021 and you came out to this point right
14 here, correct?

15 A: That's correct.

16 Q: So this is a continuous line of stable
17 vegetation, correct?

18 A: At that point.

19 **MR. WALKER:** All right. Thank you. No further
20 questions.

21 **THE COURT:** Thank you. We're now close to 4:30.
22 I'm going to break for the day.

23 **MS. PHELAN:** Yes, Your Honor. We'd all appreciate
24 a break for the day. It's been a long day.

25 **MR. WALKER:** It's unanimous.



1 **THE COURT:** Okay. We'll resume tomorrow morning
2 at 9:00 o'clock, and we'll be out by 1:00.

3 **MS. PHELAN:** By 1:00?

4 **THE COURT:** Is that wishful thinking?

5 (There being nothing further, the hearing adjourned
6 at 4:22 p.m. on Thursday, August 26, 2021, and
7 reconvened on Friday, August 27, 2021, at 9:12
8 a.m.)

9 **DAY FOUR - FRIDAY, AUGUST 27, 2021**

10 **CALL TO ORDER:**

11 **THE COURT:** If everyone is ready, we're back on
12 the record.

13 **MS. PHELAN:** Your Honor, the state would call Mr.
14 Christopher Jones to the stand. I should say
15 DHEC would call Mr. Christopher Jones.

16 **THE COURT:** Mr. Jones, if you'll face the court
17 reporter, raise your right hand, she will
18 swear you.

19 **COURT REPORTER:** Do you swear that the testimony
20 you give is the truth, the whole truth, and
21 nothing by the truth, so help you God?

22 **MR. JONES:** I do.

23 **COURT REPORTER:** Thank you. Please state and
24 spell your first and last name for the
25 record.



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1 **MR. JONES:** Christopher Jones. C-H-R-I-S-T-O-P-H-
2 E-R J-O-N-E-S.

3 **COURT REPORTER:** Thank you.

4 **CHRISTOPHER JONES,** having been duly sworn,
5 testifies as follows:

6 **MR. JONES - DIRECT EXAMINATION BY MS. PHELAN:**

7 Q: Good morning, Mr. Jones.

8 A: Good morning.

9 Q: Can you state your name again and tell us
10 where you live?

11 A: Christopher Jones. I live in Durham, North
12 Carolina.

13 Q: Can you tell us a little bit about your
14 educational background?

15 A: I was raised in Florida. I attended the
16 University of Florida. I have a Bachelor's
17 Degree in Engineering Science and a Master's
18 Degree in Coastal and Oceanographic
19 Engineering.

20 Q: And what is coastal and oceanographic
21 engineering?

22 A: It's kind of a combination of civil
23 engineering and oceanography.

24 Q: Do you have a focus for your coastal and
25 oceanographic engineering degree?



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1 A: My focus is coastal processes, specifically
2 tidal inlets.

3 Q: Could you tell us a little bit about your
4 work history?

5 A: I started out working for a small consulting
6 firm in Naples, Florida called Suboceanic
7 Consultants. We did coastal engineering
8 work, beach nourishment projects, shoreline
9 assessments, marina work. We also did
10 underwater inspections of structures,
11 pipelines, bridges, things like that. After
12 two years ---

13 Q: I neglected to ask you about your grad work
14 in Florida. What did you study for your
15 graduate ...

16 A: Sand bypassing and tidal inlets.

17 Q: Can you tell us a little bit more about that?

18 A: The study specifically was about what we call
19 artificial sand bypassing. It's when jetties
20 at an inlet block the flow of sand from one
21 side to the other. People will try to dredge
22 or move sand from the -- what we call the
23 updrift side where the sand accumulates, to
24 the downdrift side where the erosion is
25 usually severe.



1 Q: Okay. Go ahead and continue with your work
2 history.

3 A: So, after I left Suboceanic Consultants, I
4 went to work for the University of Florida,
5 their Florida Sea Grant program. It's a NOAA
6 funded and state funded program. There's a
7 South Carolina Sea Grant program as well. I
8 was there for six or seven years as a
9 statewide coastal engineering specialist. I
10 would advise local government, state
11 agencies, and private interests on matters
12 related to coastal processes, erosion,
13 erosion control, and sometimes marinas.

14 Q: And what did you do next? What did you do
15 next?

16 A: Next I moved to South Carolina and I worked
17 for Coastal Science & Engineering. We've
18 heard that name already in the case. After
19 three or three and half years I moved to
20 Charleston and I managed an office for
21 another coastal engineering firm called
22 Applied Technology & Management.

23 Q: What kind of work did you do for Coastal
24 Science & Engineering?

25 A: We did shoreline assessments. We did -- we



1 worked on work for the South Carolina Coastal
2 Council developing the interim baselines and
3 setback lines in 1988. We were quite busy
4 after Hurricane Hugo in 1989 with erosion
5 studies and the like. I also started working
6 for the Coastal Council as an expert witness
7 during that period.

8 Q: Can you tell us a little bit more about that?

9 A: I don't know how many cases I was involved
10 in, but after the passage of the Beachfront
11 Management Act, there was a flurry of cases
12 related to the establishment of the lines,
13 where they were, and what the implications
14 were for development. In the 1988 Beachfront
15 Management Act, there was no provision for
16 construction and the setback area. The 20-
17 foot setback area was called the dead zone.
18 So, there were a lot of people that were
19 concerned about takings issues, including
20 David Lucas on Isle of Palms. So, I was an
21 expert in the Lucas case.

22 Q: And what type of case was takings Lucas case?

23 A: Lucas was the takings case where his property
24 was entirely seaward of the baseline. And
25 the law would not permit any development



1 there.

2 Q: All right. And you mentioned that you had
3 managed ATM and worked there for three years?

4 A: Yes.

5 Q: What type of work did you did with ATM?

6 A: Largely the same kind of work, shoreline
7 assessments. I worked on local comprehensive
8 Beachfront Management Plans that were
9 required by the state. I worked on those.
10 So, it was essentially a continuation of the
11 kind of work I did as CSE.

12 Q: And what did you do next?

13 A: Next, I moved to Charlottesville, Virginia.
14 My wife graduated with her Ph.D. from USC
15 here in Columbia. And we moved there so she
16 could teach at the University of Virginia.
17 And it didn't really matter where I lived, as
18 long as I had an airport. Not much of my
19 work is local. And after a couple of years
20 working for a small firm, who was bought out
21 by a larger firm, then a larger firm, I quit
22 and started working for myself in 1997. And
23 I've done that ever since. In 2000 we moved
24 to North Carolina where my wife teaches at
25 UNC, Chapel Hill.



1 Q: In the course of your work as a coastal
2 engineer, have you studied and researched the
3 coastal processes along the coast?

4 A: Yes, I have.

5 Q: Can you tell me a little bit about that?

6 A: Well, I've done quite a bit of work in South
7 Carolina. I've worked in other states;
8 Florida, Delaware, Texas, Massachusetts,
9 Alaska, California, American Samoa. So, all
10 over the country; the Great Lakes, shoreline
11 erosion studies, primarily shore front
12 management plans, advice on setback line. I
13 started doing more work for FEMA, the
14 Federal Emergency Management Agency, related
15 to coastal flood hazard identification, flood
16 maps, drawing the map, setting the standards
17 for drawing the maps, as well as building
18 code work for flood resistant design in
19 coastal areas.

20 Q: Did your experience in shoreline change
21 including -- does that include looking at
22 rates of accretion and erosion?

23 A: Yes.

24 Q: And does it include assessing impacts from
25 the erosion rates or the accretion rates?



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1 A: It includes assessing the impact of shoreline
2 change on upland development. When I say
3 shoreline change, I'm talking long-term, but
4 also short-term storm effects principally.

5 Q: Did you look at shoreline changes in the
6 vicinity of inlets?

7 A: Yes.

8 Q: Could you tell us a little bit about that?

9 A: Well, I looked at, as I said, inlets
10 throughout Florida, many inlets in South
11 Carolina, some inlets in other states as
12 well. Looking at the movement of sand around
13 the inlets into the shoals and on the ebb
14 side, the inside, and the flood side, the
15 outside -- or rather backwards, the flood
16 side on the inside, the ebb shoals would be
17 on the outside. So, we looked at the
18 movement of sediment into and across and
19 around the inlets.

20 Q: Did your study and research include beach
21 profile information?

22 A: Yes. I have collected many beach profiles.
23 I have been swimming off the coast in a
24 wetsuit with a survey rod many times. So, I
25 have collected the information. I have



1 analyzed the information. I've also looked
2 at many years of beach profile data in the
3 Florida Panhandle after Hurricane Opal in
4 1995. Collected many years of shoreline
5 change on the Lake Michigan shoreline in
6 Wisconsin. I've looked at shoreline change
7 for the State of Delaware. So, all those
8 were fairly detailed analyses of the profile
9 data and aerial photos. And then I almost
10 always looked at photos and profile data for
11 any study that I'm involved in.

12 Q: Has any of your research and study included
13 looking at inlet stability?

14 A: Yes. If we talked about inlets in general
15 terms, they're kind of a battle ground.
16 We've got waves, which tend to drive sand
17 toward the inlet trying to close it. We have
18 tides trying to scour the sand out of the
19 channels, trying to keep them open. And as a
20 consequence, inlets are very dynamic and they
21 move, they migrate, sometimes they close,
22 sometimes new ones open. So, we look at all
23 that. And I have to say one thing, if I can.
24 I've been diagnosed with essential tremors,
25 so my hand shakes, and you'll see me up here



1 shaking. It happens when I'm stressed and
2 tired. And after a long week here, I'm in
3 that condition, so I apologize.

4 **THE COURT:** That's understandable. I am, as well.

5 Q: You mentioned that you worked with FEMA. Did
6 that work include assessing storm impacts on
7 the coast?

8 A: Yes, I have been working with FEMA since the
9 mid-1990s. And I have been post-storm
10 evaluations, looking at the effects of storms
11 in both the land and the upland development.
12 So, I have chased almost all the major storms
13 that have hit the US. Hopefully, I won't
14 have to go to Louisiana again in a couple of
15 days. For Hurricane Laura we did our study
16 virtually because of Covid. But I've been
17 doing that for years. So, I used my coastal
18 engineering experience and knowledge to
19 inform work that I do on coastal hazard
20 mapping and building codes and floodplain
21 management.

22 Q: Can you tell us a little bit more about your
23 experience with coastal management, what does
24 that consist of?

25 A: Coastal management is a term that relates to



1 how to manage development along the coast
2 lines where there are competing interests,
3 there are many hazards. And just trying to
4 weigh the pros and cons and the balance of
5 how to develop or redevelop. I have advised
6 the State of South Carolina on establishment
7 of setback lines and erosion control policy.
8 I have advised the State of Florida on
9 erosion control and permitting seaward of
10 various setback line. I have advised the
11 State of Delaware on a coastal hazard and
12 vulnerability study, and an assessment of
13 their hurricane program, which is basically
14 response and recovery.

15 Q: Do you have any experience with interpreting
16 shoreline change from aerial photographs?

17 A: Yes.

18 Q: Can you tell us about that?

19 A: In coastal engineering we have looked at
20 aerial photos since we had aerial photos.
21 Now, I'm not that old, but going back into
22 the 70s, when I was looking at tidal inlets
23 and sand bypassing, we studied the aerial
24 photos that we had. In South Carolina we
25 relied on the aerial photos considerably when



1 we established the interim baseline and
2 setback line for this state. And just about
3 any project that I'm involved in, any
4 shoreline assessment work that I'm involved
5 in, we looked at aerial photos. And we look
6 for shorelines. We look for evidence of
7 erosion. We look for large-scale changes
8 overtime.

9 Q: Aside from the Federal Emergency Management
10 Agency, have you worked for any other federal
11 agencies?

12 A: I have. I've done work for the US Army Corps
13 of Engineers since 2004 on developing and
14 refining what we call damage functions. If
15 we have a flood depth of a certain amount or
16 a building is undermined a certain amount,
17 how does that translate into building damage?
18 For example, we might say that a three-foot
19 water depth on a building will result in 40
20 percent loss of value of that building. So,
21 I've worked the Corps on those kinds of
22 projects for many years. I'm currently on an
23 External Advisory Panel for a project funded
24 by NIST, National Institute of Science and
25 Technology. And there is a Center for



1 Resilience at Colorado State, and we are
2 advising them on their project.

3 Q: Do any of your experience with federal
4 agencies involve teaching courses?

5 A: Yes.

6 Q: Would you tell us about that?

7 A: I have taught maybe 50 courses on coastal
8 construction for FEMA, maybe a 1,000 students
9 around the country. I have taught the basics
10 of floodplain mapping to insurance industry
11 representatives in London who were doing
12 business in the US. And that's mostly --
13 I've given a lot of talks and presentations
14 at meetings and so forth.

15 Q: Did those courses involve teaching about
16 long-term erosion rates or shoreline changes?

17 A: The FEMA Coastal Construction class was one
18 where I dealt -- where I taught with someone
19 else, usually a structural engineer. And I
20 would teach the part about planning and
21 siting development, identifying flood and
22 erosion hazards, defining the load on
23 buildings, the flood loads and the
24 consequences of erosion. And I would deal
25 with those kinds of issues. In that -- as



1 doing that, I would always tell the students
2 not to focus on the long-term shoreline
3 change rate. It's important, but it's not
4 the only thing that we need to look at. It's
5 usually the storms and the short-term
6 changes. That's the most interesting part or
7 exciting part, I guess, because it causes the
8 greatest change and a lot of damage.

9 Q: In your work, have you become familiar with
10 Kiawah Island and Captain Sam's Spit?

11 A: I have.

12 Q: Could you tell us about that?

13 A: I've been working on Kiawah since the 1980s.
14 As part of Coastal Science & Engineering, we
15 were collecting beach profiles there. We
16 also studied Kiawah Island when we developed
17 the interim baseline and setback lines for
18 the Coastal Council in 1988. I've worked for
19 development interest on Kiawah between 1995
20 and 1999, I believe, looking at possible
21 revisions to baselines and setback lines.

22 Q: Did you participate in proposing any
23 beachfront management plans for towns?

24 A: Yes. One of the requirements that the
25 Beachfront Management Act was that local



1 governments develop plans that would allow
2 them to inventory their shoreline areas and
3 manage those shoreline areas. I wrote the
4 first plan for the Town of Kiawah Island in
5 1991. I wrote the plans for Horry County,
6 South Carolina. I wrote the plan for
7 Surfside Beach. I wrote the plan for the
8 City of Isle of Palms. And I'm still working
9 for the City of Isle of Palms on updates to
10 their plans over the years.

11 Q: Could you turn to Respondent's Exhibit 78,
12 please? I think it's in volume one. I stand
13 corrected, it's in volume two.

14 **(Respondent's Exhibit Number 78 was introduced.)**

15 A: Volume two.

16 Q: Can you just identify this document for me,
17 please?

18 A: This is my resume from June of 2021.

19 Q: Okay. And is that a current resume?

20 A: Yes.

21 Q: And does it summarize your professional
22 experience and background?

23 A: It does.

24 Q: And your education?

25 A: It summarizes much of it. After 45 years,



1 I've either forgotten or don't bother with
2 some things.

3 Q: Okay. And is there -- attached to this
4 resume, is there a list of your publications?

5 A: There is. And these are what I would call
6 true publications; published in journals,
7 conference proceedings, things like that. It
8 does not include project reports from the
9 many projects I've worked on over the years.

10 Q: Are there any publications that you would
11 like to direct our attention to that you
12 believe relate to issues that are before us
13 today?

14 A: Probably the -- starting in 1988. Let me
15 find it. I guess that's the project report.
16 I was going to refer to the interim setback
17 line report, that is not listed on here. But
18 there is a paper that I wrote with some
19 Coastal Council, Deborah Hernandez and Bill
20 Eiser, talking about the Lucas case and the
21 setback lines, that was a 1998 publication.

22 Q: Are any of these publications related to
23 assessment of shoreline change?

24 A: Many of them are. The 1998 shoreline
25 recession rate development on the Lake



1 Michigan coast would be one. 2001 with
2 Sriniva and Jones was related to the work
3 that we did on the analysis of beach profiles
4 in the Florida Panhandle after Hurricane
5 Opal. So, there are several in here.

6 Q: Are any of your publications related to the
7 storm impacts in coastal management?

8 A: I'm going to say yes. Many of them are
9 indirectly related, because I focus on the
10 impact of the storms, on flood loads,
11 building, codes and flood resistant design.
12 But in the coastal area, that is principally
13 driven by storms.

14 Q: I noticed that in 1989 there is a article
15 written here that's entitled Impact of South
16 Carolina Setback Line and Hurricane Hugo on
17 the South Carolina Coast.

18 A: That's correct.

19 Q: Could you tell us a little bit about that
20 paper?

21 A: That was a summary of -- that was in 1989 a
22 conference in Virginia Beach. I'm sorry,
23 that was South Padre. Another one was
24 Virginia Beach. It was kind of a summary of
25 what happened in South Carolina in the mid-



1 to-late 1980s with the establishment of the
2 lines, many of the lawsuits, including Lucas,
3 and the effects of Hurricane Hugo.

4 Q: And on the next page, which is Bates stamped
5 000346, several pages after your
6 publications, there's a page that's entitled
7 C. Jones Expert History. Did you compile
8 that?

9 A: I did.

10 Q: And could you just summarize for us -- you
11 talked about Lucas. What other expert
12 experience do you have?

13 A: Well, there were many challenges to the
14 baseline and setback line originally, so I
15 was involved in many depositions, gave some
16 affidavits. I can't remember how many of
17 those actually went to trial, Lucas certainly
18 did, so I was involved in those. I was
19 involved in a case that went for eight years
20 looking at erosion along the intercostal
21 waterway in Horry County, South Carolina, so
22 I was involved in that. I've been involved
23 in some FEMA work. And the last expert work
24 that I did was in 2016 related to Hurricane
25 Sandy in New York -- the site was actually in

