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2
3 SUPPLEMENTAL ENVIRONMENTAL IMPACT
4 STATEMENT(SEIS) TO EVALUATE THE POTENTIAL
5 DESIGNATION OF ONE OR MORE DREDGED
6 MATERIAL DISPOSAL SITE(S) IN EASTERN
7 LONG ISLAND SOUND
8
9 DECEMBER 9, 2014
10 3:08 P.M.
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12 FORT TRUMBULL
13 90 WALBACH STREET
14 NEW LONDON, CONNECTICUT
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22 BRANDON HUSEBY REPORTING & VIDEO
Reporter: JACQUELINE V. McCAULEY, RPR, CSR
LICENSE #40
23
24 249 Pearl Street
Hartford, CT 06103
(860) 549-1850
25 (860) 852-4589

1 APPEARANCES:

2
BERNWARD J. HAY, PH.D.
3 PRINCIPAL ENVIRONMENTAL SCIENTIST
THE LOUIS BERGER GROUP, INC.
4 117 KENDRICK STREET, SUITE 400
NEEDHAM, MASSACHUSETTS 02494
5 (781) 707-7482
bhay@louisberger.com
6

7 W. FRANK BOHLEN, Ph.D., Professor
UNIVERSITY OF CONNECTICUT DEPARTMENT OF MARINE
8 SCIENCES
1080 SHENNECOSSETT ROAD
9 GROTON, CONNECTICUT 06340
(860) 405-9176
10 walter.bohlen@uconn.edu

11
GRANT MCCARDELL, Ph.D.
12 UNIVERSITY OF CONNECTICUT DEPARTMENT OF MARINE
SCIENCES
13 1080 SHENNECOSSETT ROAD
GROTON, CONNECTICUT 06340
14 (860) 405-9171
Grant.mcardell@uconn.edu
15

16 JEAN BROCHI, PROJECT MANAGER
OCEAN AND COASTAL PROTECTION UNIT
17 EPA NEW ENGLAND, REGION 1
5 POST OFFICE SQUARE - SUITE 100
18 BOSTON, MASSACHUSETTS 02109-3912
(617) 918-1536
19 brochi.jean@epa.gov

20

21

22

23

24

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(The hearing commenced at 3:08 p.m.)

DR. HAY: Welcome to this public meeting. Thanks for coming out on this lovely balmy afternoon here. So before we start, a couple of housekeeping measures. We don't have a microphone so if you have difficulty hearing, please move to the front. There are lots of seats up in the front.

Secondly, the bathrooms are outside just outside the hallway. Not outside the building. The sign-in sheet, I hope everybody had a chance to sign in. Also, if you want to make a comment at the end of this presentation, please also sign in. There is a sign-in sheet there, although there will be an opportunity to ask questions that you may not anticipate at this point.

Finally, please turn off your cellphones or any other kind of audio devices so that we don't get interrupted or put them on vibrate. My name is Bernward Hay. I'm with The Louis Berger Group. We're under contract to the University of Connecticut, which is under contract with the Connecticut Department of Transportation, and we're working together for the DOT and the EPA for the evaluation of potential dredged material disposal sites in open waters in the Eastern Long Island Sound

1 region. So the EPA is the lead agency from the
2 Federal side for this project.
3 Parallel to this meeting there was
4 another meeting yesterday in Riverhead in New York,
5 and today's meeting will focus on the findings of a
6 physical oceanography study that was conducted for
7 this Environmental Impact Statement. This will be
8 presented by the University of Connecticut, Frank
9 Bohlen and Grant McCardell, and it will be an
10 informational meeting. So as a result, there won't be
11 any specific comments or any specific comment period.
12 The meeting will be introduced by
13 Ms. Jean Brochi. She's the project manager with EPA
14 for the Ocean and Coastal Protection Unit, and she
15 will provide a project status to see where we are in
16 this process, and we have a 50-minute presentation by
17 Frank and Grant, and after this the floor will be open
18 for questions and comments.
19 The meeting will be recorded by a
20 stenographer and also an audio recording device, and
21 the transcript of the meeting will be made available
22 to the public later on EPA's Web site. So with that,
23 Jean?
24 MS. BROCHI: Thanks, Bernward. I
25 probably need a mic. So of all of the speakers you

1 will hear today I am probably the one that needs a
2 mic. So if I talk too fast or you can't hear me, just
3 raise your hand. I will repeat or I will stop.
4 Again, I'm Jean Brochi from EPA
5 Region One, and I just wanted to introduce a few folks
6 that are in the room as well with me. They're members
7 of our cooperative agency group, and it includes Brian
8 Thompson, George Wisker from DEEP. Joe Salvatore from
9 Connecticut DOT in the back. We've got Todd Randall
10 from the Corps of Engineers, Mark Habel from the Corps
11 of Engineers New England. We have New York DEC and
12 DOS representatives as well as EPA Region Two folks
13 that came to last night's meeting in Riverhead, New
14 York.
15 So you're here, because you are
16 interested in the Eastern Long Island Sound
17 Supplemental Environmental Impact Statement, and,
18 again, I'm representing EPA Region One. So Bernward
19 already went through the agenda. We will have Frank
20 Bohlen and Grant McCardell show results of a physical
21 oceanographic study.
22 So if you haven't been to previous
23 meetings, we had a few introductory meetings on this
24 process, and this has been going on since 2012. This
25 meeting is going to be a summary of some of our

1 responsibility and really just an update on the
2 process, and then I'm going to give it to the
3 University of Connecticut folks.
4 So EPA and the Corps of Engineers
5 share responsibility for dredged material. EPA
6 through the Marine Protection Sanctuary, Research and
7 Sanctuaries Act, Section 102, has the authority to
8 designate dredged material disposal sites. The Corps
9 has, under the Ocean Dumping Act, Section 404 has the
10 authority to select disposal sites.
11 There's a difference. The
12 designation that EPA would use for dredged material
13 sites is long term. We both manage and monitor sites.
14 EPA, when we designate a site, we issue a site
15 management monitoring plan, and that's also a shared
16 responsibility that we partner with the Corps on.
17 Now, for permits, as you know,
18 that's directly to the Corps of Engineers, and EPA has
19 authority for the testing, to review the testing and
20 make determinations on suitability. So the history --
21 a little history of the disposal sites.
22 You know that in 2005 EPA entered
23 into an Environmental Impact Statement and designated
24 Western and Central Long Island Sound. This is a
25 supplemental for the eastern part of The Sound only,

1 and the sites that are part of this effort include the
2 Cornfield Shoals site and New London site, and both of
3 those sites were selected by the Corps of Engineers.
4 And the two sites, Cornfield and New London, expire
5 December 2016, and here are the other sites.
6 So you have Central and Western and
7 then the focus here is for Eastern, New London and Cornfield.
8 So, again, EPA's role in dredging is to review the
9 permits, designate disposal sites. We promulgate the
10 regulations. We develop site management monitoring
11 plans, and then we manage the sites with the Corps of
12 Engineers. So the initial approach to this effort was
13 to look at site screening, and we looked at five
14 general criteria and 11 specific, and all will lead
15 to what we had done in the first EIS.
16 These are site selection criteria
17 that are in the Marine Protection, Research and
18 Sanctuaries Act, and so what we cover for some of this
19 information is biological resources. We will be
20 looking at conflicting use. We will be looking at
21 sediment environment as well as physical conditions,
22 and one of the aspects that was so most interesting to
23 EPA and what you will hear more about later on is the
24 physical conditions and the sediment transport at
25 sites such as New London and Cornfield where they are

1 so different in characteristics.
2 So the initial screening process
3 started with 11 sites, and of those sites they
4 included some historic disposal sites and the active
5 disposal sites. For the historic sites those were
6 sites that we knew had some dredged material disposal
7 at some point in time. Most of them were in the 40s,
8 and that was what the Corps of Engineers gave us for
9 their official record.
10 So the 11 sites we initially
11 screened, and they're listed on the bottom here.
12 Active sites are included in that, and then from that
13 group we narrowed it down to Cornfield Shoals disposal
14 site, Six Mile Reef, Clinton Harbor, Orient Point,
15 Niantic and New London, and those sites are still
16 being evaluated.
17 So for the physical oceanography
18 study you can see -- in the yellow block you will see
19 the names of some of the historic sites and then -- it
20 would be great if this worked, but -- there we go.
21 DR. BOHLEN: No, here.
22 MS. BROCHI: Thank you.
23 DR. BOHLEN: That's me.(referring to
24 a laser pointer)
25 MS. BROCHI: Listen. Don't take my

1 steam. You are coming up next. There we go. So the
2 yellow is historic, and the bluish white are the
3 active sites, and what you are looking at is the
4 disposal sites in red, and then for the green are the
5 buoys that were placed for this physical oceanographic
6 study that was conducted by UConn, and these black
7 lines right here, I think Frank will go into more
8 detail, is the zone of siting feasibility, which was
9 established for the Environmental Impact Statement.
10 It's a busy slide so I will keep it
11 up for a minute. So the process again, we started out
12 the process October 16, 2012 with the Notice of
13 Intent. Several folks had come to that meeting. We
14 had an official comment period for that Notice of
15 Intent, and since then we have had several public
16 meetings as well as cooperating agency meetings.
17 At one of the June meetings, it was
18 June 25 and 26, a representative from Sarah Anker's
19 office requested that we try to reach out and do some
20 more education. So EPA Region One and Region Two
21 hosted a webinar on dredging, dredged material,
22 dredged material equipment, and that was April 3, and
23 that was well attended. I'm not sure if some of you
24 folks were in there. I haven't looked at the sign-in
25 sheet.

1 So if you are new to the process or
2 you are interested and you haven't received
3 notifications, please, again, you can e-mail me
4 directly, I'm Jean Brochi, or you can e-mail the
5 elis@epa.gov e-mail address, and we will add you to
6 the distribution list, and we will also send out
7 notifications whenever we're going to have a meeting,
8 whenever we're going to post something on the EPA Web
9 site.
10 The EPA Web site address is right
11 here, and the minutes from the meetings, the
12 documents, the studies will all be uploaded onto that
13 Web site. There are people writing. I'll just leave
14 this on for a few minutes.
15 Okay. So the next step draft,
16 environmental, Supplemental Impact Statement, and
17 rulemaking in the spring of 2015. We will at that
18 point have additional public meetings for an official
19 comment period on that document. And then if the SEIS
20 recommends a designation of one more or sites, we will
21 issue a final SEIS and rulemaking by December 2016.
22 That's all I have. Thank you for coming and Frank is
23 up next. I will give you back your laser.
24 DR. BOHLEN: Good afternoon. I'm
25 Frank Bohlen. I'm a physical oceanographer on the

1 staff at the University of Connecticut Department of
2 Marine Sciences. Physical oceanographer. I ain't no
3 biologist. That's what that means. The physics of
4 the ocean. And I'm here to talk about the study of
5 the physical oceanography of the zone of siting
6 feasibility.
7 It's important to realize what the
8 talk is not. We're talking about the physical
9 oceanography, circulation, currents, waves, and the
10 factors that affect the movement of materials. You
11 are going to hear a lot about boundary shear stress.
12 We hear a lot about stress these days. This is
13 boundary shear stress, the force that's going to be
14 exerted on the bottom. And if the material fails, the
15 material, because of that force loading, may be
16 transported. So that's the physics of the process
17 that we're going to be looking at.
18 Physical oceanography of the zone of
19 siting feasibility I just told you the why of it. The
20 how of it. We just can't go out and measure
21 everything we want to know about every point in the
22 field. That's a fair amount of area. You saw it on
23 the earlier slide. So the best way to do that is to
24 build a numerical model of the system. And we're all
25 very familiar with models. We wake up to the results

1 of models on your weather forecasts. We live with
2 models, and they're modeling everything from your
3 voting preferences to what you eat and what you don't
4 eat sort of a thing.
5 So you understand models at least in
6 concept. The model is just that, one man's view of
7 what the system is, how it functions, and that can be
8 less than perfect. So what we try to do is, to the
9 extent possible, to verify the results of the model,
10 and to do that we take a series of measurements. Not
11 as many as we might like to get, not as long as we
12 like to get them. You talk to scientists. You guys
13 are always cursing the scientists. They're saying,
14 damn it, we always want more data.
15 But we get a fairly representative
16 set of data and use it to calibrate a model. That
17 will give us information on a much smaller, spatial
18 scale, time temporal scale, than we could ever hope to
19 do by taking direct measurements. That's the model.
20 We will talk to you a little bit
21 about how we go about evaluating, the instruments that
22 we're going to be using, and then what the results
23 look like, what the model tells us about the currents
24 that may affect the dispersion of materials that are
25 in the water column either resuspended from the bottom

1 or entrained when you dispose of a couple of cubic
2 yards of material in a dump, okay?
3 And then the boundary shear stress.
4 If the stuff gets to the bottom and sits there under
5 normal circumstances, under what condition might that
6 stuff start to move around, okay? And then we will
7 summarize the results.
8 Let's start out with a little bit of
9 the physical oceanography. I told the gang yesterday
10 that it's only right that we start with the physics of
11 the system, because physics is, after all, the queen
12 of the sciences, and everything else is simply
13 handmaiden to the queen, okay? So physical
14 oceanography, the science that explains the paths of
15 ocean circulation, distribution of a property, blah,
16 blah, blah. You can read it.
17 But of particular importance within
18 this study are the factors governing boundary shear
19 stress. Boundary shear stress. If we had a better
20 rug, we could get the rug moving, okay? The force
21 that's exerted, a horizontal force that's exerted on
22 the bottom because of a gradient in the velocity as we
23 approach the bottom. We have some wind movement over
24 this floor here. If you can believe it's moving here
25 pretty uninterrupted, and as it gets closer down to

1 the floor, the flow is more and more influenced by the
2 floor.
3 So there is some frictional drag on
4 the velocity as it gets down to the bottom. That
5 gradient and velocity from the free stream value to
6 the boundary value produces a force on the bottom,
7 horizontal force, a force per unit area, and the units
8 we're going to be talking about are pascals. You can
9 go out and look it up, pascals. You are familiar with
10 pounds per square inch. You may have heard of Dynes
11 in your physics class way back when. This is just
12 another version of that force. And then we have a
13 force per unit area, a shear, a horizontal force.
14 You hear of pounds per square inch,
15 and a millibar, as a vertical force through the
16 atmospheric pressure. This is just a horizontal
17 version of that same sort of thing. By the way, we
18 speak our own language. We tend to speak our own
19 language, and sometimes we take for granted that
20 everybody knows what that word means.
21 But on occasion we find -- on more
22 than one occasion we find that's not so. Don't be
23 afraid to say wait a minute. There are no silly
24 questions. So don't be afraid to say wait, wait,
25 wait, wait, wait a minute on that for clarification.

1 For substantive response we have to wait till the end
2 of it.
3 So of particular importance within
4 this study are the factors governing boundary shear
5 stress, because it might affect the movement of
6 sediment. This is a very simple picture (slide)
7 that's not entirely appropriate, but it's one you
8 often see in the textbooks when they talk about the
9 forces acting on a sediment particle.
10 Now, why isn't it entirely
11 appropriate? Because they're showing you discrete
12 particles sitting here. Here is a sand particles
13 sitting in the presence of a number of other sand
14 particles. A bunch of billiard balls laying on each
15 other, marbles, right? Got Bee-Bees? Pick a size.
16 Got it? Not entirely appropriate, because the
17 sediments that we deal with tend to be in structure
18 quite a bit more complicated.
19 They're not simply one particle or
20 another particle held together by gravity. They tend
21 to be one particle, another particle quite small held
22 together by lots of different gluing factors, gluing
23 factors such as electrochemical binding. The magnetic
24 attraction between the particles, or a biological
25 film, mucilaginous matrix that's on the bottom. Kind

1 of gooey-looking stuff. You can see it. On shellfish
2 it's not uncommon at all, okay?
3 So what we tend to deal with is an
4 assemblage of particles that we class as being
5 cohesive. This sort of picture, simple picture you
6 have back here really applies to the noncohesive class
7 of sediments that you are all familiar with in terms
8 of beach sand. That's a good example of noncohesive
9 sediment. But it's okay when you start talking about
10 drag on the bottom, and drag, of course, retards the
11 flow, builds up that force that we were just talking
12 about, the shear stress that particles can be moved.
13 The bottom also influences the near
14 bottom velocity in a variety of different ways. In
15 this case they're showing you how a sand wave field,
16 nice, rhythmic sand waves, you have seen them off the
17 beach maybe when you're laying-floating, you're facing
18 down in the water and you are sort of hanging there,
19 you can see the waves coming and building little sand
20 waves, ripples in the bottom.
21 The velocity gets quite complicated
22 over a structure like this, and you will see a number
23 of instances in the study of the velocity field that
24 we're looking at. We're interested in that, because
25 that's what's going to affect the boundary shear

1 stress displays quite complex characteristics.
2 The famous diagram, the Shields
3 diagram, the only reason I put this up here is to show
4 you that there is a class of sediments that is
5 cohesive, a class of sediments that is noncohesive,
6 and they're going to display different response
7 characteristics to a given velocity field,
8 and it's going to vary as a function of particle size.
9 The velocity of the shear stress is buried in this
10 parameter, okay?
11 So you can see there's a difference
12 between cohesive and noncohesive. Maybe it's clearer
13 when you look at something like this in tabular form
14 where I'm only going to emphasize this -- what does
15 that say? I can't quite see it. Stress at the
16 initiation of motion. Stress at the initiation of
17 motion. The stress that it's going to take just to
18 get that particle to start rolling along.
19 And you can see here this is in
20 pascals, as I said. That if you are dealing with
21 course sand, you may have a value of 0.48, and it's
22 interesting. It's counterintuitive that as the grain
23 size goes down so medium, fine, very fine, course
24 silt, medium silt, fine silt, and beyond that would be
25 clay, and you can see here in terms of grain size, the

1 diameter in millimeters, you are starting about a half
2 millimeter.
3 You ever calibrate the sand? You
4 sit on a beach, you know, what you feel good about.
5 There are people that do that. If you sit on a beach
6 in England -- of course, if you are a Brit, you can
7 sit on golf balls, and they figure that's a very nice
8 afternoon on the beach, okay, the cobble, the typical
9 British cobble beaches. But around over here if it
10 gets too fine, you stand up and you sort of have all
11 the sand stuck to your back. You don't like that
12 either.
13 So it's about quarter of a
14 millimeter or a half millimeter sand. It's what you
15 see on a lot of beaches, and there are a variety of
16 sands when you go along Fisher Island Sound's coast
17 beaches. You will see a variety of sand sizes.
18 That's just to give you -- you've got to develop a
19 feel for this stuff, okay? You got to -- it's
20 cohesive like bring it in here and slop it on the
21 table.
22 Counterintuitive, he says. What's
23 that mean? Most folks tend to think of transport in
24 terms of grain sizes simply. So they have this idea
25 that since it's more difficult for me to blow sand off

1 the table than it is to blow flour off the table,
2 right? Can't you see it? Flour, okay? Makes a hell
3 of a mess. That if we have fine grained sediment,
4 that stuff must move more easily than if we have
5 coarse grain sediment, not true, and it's not true for
6 a variety of reasons.
7 But to begin with, and the simplest
8 one for you to understand is, wet that flour. On your
9 countertop make a mess for mom. Wet the flour. You
10 got a nice gooey mass of stuff. You got to wash it
11 off your hands, okay? When that stuff gets wet, it's
12 cohesive, extremely cohesive. And when I go (blow
13 sounds), I get it on the floor before I get that stuff
14 to move, okay.
15 So that's what they're trying to get
16 through to you is that the simple relationships
17 between grain size and transportability you got to
18 revise -- a lot of people have to revise their
19 thinking, okay?
20 Now, out of this the only reason we
21 put a red box around this we sort of picked a range in
22 the three quarters of a Pascal, you will see more of
23 this later, as the level that we're looking at is sort
24 of the critical level. The material we're playing
25 with, there's some field data to back that up. But I

1 want to show you this again to reinforce this
2 cohesive/noncohesive component when you begin to think
3 about how these mounds of sediments are affected by a
4 flow.
5 Okay. Here we are. The objective
6 of the physical oceanography study is to take a look
7 at the distribution of maximum bottom shear stress
8 through the zone of siting feasibility. It runs from
9 Guilford to Mattatuck, western boundary, Montauk to
10 Block, Block to Point Judith, pretty good patch of
11 water, and, you know it to be, I know most of you that
12 are out there, a moderately dynamic patch of water.
13 I'll show you some depths in a
14 couple minutes. These are the stations that are being
15 looked at, okay? You just heard about them, and there
16 is a variety of them sitting up here. There are only
17 two active, the Cornfield and the Fishers Island, the
18 Eastern Long Island Sound, sorry, New London site and
19 Cornfield.
20 There are a number of historic
21 sites, and there are 3 or 4 -- I think there are the
22 1, 2, 3, 4 new sites that are on there I picked out,
23 okay? To characterize the circulation, that's the
24 water column characteristics, we're looking at how the
25 water column moves, and acquire enough physical

1 oceanography data to support the verification of this
2 numerical model that we're going to be using really to
3 look at transport characteristics in detail, the study
4 will.
5 That's a mess (referring to a
6 slide). The only reason I show you, Long Island
7 Sound, these are the old DEP stations over the years
8 since the early '90s, and I wanted to point out M3.
9 It's important down here. You can't read M3, but it's
10 in The Race just off Fishers Island, because -- in a
11 minute it will show up.
12 You recognize that there are a
13 number of factors that govern circulation in Long
14 Island Sound. Most of us think of the tides. Comes
15 to no surprise there, right? Take a look out the
16 window, and you got a fair idea of tides going. You
17 go for a sail, and you are influenced by the tides.
18 Your front yard is influenced by the tide today if you
19 took a look there, okay?
20 But there is also the matter of
21 fresh water inflows. Fresh water inflow show this
22 regular seasonal variability with a peak discharge
23 value typically in April/May. So we can expect to see
24 some amount of seasonality in fresh water inflow. The
25 fresh water inflow in combination with the temperature

1 can affect water column densities, and the water
2 column density, just like the atmospheric the air
3 density that influence high and low pressures and
4 influence winds, will influence circulation in the
5 waters.
6 So now you have tides coming and
7 going, yin and yang, and you have possibly some
8 density-driven components as well associated with
9 temperature and salinity. It shows the seasonality.
10 The seasonality result looks something like this.
11 These are three profiles along the axis of The Sound.
12 Here is M3 sitting down in here, okay? You start down
13 at the end at Throgs Neck, more or less, and you can
14 see, if we look at April, August and December, that
15 there is, in terms of water temperature, some evident
16 differences in the vertical structure.
17 You see much more stratification in
18 the summer. Surface waters are warmer. Bottom waters
19 are significantly cooler. That makes for some
20 differences in terms of vertical exchange, and you
21 have heard about it in terms of hypoxia and the like,
22 but you can also believe that the seasonality that you
23 are looking at here from April, August and December,
24 the differences in temperature -- go out there right
25 now, the water temperatures are less than they were in

the summer. Go out there yesterday, they were less than they were last weekend sort of thing. It's cooling down. It might influence the density.

We go along and take a look at salinity, it's a little more subtle. But, again, you are going to see this is higher salinity waters, okay, the shelf waters, and you are going to see some differences in the extent of intrusion when it starts coming in.

This guy is April. We got a lot of fresh water coming out so The Sound, greater body of The Sound is somewhat fresher. You come into the summertime, and this guy in here, this will vary not only seasonally but year to year depending on what the wind condition looks like.

Just real quick. You know this. This is on our Web site (referring to a series of slides). You can take a look at this. If you want to play with it, you can just run the cursor. But I only show you this to impress you with the fact that there is a significant spatial variability in the velocity field in Long Island Sound, and, again, most of you know it.

You don't see much in the way of currents in the western Sound. You see a fair amount

of currents in the eastern Sound. The Race area is moderately energetic, okay? That guy's on the ebb. It's decided not to like us (slide show malfunction). I don't know. Well, if it was working, we turn it around and show it going the other way, okay, and you are going to see a significant amount of spatial variation in it, and it will -- if it doesn't -- there you go, okay? You can plug that in and play with it, get an idea that there is a significant spatial component to the tide. There is a significant time component to the tide, okay?

Now, just to impress you with all of that, can we impress you with the technology that's possible today or not. Can we shut it down? (set to run a video showing surface salinity distributions from a computer model)

(Whereupon, there was a discussion off the record.)

DR. BOHLEN: It's nothing you don't know. That's the other thing that's sort of frightening about school and education, right? If you just stop for a minute and think about it, you heard it in kindergarten or somewhere. You just sort of brighten this up.

So what I'm telling you about

1 circulation in Long Island Sound in general
2 characteristics you probably know pretty well. Speak.
3 MR. ALLYN: You don't have --
4 COURT REPORTER: Sir, what's your
5 name?
6 MR. ALLYN: Lou Allyn. Do you have
7 a slide that in the future maybe you can talk about
8 how many people you have working on this project with
9 you, what the organization of the staff is?
10 DR. BOHLEN: Yeah. Jim O'Donnell is
11 the principal investigator, he's not here today,
12 myself, Grant, we have another post-Doctoral
13 investigator, and we have two technicians who are on
14 the project.
15 Video beings to run
16 This is a model run if you look up
17 in the top, it says 10/21, and it's just real quick
18 running through a tidal cycle and higher salinity
19 water out here, okay? Lower salinity water back in
20 here. Outflow of the Connecticut River, okay.
21 And if you keep running this, and we
22 could run this, but we don't have enough time to run
23 it -- I saw they gave us a deadline of time -- you
24 could run this right on through Sandy, which was
25 10/29. This is 2012, okay, and beyond, because the

1 Sandy effects in the system, you pulse it, and then
2 the system responds over the course of four or five
3 days.
4 So the storm occurred on the 29th,
5 and you might look to see what was going on on the
6 31st or so. But just to give you an idea -- and,
7 again, some of you have seen this, the plume coming
8 out on the ebb, casting waters that come down.
9 Sometimes when there is a larger discharge, you will
10 see the discharge right into the, down into The Race
11 and into Plum Gut.
12 But you will generally always see a
13 nice frontal zone in the vicinity of the Connecticut
14 River. You may not see as much as in the case of the
15 Thames. But if we ran this a little bit longer, we
16 get a good rainfall after Sandy. You will see this
17 guy coming out and getting very close over to Fishers.
18 So we're dealing with a spatially
19 and temporally variant system, and the problem -- the
20 question, the project goal is to assess what that
21 means in terms of circulation and boundary shear
22 stress, okay? Let's go back to the slides.
23 Well, you saw it. Again, this is
24 just sort of a summary slide. We're really ahead of
25 ourselves here. We are showing you some model results

1 in the blue, but the red or green observations are a
2 couple places in the study area, and you have to look
3 at this carefully to realize there's a difference in
4 scale here, but you are seeing waves down in this area
5 that might have a significant wave height of about one
6 and a half meters, 1.4 meters.
7 We get further in, Six Mile Reef
8 down in here, you will see waves that very seldom get
9 over about one meter or so. This down in here is just
10 about a meter. So there is some spatial variation as
11 you would suspect, okay? An area a little more
12 sheltered, an area a little more prone to the wind
13 effect, because the water depth and the like there and
14 some other spatial variations. We will see more of
15 this when we get into the results of the model, okay?
16 So just the background of the
17 physical oceanography of Eastern Long Island Sound,
18 which I hope just reinforces what you already know.
19 Next one (slide). So Grant will tell us a little bit
20 about the model.
21 DR. MCCARDELL: So what we want to
22 use the model for, as Frank was just telling us, is to
23 be able to sort of fill in all the gaps for what we
24 cannot measure both in space and in time. We can go
25 out there. We can put something on the bottom. We

1 can deploy it till the batteries run out. We can get
2 a month or even 60 days worth of data, and we can do
3 that at one location with a broad-reaching study like
4 this. We can even do it at seven locations, but we
5 can't do it everywhere, and we can't do it through all
6 time.
7 So what we want to do is we want to
8 answer the question of what's the spatial distribution
9 of stress throughout this entire study area. So how
10 do we do that? We are going to run this model, and
11 we're going to be able to then answer the questions
12 about where the regions are where the stresses are the
13 largest and the stresses are the smallest, and then
14 the other question that we will be able to answer at
15 some point is where does the material in the water go.
16 If it does get eroded, where will it go?
17 And to do this we're using a model
18 called FV-COM, which is the Finite Volume Community
19 Ocean Model. It's been developed by UMass up in New
20 Bedford and we're nesting it -- this is our model
21 domain here extending out onto the shelf. At the
22 shelf boundary here we are driving it using this
23 larger model, which covers the entire northwest
24 Atlantic.
25 Our model is forced by tides along

1 this outer boundary. The water goes up and down,
2 which forces the water in and out in an appropriate
3 manner. We're forcing it with observed river flow,
4 these green arrows, and we're getting that from USGS
5 gauge data. So for any given day we're replicating
6 what was the actual river flow in the Connecticut
7 River at that day.
8 In terms of the warming and the
9 cooling for the heat, we're using climatology, and by
10 the word "climatology" here what I'm talking about is
11 "what are typical conditions at a given date and
12 location." In other words, the climatology for Fort
13 Trumbull here for today is probably that it's 35
14 degrees and overcast, and temperature, yeah, we're
15 pretty close to climatology today. In terms of
16 precipitation we're probably not very close to
17 climatology.
18 Think of climatology as sort of like
19 the Farmer's Almanac of what are the typical
20 conditions for a typical location for a particular
21 week or month, and so that's what we use for the
22 surface heat exchange. So we're not modeling
23 individual years for the surface heat exchange, and
24 we're also not modeling individual years for how we
25 start this up, but we do run it for long enough that

1 we then are able to model individual years. Next
2 slide.
3 So how does this whole thing work?
4 Well, this works on an unstructured grid. It's finite
5 volume. I'll show you what that means in a minute.
6 It's a primitive equations model. What that means is
7 it works according to first principles. It works
8 according to Newton's laws by F equals MA. So it
9 starts from the very, very basics, and it solves the
10 equations that were derived from Newton's laws by
11 Navier and Stokes in the early Nineteenth Century, and
12 they derived these equations, but they were unable to
13 solve them.
14 But fortunately we can approximate
15 numerical solutions to these equations with computers.
16 And so what we get from the model is we get the water
17 velocity; get the sea surface height; get temperature
18 and salinity, and then the model iterates itself. It
19 says "okay, here I am. What's going to happen next?"
20 and the model runs on a time step of 6 seconds.
21 So every 6 seconds of real world
22 time we do this calculation, and then what we're
23 interested in getting out of the model for this study
24 is the stress. That's tau, the Greek letter tau we
25 use to represent the stress, and that's the product of

1 the water density times rho. (That's the thing that
2 looks like a P) there times this C sub D, which is the
3 drag coefficient -- Frank will talk to you a little
4 bit about that afterwards -- times the square of the
5 water velocity. U is the east-west velocity. V is
6 the north-south velocity.
7 You can think of it (pointing to
8 u-squared plus v-squared) as just the square of the
9 magnitude of the velocity, and it's important to
10 realize that it's the square of the velocity. What
11 that means is that a small change in the water
12 velocity will equal a bigger change in stress. If I
13 double the water velocity, I will quadruple the
14 stress, and this is the way the model calculates
15 stress, and this is also the way, as you will see,
16 that we have determined to be one of the more robust
17 methods to calculate stress out in the field as well.
18 Next slide.
19 So here is our entire model domain
20 again, and like I say it runs on these little
21 triangles. So for every single one of these little
22 triangles we're solving the full equations of motion,
23 and our model domain right now has about 30,000
24 triangles, and it does this at 15 different depths.
25 So we're modeling about a half a million discrete

1 finite volume fluid elements, and we're solving these
2 equations at a real world time of every 6 seconds
3 across this domain.
4 So needless to say 10 or 20 years
5 ago we couldn't do this. You need state-of-the-art
6 computing equipment to be able to run this sort of
7 model. Now our study area here is this red box. Next
8 slide.
9 And you can see the little triangles
10 here, and so here is The Race. There is the
11 Connecticut River, Niantic, I'm sorry, Niantic Bay,
12 the Thames, Connecticut River over here, and these
13 little triangles are what the model is running on. So
14 the resolution of our model is those little triangles.
15 And it's important to note that this
16 is the resolution of our grid; it's about 100 to 500
17 meters, which is about a quarter of a mile so we're
18 resolving down to a quarter mile. So we're resolving
19 the individual dump sites, but we're not resolving
20 whether or not we cut off a little corner of one of
21 the dump sites or whether we move the border of one of
22 the dump sites by 100 feet. Next slide.
23 So how well does this model do this?
24 Well, this is sea level that's coming from the model
25 (being forced at the boundary like I said) compared to

1 data at the Bridgeport gauge, and it's doing pretty
2 well. The model is in blue. The data is in black,
3 and it also does very well for temperature and
4 salinity as well, and this is throughout the entire
5 domain.
6 And we determine something called a
7 Skill is, and what the Skill is, is what's the error
8 in the model from 100 percent. So if the model was
9 perfect, it would have a Skill of 100 percent. A
10 Skill of 90 percent means that the model is staying
11 within about 90 percent of the data. In other words,
12 there is about a 10 percent error in the model.
13 That's about a 10 percent error in velocity as well.
14 So if I square that 90 percent
15 Skill, because the velocity is square, I come up with
16 a Skill for the stress of about 80 percent. So, in
17 other words, these stress values you probably can take
18 as being plus or minus 20 percent, and spatially it's
19 probably even better than that.
20 So our model is working very well in
21 the world of physical oceanography and ocean models --
22 and atmospheric models, for that matter. I should add
23 that atmospheric models work on this exact same set of
24 equations. They model fluid flow whether it be air or
25 water. And in terms of model skills our model is

1 doing very, very well. These are very, very good
2 numbers. Next. And how good is the stress and what's
3 the stress? Well, that's why we had the field
4 program.
5 DR. BOHLEN: So we're going to go
6 out and gather up some data to verify all of that and,
7 again, within the zone of site feasibility, and we
8 selected seven sites, and it says deployed instruments
9 on 7 bottom tripods on two, sorry, three two-month
10 observation campaigns, you will see the three
11 campaigns, to observe spring, fall and winter
12 conditions at locations having different stresses.
13 How did you pick out these seven
14 sites? They're not coincident with any of those boxes
15 you saw before. They're close on some cases, but that
16 wasn't the issue. We have run stress models before in
17 this area, and we were looking to get data at a
18 variety of locations that would give us a variety of
19 conditions.
20 So don't put all your instruments
21 within a quarter mile of each other. Pick out a
22 number of locations that are going to give you a range
23 of answers. So what you have the seven sites here
24 going from roughly Six Mile or so down in here out
25 close to Block.

We conducted three campaigns -- you will see it in a minute -- three campaigns, and during each of those campaigns there was also a survey, shipboard surveys. We went out to service the array so we did measurements along the transects. So there is a variety of data gathered up during these campaigns, six cruises with water column measurements at the seven tripod locations plus four additional stations in between, okay? Next.

Here are the campaign periods we had, spring, summer and winter. Conditions you are familiar with, the seasonality. You saw at least in stream flow, that there was a clear seasonality. You saw, I hope, in the temperature and salinity that there was something of seasonality, and you can probably believe that if we looked at the wind field, there is something of seasonality in the wind field.

We generally believe that the highest winds are during the transition periods in the spring and in the winter, sorry, spring and in the fall, okay? And so we have a spring campaign that's March to May, 66-day -- all around 60-day campaigns. When we had high river flow, you saw that April typically, generally high winds. Summer, low everything. Sailors know that all too well, right?

1 And then winter was November through January where we
2 had low river flow and a fairly energetic wind field,
3 okay?
4 So we put out these arrays. This is
5 a triangular array (referring to slide). We can get
6 an idea of what it looks like here, stands about 6
7 feet or so tall, okay, and it has a variety of
8 instruments, and I can spend all afternoon talking
9 about the instruments to you. So if there are
10 questions, we can do this later.
11 But to begin with you had an
12 acoustic Doppler current profiler. You are going to
13 hear a lot about ADCPs if you start playing with
14 oceanography these days. That's how we measure
15 currents these days. In the old days you put out a
16 current meter at a discrete point, maybe a number of
17 them over the vertical. So you had this array of
18 instruments sitting over the vertical.
19 Now we have a single instrument at
20 the bottom that can project an acoustic beam through
21 the water column. And if we segment up the
22 reflection, if you will, of that acoustic beam back to
23 the sensor package, I can tell you what the currents
24 look like at layers through the water column. In this
25 case this is an RDI acoustic Doppler current profiler,

1 and it's looking up, and it's giving us one meter
2 slices through the water column to the surface through
3 the bottom, okay?
4 We have another instrument sitting
5 on here. This is a Nortek acoustic Doppler current
6 profiler, same ADCP but very different instrument.
7 This is what they call a pulse coherent instrument,
8 which allows you to make very fine measurements. This
9 thing is mounted about three-quarters of a meter above
10 the bed, and it's measuring currents every centimeter
11 down to the bed. So we're really slicing up that
12 portion of the boundary layer that's coming down right
13 onto the bed that I told you was important in terms of
14 boundary shear stress.
15 Now, that current is very, very --
16 as it gets down at the bottom is very important.
17 We're measuring it. We can measure it. We can take a
18 look at it. We can also see that Grant, in his model,
19 the values for the velocity in that profile.
20 There is also a temperature salinity
21 sensor over here, that's what the SBE is, and then
22 there are two optical sensors here looking at
23 suspended material concentrations. These are optical
24 back scattering probes, OBS, that measure the
25 concentration of suspended materials at a couple of points

1 over the vertical. The rest of it has to do with the
2 recovery.
3 So we get water column currents and
4 waves from the ADCP, RDI. We get currents and stress
5 at the bottom. That's the Nortek. We get suspended
6 material concentrations. We get temperature and
7 salinity. We put this thing out for 66 days. It
8 samples once every 15 minutes and it bursts samples.
9 That means that it runs for a period of time every 15
10 minutes. Sample rates are typically on the order of
11 one sample a second, maybe two to four samples a
12 second, depending on the instrument, for minutes,
13 every 15 minutes. You can imagine you are bringing
14 back a fair block of data.
15 The shipboard surveys made use of
16 this guy. This is a profiling conductivity
17 temperature depth sensor right here, CTD. It also has
18 a series of bottles on it. So as I send this down to
19 measure temperature salinity over the vertical, I can
20 draw water samples. You can bring the water samples
21 back and use them to calibrate the other instruments.
22 I actually have a sample of water
23 now with some amount of suspended material in it. I
24 can filter it down, and I can see what the OBS is
25 telling me and where it's right or wrong. The optical

1 back scattering probes, okay?
2 At each of the stations where we
3 stop to use the CTD we got water samples, but we also
4 got sediment samples, grabs, bring them back and take
5 a look at what the sediments are at those stations.
6 There are much, much more extensive sediment maps out
7 there. These are supplementary measurements to the
8 sediment maps.
9 The U.S. Geological Survey has done
10 an extensive high-resolution survey of sediments in
11 this area. We know the sediments in Eastern Long
12 Island Sound very well, okay? (next slide) This is
13 the data recovery for temperature and salinity. That
14 was that CTD probe that was on the frame, currents and
15 suspended sediments, that's Nortek and the OBS, and
16 this is waves. That's the RDI. And we start off with
17 different campaigns. These are coming down running
18 through this.
19 To make a long story short the data
20 recovery was something in excess of 50 percent
21 depending on what you happen to look at, and in some
22 areas, sometimes it was 100 percent. But in some
23 times this guy gave us 66 days, and we were out there
24 for 66 days so it worked all the time, but this guy
25 gave us nothing. That was courtesy of the

1 manufacturer.

2 This was an instrument that was sent

3 back to the manufacturer for refurbishment before

4 being put out, and they put the wrong firmware in it.

5 It came back brand new, well paid for, no work, okay?

6 You will also notice this 6A/B here. That we get out

7 here campaign one, the Nortek, 25 of the 66 days, here

8 28 of the 66 days.

9 There were two things going on here,

10 the main one being that the frame got tipped over. It

11 got tipped over one and a half times, and then we were

12 smart enough to move it after that. We generally try

13 to pass the word out among the fishermen so that they

14 know where the gear is, and it's been a very

15 successful approach over the years, but somehow this

16 guy managed to get bumped.

17 The other thing it was that in the

18 first campaign you see this all 25 of 66. This was a

19 learning curve on the batteries and what the batteries

20 could do, and we expected them to last for the 60

21 days. They didn't last for the 30 days. That's why

22 you got 25 days of recovery.

23 But overall if you look through

24 this, the data return is very, very good and certainly

25 provides us with more than enough data remembering how

1 we're bursting and frequency that we're sampling
2 during the burst to calibrate the model. Let's take a
3 look at some of the results. This is the RDI ADCP
4 mean velocity. You are going back, You are going
5 forth, you are going back, You are going forth, you
6 are going back, You are going forth, and every little
7 bit you get a little bit further along.
8 There is a mean in the velocity
9 field. It ain't just sloshing back and forth. Some
10 of that temperature salinity effects, some of the wind
11 effects give us a net, and that shows up in the means,
12 okay? So the stuff will go up as you saw in the movie
13 the way the plume was moving back and forth.
14 If you take a look at it, in my case
15 when I'm not tied to the river, I might be moving one
16 way or the other. In this case what the data are
17 showing you is that if you set it at this point, the
18 net transport would be to the northwest. Here it is
19 slightly more west of north, and here it is more like
20 southwest, southwest, southwest, well, west, call it
21 northwest, got it, with the three different colors
22 being the three different campaigns.
23 The net drift near bottom, what this
24 is saying the net drift near bottom water column, we
25 are 3 meters off the sea floor, is into The Sound. A

1 typical estuarine pattern you expect bottom waters in
2 the estuary to be moving in. Fresh water on top is a
3 little bit lighter, a little bit less dense. Sitting
4 on top, it runs out. So if it's running out, it's got
5 to be running back in to keep the water in The Sound.
6 Typical transport.
7 If you get down closer to the bed,
8 this is a Nortek matter, (pointing to another slide)
9 looking at that three-quarters of a meter to the bed,
10 same sort of thing roughly. You know, if you take a
11 look in a little more detail, there are now going to
12 be six arrows, because we went out and recovered data
13 twice during each campaign -- these on the bottom,
14 okay? Basically the same sort of a pattern.
15 The main thing, the message to take
16 home here it is a typical estuarine flow coming in at
17 the bottom, and a magnitude, how about that one?
18 These little arrows are worth 10 centimeters a second
19 if they're about that long. Capish? 10 centimeters a
20 second? Nah. Come on. You don't have to lie to me.
21 10 centimeters a second, fast or slow?
22 MR. JOHNSON: Fast.
23 DR. BOHLEN: I got a fast. One
24 knot, one nautical mile per hour 6,080 feet per hour,
25 okay? 50 centimeters a second, 5-0, one knot. You

1 can call me a liar if you want to (inaudible). One
2 knot, 50 centimeters a second, so 10 centimeters a
3 second is not all that fast, but it's persistent.
4 It's persistent, okay?
5 Again, back to that, we get a feel
6 for this thing, you know, what's sticking, what's not
7 sticking, what's fast, what's slow. It's important.
8 Okay. So you are looking at net drifts that run on
9 the order of 10 centimeters a second, 5 to 10
10 centimeters a second, and you can figure out what that
11 means in terms of net transport over the course of a
12 day.
13 This is probably not entirely
14 necessary, (next slide) but this is the tidal ellipse
15 over the vertical. This is the average over the whole
16 of the vertical, and it just shows you that if we were
17 tracking the tide the way this thing goes and it's on
18 the flood, it would be going that way, and then we
19 wait six hours or so, and little by little the tide
20 starts to drop off in speed, but it changes direction.
21 With me?
22 Little by little over the course of
23 a half an hour or so it's dropping in speed and
24 changing in direction before it goes back onto flood.
25 That's what you are looking at here, the so called

1 tidal ellipse. The major axis of the tidal ellipse
2 going off here to the southwest, more to the west of
3 southwest, okay? Here a little bit more northwest,
4 northwest, and the magnitudes running in here on the
5 order of half a meter per -- 50 centimeters a second,
6 a knot.
7 So you got that guy there, I don't
8 know, call it from here out, maybe a knot and a half
9 in that neck of the woods as the major axis, okay?
10 So, again, you pretty well have that in mind, and you
11 saw it pretty well in the movie going back and forth,
12 this magnitude, and this shows you there really wasn't
13 much difference for all of the seasonality that we
14 were looking for in terms of the behavior of the
15 system from campaign 1, 2 and 3, not all that much
16 difference in terms of the tidal ellipse. Okay.
17 Real quick what this is showing we
18 were looking here at the wave conditions, significant
19 wave height at the station off Montauk, okay? Block
20 Island, Montauk sitting here, this guy in here, and
21 we're looking to see what the effect of the waves are
22 on the bottom shear stress, and to make a long story
23 short what these data are showing, despite the fact
24 there is a significant difference here in wave
25 characteristics, there isn't that much difference in

1 bottom stress, okay, as you come along in this.
2 It's an interesting curve in the
3 tracking. We can get into this later whether its
4 tracking logarithmically over the vertical or not.
5 Next slide. Now that makes sense. One thing I didn't
6 tell you, when I showed you that slide of the zone of
7 siting feasibility, there was around the perimeter a
8 gray area. That's an exclusion area. That's thought
9 to be more or less coincident with the areas that are
10 going to be influenced by waves. So its variously
11 estimated at being something like 17 meters.
12 DR. HAY: 18 meters.
13 DR. BOHLEN: How many.
14 DR. HAY: 18 meters.
15 A. 18 meters, he says. We were arguing
16 yesterday about 17 or 18, 18 meters. So it ends up
17 around 60 feet or so, alright? So it's not terribly
18 surprising when all of our instruments are outside of
19 that that the response to the system, to the waves, is
20 not all that great, okay?
21 This just shows another area -- to
22 show you that we've got a real spring neap cycle in
23 the boundary shear out here, okay, that we don't see a
24 lot of kick up in the shear as we change the waves,
25 and we're getting up to 2 meter waves here,

1 significant wave height. That's a significant wave
2 height. The average of the one-third highest waves,
3 that's not the maximum wave, so you can get almost
4 twice as much. The maximum heights are almost twice
5 as much as that.
6 So, again, you pick up the spring
7 neap cycle pretty well in this, but it doesn't show up
8 very much in terms of wave response, okay? (next
9 slide) This is a comparison between two methods to
10 calculate the boundary shear stress, and the one you
11 saw was the so called bulk formulation. That we take
12 the drag coefficient times the square of the
13 velocities. That's the bulk formulation.
14 There is another way to do it, and
15 you argue whether it's better or not so good, and
16 that's the log in here. And if there was a perfect
17 fit between the two, it would be on this one-to-one
18 line down here. Well, you see that we're coming along
19 calculating the stress levels using the two
20 techniques, and they're pretty close, you might slide
21 that over a little bit, until we get up to a stress
22 level of about one Pascal, and at one Pascal it starts
23 to dive off.
24 We could sit here and argue with you
25 about why it's diving off. It would take another half

1 an hour to explain the differences in the change of
2 the flow field, what happens when you get up here, why
3 the velocity profile may not be logarithmic at that
4 level. But suffice it to say what we're using this
5 little calculation for is to demonstrate at least to
6 us the adequacy of the drag coefficient of 0.0025,
7 which was the selected drag coefficient that was used
8 in the formulation you saw earlier.
9 So the data do a pretty good job of
10 verifying that selection until you get up to a point
11 where nobody is surprised that it doesn't work, to put
12 it in plain language, okay? So this is a very
13 valuable set of data. If you take a look at this, you
14 don't often get a chance to really get down into the
15 nuts and bolts of the flow field.
16 MR. ALLYN: So the coefficient gives
17 the best fit between the two models. Is that how you
18 have the coefficient?
19 DR. BOHLEN: The coefficient was a
20 selected value. Well, there is a lot of data to say
21 it ought to be that value, and then the question is
22 does it make any sense.
23 MR. ALLYN: Yeah.
24 DR. BOHLEN: And now you are
25 comparing the results of a bulk formulation that uses

1 that coefficient against a different way of
2 calculating the stress, okay? Alright. So here we
3 go. The rubber hitting the road. The model
4 simulation says here we reproduce tidal and spring
5 neap variations on the observed stress. Now, you saw
6 some of the spring neap variation -- spring neap, do
7 you understand that? Twice monthly variation in the
8 tide, right?
9 We're just off the full moon. We're
10 in the spring portion of the monthly tide. It has
11 nothing to do with April, May, March, whatever it is,
12 okay? This is twice a month. You got a new moon, and
13 you got a full moon, and you have maximum tide during
14 the new moon, maximum tidal range during the full
15 moon, and in between smaller range -- neap, okay?
16 So you are looking at the spring
17 neap cycles here coming along this guy, and then you
18 are looking at a comparison, and I realize it's a
19 little difficult to see here between the field
20 observations the calculated values and the model
21 values. And to make a long story short on this one we
22 argue, using these sorts of data, that the model is
23 doing a pretty good job of reproducing the measured
24 results, which is what, of course, we were trying to
25 verify. And next time we will have a different color

1 for you. The blues and reds and pinks and purples are
2 hard to see. Okay, next.
3 This is very good here. This is
4 another comparison between the two. This is your bulk
5 formulation again, that equation, okay, and these are
6 the field observations.
7 DR. MCCARDELL: No.
8 DR. BOHLEN: I'm sorry. The other
9 way around. These are the field observations and
10 that's the model. We have it upside down and that's
11 the model, and this is the mean of the boundary
12 shears, okay? And then if they were identical, they
13 would lay on the one-to-one lineup here, and what you
14 are looking at this is now mean values over the
15 period.
16 Correlation coefficient of about
17 0.91, which is very high. When you start looking at
18 the maximum predictions, this gets a little more
19 scattered in there, but it's still pretty close to the
20 one-to-one. In this case it gets down to a 0.7 -- 70
21 percent. So you put that together with Grant was
22 saying about the accuracy of the model, the accuracy
23 of the comparison of the two, and it's looking like
24 we've got a pretty good handle on the boundary shear
25 stress in the model, okay?

1 What's it all mean? So we want to
2 find the maximum bottom -- so we're now using the
3 model, because the model gives us information on all
4 those little triangles, every quarter mile a little
5 square, okay, over the whole of the field. Compare
6 the value of the sites identified in the screening
7 process and simulate a period of a severe storm. We
8 picked Sandy. Go ahead.
9 The bathymetry. You know it, right?
10 Fairly deep in The Race, not so deep near shore. You
11 got the net depth coming back up. Six Mile on the end
12 (west). I don't think you need to see anymore. These
13 guys know this by heart, okay? So here you are in
14 terms of stress distribution. This is Pascals. Red
15 is high, on the order of 3 or maybe down in here,
16 okay? Montauk not terribly surprising. Some places
17 in the vicinity of The Race, some reds, fair amount of
18 yellow, and some amount of blue, low.
19 As far as the zone of siting
20 feasibility goes, remember where that is going, come
21 back over to see Block Island, okay? You got your
22 Point Judith sitting over in here. It says that there
23 is a fairly high stress level particularly in the
24 Eastern Sound through much of the zone of siting
25 feasibility, okay? You are up in here.

1 Remember we were cutting things off
2 looking at values something like 0.75 as being
3 something of a critical value for some of the
4 sediments we might be playing with in terms of dredged
5 material. The -- one of the things that's interesting
6 here is that as we run this through the different
7 campaigns, that the spatial differences we see
8 between -- here's an area, you know, Long Sand Shoal
9 at the mouth of the Connecticut River and Block Island
10 Sound, you look at the spread, it's quite a spread in
11 stress values. That spread is much larger than you
12 will see seasonally, much larger than you will see
13 seasonally.
14 So that says that, to me that the
15 tidal field is important, and that the differences
16 we're seeing are down in the subtle -- you will see
17 some of the subtle things in a minute -- but subtle as
18 in changing mean flow characteristics. That little 10
19 centimeters a second interacting with the mean flow of
20 a knot or knot and a half, may be substantial -- may
21 have a substantial effect.
22 So snapshot picture of the whole
23 thing. This is maximum bottom stresses during
24 campaign 3. We picked campaign 3, because that's the
25 supposed to be the highest energy winds in winter, and

1 then we picked our storm conditions, okay? Next.
2 Here are some of the numbers. We
3 broke it down by Eastern Long Island Sound and Block
4 Island Sound, and you see the Cornfield Shoals site
5 generally has the highest stress. Probably not
6 terribly surprising. For those of you who have played
7 down there you know it's mostly sands, and that from a
8 management standpoint over the years we counted it as
9 a dispersal site, and there is good reason for it when
10 you take a look at the stress values.
11 Look at the range as you go through
12 Six Mile, Clinton, Orient Point, back to Orient Point,
13 Niantic Bay, and here is New London, okay? All values
14 below 0.75. Get out, Fishers Island, east-west and
15 center. This is south of Fishers Island around what I
16 call the deep hole, okay? So there are values in
17 there. Fishers Island center it looks pretty low,
18 okay? Might even get east looking low relative to
19 what we see in The Sound. Block Island yet lower.
20 North of Montauk, low. North of Montauk is really
21 Montauk Harbor, really in there. It's in the shelter.
22 Okay, next.
23 So we took a look at Sandy, see what
24 we could do with it. Sandy was a fairly interesting
25 event, right? Blew a little bit. These are our

1 MYSOUND buoys out there, Ledge, Central Long Island
2 Sound, Western Long Island Sound, Execution Rocks, and
3 not surprising the Ledge shows the highest, about 60
4 knots or so, okay? Very short period.
5 So it was a wind event, short lived.
6 We know that. What you don't know, what this thing
7 doesn't show you one of the unique things about Sandy
8 of course is that it may not have blown all that much
9 max, but it blew a lot for a long time, and that is
10 significant duration, unusually long duration, and a
11 lot of that was from the southeast, which made for
12 interesting conditions through a number of our areas,
13 right?
14 And if you take a look at the fetch,
15 the over-water distance in which the wind can act, for
16 Eastern Long Island Sound southeast is favorite. East
17 nearly, northeast not so much; but certainly southeast
18 has the potential for influencing what's going on down
19 here.
20 So it was good from that standpoint,
21 fairly reasonable winds and significant duration, and
22 a storm surge which increased water depths through the
23 whole system, right? This guy is Kings Point
24 (pointing to a slide). This guy is New London. So
25 there is New London. You had a surge of something

1 under 2 meters, about 1.5 meters - 5 to 6 feet, a
2 surge down here, which has a recurrence interval of
3 every 10 to 30 years. You know, we will see it again,
4 that kind of a thing.
5 You get down the western Sound, oh
6 my goodness, look at the western Sound. Four meters
7 down at Kings Point, and, you know, in New York Harbor
8 it was even more. Occurrence intervals down there are
9 hundreds of years. We won't get into an argument
10 about how many hundreds of years. In fact, we
11 discussed that, but it's very, very low probability.
12 What should you care? Because you
13 stuffed a lot of water down my Sound, okay? You piled
14 up a lot of water down the western end of The Sound
15 and that water's got to get out. That water coming
16 back then has the potential to influence the velocity
17 field in the eastern Sound, and from that standpoint
18 that much water heading back out this way makes Sandy
19 an unusual event, and we're very fortunate to be able
20 to take a look at some of the numbers on it, okay?
21 It may be that there is a lot of
22 subtle influences. It may be that it was the wind
23 field does more to that data. We will see. We will
24 take a look at it. But people talk about the
25 frequency of occurrence of Sandy down here just in

1 terms of wind and maybe storm surge. That's one way
2 to think about it. But we're out in The Sound now,
3 and what we care about is the amount of water that was
4 produced in this and where it went and what it is
5 going to do to us if it starts going back out. Okay.
6 So to make a long story short, if I
7 showed you that earlier slide with the yellows and
8 blues on stress, and I showed you this guy here now,
9 this is Sandy's effect. About the only difference you
10 are going to see it says created higher maximum bottom
11 stresses in some areas. Well, now it turns out if you
12 looked at the absolute numbers on the table -- I'll
13 show it to you in a minute. I don't expect you to
14 memorize the last table.
15 I'm telling you what we're looking
16 at is, for the most part, each one changed a little
17 bit. Some fair number of them went up a little bit.
18 But in terms of the deeper water effects they weren't
19 as great as you might expect. Most of the effects
20 we're looking at higher stress in the shallow areas
21 near shore, which given the wind field, you know, you
22 don't need a model to tell you that probably. Okay,
23 next.
24 So here we are. About the same
25 distribution of stress. And if you went down and

1 compared this set of numbers with the earlier set of
2 numbers, you'd see just what I told you. You still
3 got Cornfield Shoals as the winner, New London as the
4 lowest end on the Eastern Long Island Sound sites.
5 And if you run down this guy here, about the same.
6 Now you are getting down Fishers Island center,
7 Fishers Island east, it's still below your 0.75. This
8 guy went up quite a bit, the west, as you might
9 expect. The same thing for the Block Island Sound
10 site. It went up. Next?
11 So it's defined as a level of stress
12 that's got to be mobilized, and I figured that we were
13 using a cutoff for the sake of screening of about 0.75
14 pascals. That's going to vary depending on the stuff
15 you are playing with. The more cohesive, it's going to
16 take more stress. The sandier, if you bring me out a
17 beach sand, it's going to take less, okay, and a
18 variety of other factors, too.
19 If you just get me in talking about
20 the biological effects. Okay. Those damn bios messed
21 up the texture of my sediment. They burrowed into the
22 sediment, and so the physical oceanographer has to be
23 sensitive to the biology, but that's affecting the
24 uppermost layer of the sediment column, and it has
25 been shown over the years to be a relatively minor

1 effect. They build themselves little cocoons to stay
2 put, okay? Next.
3 If you do that -- why don't we --
4 This is the comparison. Basically what you are
5 looking at here we just split up what you just saw
6 into areas that were greater than one Pascal, 0.75 to
7 1 Pascal and less than 1 Pascal, and you got Block
8 Island Sound, New London, Fishers, Orient Point,
9 Fishers Island east and north of Montauk as the sites
10 that are below 0.75. The remainder were above 0.75.
11 Okay.
12 MR. JOHNSON: Are you going to talk
13 about capacity in any of these sites?
14 DR. BOHLEN: No capacity. Just --
15 with the exception of depth that is included in the
16 model, what's out there is what's out there.
17 COURT REPORTER: Sir, can I have
18 your name, please?
19 MR. JOHNSON: John Johnson.
20 COURT REPORTER: Thank you.
21 DR. BOHLEN: So before I gave you
22 different shadings from the reds to the blues, right,
23 browns to the blues. Here we just -- everything
24 that's above 0.75 is in brown, and you can see this is
25 maximum bottom stress exceeding during the simulation

1 of Storm Sandy, okay? What are you looking at is
2 Sandy. And as I said, if we did this for the
3 non-Sandy, you're not going to see all that much of a
4 change. You are going see some change but not all
5 that much of a change.
6 What impresses you here is that
7 there is a lot of brown. That's fine. What does it
8 all mean to us? This guy. It says sites 1, 2 and 7,
9 Cornfield Shoals, Six Mile and Fishers Island.
10 Fishers Island - West, that's south of the island,
11 have high maximum stresses. You saw that. Orient
12 Point, that's Orient Point, Block Island Sound show
13 maximum stress levels below at the center of the site
14 but have values in excess of 0.75 within the boundary.
15 So there is some variation maybe the
16 way the triangles were placed. We can argue about it.
17 Niantic Bay and Clinton Harbor show maximum stresses
18 exceeding 0.75 but less than one. We can sit and tune
19 this later, but that's what the model is showing you
20 right now the way it's laid out. New London disposal
21 site is the only site in the Eastern Sound with a
22 maximum bottom stress below 0.75. That's what we did,
23 that's how we did it, and that's what we found.
24 Questions?
25 DR. HAY: So we have 35 minutes or

so for questions and comments. Please speak up, and also please mention your name and any affiliation up front.

MR. CAREY: Drew Carey. Frank, the sediments on the bottom are obviously going to integrate the shear stress over time, and you didn't see a lot of effect from the wave climate in general because of the water depth.

DR. BOHLEN: Yeah.

MR. CAREY: So really the tidal prism and the bathymetry is what's driving a lot of the distribution of this shear stress, I would guess. Do you expect to see pretty reasonable correlation between those model shear stresses and the kinds of sediments that will be seen on the sea floor in different locations?

DR. BOHLEN: In a general sense, yes. That is to say if I was to draw you that stress diagram from Central Long Island Sound to Montauk, you would see that in general the stresses are lower in the western part of that down toward Central Long Island Sound than in the east.

And if you look at the sediments in general, once you get across Mattituck Sill, you tend to find softer sediments that have accumulated. Out

1 in the Eastern Sound, it may be somewhat coarser on
2 the bottom on average. So a simple correlation might
3 be there except for the fact that I can also bring you
4 to a number of locations in the Eastern Sound right in
5 The Race where you have very fine grained deposits
6 that are quite stable. And when you go down and you
7 put your flippers into it, you are amazed that because
8 you are dragging along trying to stay there that this
9 stuff stays put.
10 The sediments there are classes of
11 fine grained sediments, and the majority shows this
12 behavior when stress can really build up resistance to
13 movement. So the simple correlation is very often
14 hard to realize. You will find high energy flows and
15 fine grained deposits out there. Is that what you are
16 looking for?
17 MR. CAREY: Yeah, and so a little
18 follow-up is that presumably based on characterization
19 of dredged material you chose fine sand as kind of the
20 driver that gave us this 0.75 Pascal.
21 DR. BOHLEN: Right.
22 MR. CAREY: If you shift down to say
23 very fine sand or a slightly more complicated mix of
24 grain sizes, you could get those materials to the
25 bottom, get them to stay in place in slightly higher

shear than necessarily this.

DR. BOHLEN: Absolutely. What we're looking at here, this is the conservative.

MR. CAREY: Right.

DR. BOHLEN: I don't know how you class the conservative anymore, but --

MR. CAREY: Go ahead. Call me a conservative.

DR. BOHLEN: Now, what we have up here, 0.75, you can probably find that same material staying put in stresses in excess of one. I would say we really want to have that stuff -- we would be sure that that stuff is going to stay. That's use 0.75. I don't know whether that's liberal or conservative.

DR. HAY: Any questions? Comments?

MR. ALLYN: Compliments to you and your staff. That was amazing.

DR. HAY: Thank you.

DR. BOHLEN: I want to emphasize two things. This continues to be a work in progress, because the next step on this whole thing is to quantify the sediment transport. So we got a pretty good understanding of the velocity field and the shear that's associated with it.

Now we want to try for the sediment

1 transport model so we give you some ideas of the
2 probability of movement, and then again what he said,
3 Grant said about where the stuff is going to go so
4 we're not finished yet. And then for those who
5 haven't asked the question, I asked the question about
6 when I heard about it.
7 The next step in this whole business
8 is so you have established some background for
9 exposure. The swimmer is down there, and there is
10 some mud that's looking at going by. What about the
11 effects, the biologicals, where the movement of the
12 mud and the movement of the mud where the constituents
13 may be impacting the benthic community or the water
14 column. So the biological study has also yet to be
15 done so it's very much a work in progress.
16 MS. MCKENZIE: Tracey McKenzie. I'm
17 curious as to what your schedule is for your next
18 sediment transport modeling.
19 DR. BOHLEN: You want to answer
20 that.
21 DR. HAY: Well, the sediment
22 transport modeling is -- there are two elements that
23 are still being worked on. One is an LTFATE,
24 long-term sediment transport model and a short-term
25 sediment transport model. Maybe Grant, you want to

elaborate on that quickly.

DR. MCCARDELL: I have to refer you to Professor O'Donnell who is out of town as far as that's concerned. We're working on both of those projects.

DR. BOHLEN: The reason that I laugh is soon is all we ever hear. So I can't tell you that it's December 16 or whatever, but all of this I think as you saw in the schedule is going to have to be quickly addressed to get things finished off by next spring.

DR. HAY: In other words, there is still modeling that is taking place at this time.

DR. BOHLEN: Right.

MR. JOHNSON: John Johnson. Is this --

DR. HAY: Do you have an affiliation.

MR. JOHNSON: Yeah, I'm sorry, CMTA. Is this the only input that's going to determine the relocation sites and sediment dump sites? We take offense in the Marine industry to calling them dump sites. I think they should be called property relocation sites.

That all being said the question is

1 does -- what other additional information is going to
2 be inputted to those people who are going to, you
3 know, designate some other sites?
4 DR. BOHLEN: Jean.
5 MS. BROCHI: Again, I can take that
6 and I can answer the capacity question as well. So
7 the capacity of the potential disposal sites, the
8 dredged material disposal sites, potential sites, not
9 dumping sites, the capacity and dredging needs is part
10 of the Environmental Impact Statement as well as
11 biological characterization, the physo (physical oceanography), sediment,
12 economics.
13 And all of that will be pulled
14 together in an environmental consequences. It will be
15 evaluated along with no alternative, which means what
16 happens if we don't -- there are no sites that are
17 available.
18 MR. JOHNSON: How far along are you
19 in the studies of those other factors?
20 MS. BROCHI: This is one of the
21 major studies that we just completed. That's why
22 we're having this public meeting. Biological
23 resources we have some information. We have a
24 literature search on, the dredging needs capacity. We
25 have the Corps of Engineering finalizing that report

1 right now, and it all will be compiled into the
2 document, which will be the draft.
3 MR. JOHNSON: And your deadline is
4 December of next year.
5 MS. BROCHI: 2016 for the final.
6 MR. JOHNSON: January 1, 2016?
7 MS. BROCHI: December 2016 is the
8 final, rulemaking and --
9 MR. JOHNSON: That's two years.
10 MS. BROCHI: Yes. We're coming out
11 in the spring with the draft so that's probably the
12 date that you will hear from us, and we will have a
13 public meeting.
14 DR. HAY: Next up is -- next up is
15 Bill, actually, sorry.
16 MR. SPICER: Bill Spicer, Spicer's
17 Marinas. Also a member of the Connecticut Marine
18 Trades and a member of the Stakeholders Commission who
19 is supposed to comment on the DMMP. I noticed a
20 couple, three things. All of us have been looking at
21 the NY DOS failure of consistency for some of our
22 dredging permits. Mine has been out for eight years,
23 since 2006, and continuously renewed very faithfully
24 and is in force.
25 But it recently was declared, after

1 208 days, to be nonvalid. That it was not consistent
2 with what New York had. It's very interesting the
3 site 6 tests out very, very nicely when you're putting
4 real scientific data out with real oceanographic
5 studies and real oceanography running, and it shows
6 that the NLDS is doing very well.
7 Now, I know we're in here, because
8 we're supposed to be designating one or more sites in
9 Long Island Sound, which is kind of interesting,
10 because in some of the NY DOS claims where they are
11 claiming inconsistency, they have located NLDS as
12 northeast of the basin of Long Island Sound.
13 Now, what that would mean The Race
14 runs out in two deep valleys that kind of make a V.
15 The eastern one runs in through past Race Rock and
16 between there and Fadden and comes out to about where
17 Bartlett's Reef is and swings west. The other one is
18 further west over by Little Gull Island, between there
19 and Fadden.
20 Now, I contended in a bound paper
21 that I submitted to Mike Keegan very early in this
22 that the NLDS was in Fishers Island Sound. It's not
23 down in the valleys and canyons. It's up on the top
24 of the plateau, and it's not subject to Ambro. It's
25 subject to 404 waters and regular Army Corps of

1 Engineers analyses the same way as is occurring in
2 every other estuary in the country.
3 But we got singled out in 1980 by an
4 amendment slipped through Congress by Representative
5 Ambro of New York aided by -- out of the guy's own
6 mouth, because he was bragging at a Holiday Inn in New
7 London in 2006 that he aided Ambro in doing it, and
8 his name was all over the coastal zone management
9 sheet, and he happens to be employed by NY DOS, and
10 both of these were sneak attacks without any
11 particular notice to Connecticut's waterfront
12 stakeholders.
13 And I also have a document from NOAA
14 that says that they were very surprised that
15 Connecticut didn't object to New York's -- or it
16 seemed that way to me -- coastal zone management. But
17 you know what? There weren't any comments against
18 that being extended. You know why? We didn't know
19 about it, because I believe that rumor has it, and the
20 best information I can get was they're supposed to
21 notify the Army Corps of Engineers.
22 What Army Corps of Engineers did
23 they notify? New England? No. It's believed they
24 sent it to New York. I can't prove that, but I sure
25 know that there wasn't anything that I can find that's

1 here in New England except that when I -- I found out
2 about it in the afternoon, and I went to DEP the next
3 morning to challenge it, because I was furious.
4 We have been opposing Ambro for 32
5 of 36 municipalities to have water go up and down in
6 Connecticut, tidal water, 32 of 36 opposed Ambro in
7 print and wanted it repealed.
8 MS. BROCHI: Okay. So I am going
9 to -- you bring up two good points I did want to
10 mention, actually. So Mike Keegan -- you sent
11 something to Mike Keegan. He's working for the Corps
12 of Engineers on -- he's joining us on this effort, but
13 that's the Dredge Material Management Plan, which is a
14 separate effort, which I didn't mention tonight, and I
15 think most of you are familiar with that.
16 They will also be having public
17 meetings coming out with the programmatic EIS and
18 documentation for that.
19 MR. SPICER: For the record I
20 submitted that timely with a request for that. I
21 think it was in December of '06. It was undated on
22 the actual document. It was about that thick with
23 white covers and spiral bound.
24 MS. BROCHI: Okay.
25 MR. SPICER: I can provide more

1 copies.
2 MS. BROCHI: I mean, we can talk --
3 MR. SPICER: That's okay, continue,
4 continue. You're doing fine.
5 DR. BOHLEN: As far as our
6 designation of the site, I mean what we classed as
7 Eastern Long Island Sound versus outside of Eastern
8 Long Island Sound had nothing to do with political
9 jurisdictions and boundaries.
10 MR. SPICER: The Corps put $7
11 million of signs in by 2005 and then got a political
12 decision where something was rammed down our throat
13 here in Connecticut, and people weren't happy, and
14 during the midst of this NOAA was kind of surprised.
15 It seemed to me that nobody objected.
16 But when I got to DEP, I found that
17 Gina McCarthy knew all about it, and she did find a
18 way on one of the other things to shut me up. There
19 was a letter from her deputy, Amy Marella, that told
20 me to -- you know, I kind of got stabbed in the back
21 about Ambro, and she had a way of shutting me up that
22 was interesting. She looked me in the eye --
23 MS. BROCHI: I apologize on behalf
24 of the agency --
25 MR. SPICER: Wait a minute. She

1 looked me in the eye and she said I wrote it. That's
2 I, Gina McCarthy, wrote it. So I shut up. If it was
3 a man, I'd address her in spades. A woman, I shut it
4 up and turned around and decided that I had been
5 really stabbed in the back --
6 MS. BROCHI: So --
7 MR. SPICER: -- and I haven't shut
8 up since.
9 MS. BROCHI: So one other point that
10 you made was about the DOS coastal zone consistency,
11 and so they do have that authority. If anything is
12 abutting, they can make comments on projects. Project specific review appens within the regulatory agencies and the Corps and EPA will hand that separately. If it
13 is project specific, they have it within the
14 regulatory agencies, the Corps and EPA, will handle
15 that separately. This meeting is about the SEIS, do you have any questions specifically about this effort? This is -- I mean, if you have
16 anything specific about this --
17 MR. SPICER: Yep, I do have it --
18 MS. BROCHI: -- process --
19 MR. SPICER: -- specific with NY
20 DOS.
21 MS. BROCHI: Okay.
22 MR. SPICER: They're inconsistent.
23 Did they say where in New London NLDS is? NLDS is in
24 Fishers Island Sound.
25 MS. BROCHI: We --

MR. SPICER: Some others have made some errors, but that one may be crucial.

MS. BROCHI: Okay. So we do have a representative as part of our cooperating agency group here today. Mike Zimmerman is here. Can you speak to any of this or should they -- is there somebody else you can refer them to?

MR. ZIMMERMAN: Well, is there a specific question, I guess?

MR. SPICER: There is a statement that they have made contentions that are incorrect.

MS. BROCHI: So that --

MR. SPICER: They have had plenty of practice at making incorrect ones, and I have corrected them on numerous occasions, and I think we need to put it on record here that NLDS is in Fishers Island Sound and is 404 waters, and they have admitted it, and I call it if it was legal, it's an admission against interest. Where they have admitted, it's northeast of the eastern basin of Long Island Sound.

MS. BROCHI: Okay. So, Mike, would it be appropriate for Jennifer to receive something then?

MR. ZIMMERMAN: I'm sure she would be happy to.

1 MS. BROCHI: So if you want to
2 submit official comments to NYDOS, Jennifer Street would
3 be the contact.
4 MR. SPICER: At the moment I have
5 cooperated, because I am being threatened standing on
6 my air hose and I'm a diver. That I would go to
7 Central this time, but that doesn't mean that they
8 don't come in here and be honest with the folks.
9 MS. BROCHI: Right.
10 MR. SPICER: You got to tell them.
11 In short, we have been jocked a couple times.
12 MS. BROCHI: Thank you.
13 DR. BOHLEN: Susan.
14 DR. HAY: I want to get some more
15 comments, though.
16 MS. BURNS: Kathleen Burns, CMTA. I
17 just wanted to follow-up on JJ's point when you were
18 discussing impacts that would be weighted, the impacts
19 that you are or not impacts, I apologize, but the
20 different, the various studies that will be entered
21 into this impact study. Are those weighted?
22 MS. BROCHI: Sorry, could you just
23 say your affiliation?
24 MS. BURNS: Oh, I'm sorry,
25 Connecticut Marine Trades Association. So there is

1 the physical. There is the biological. You had
2 mentioned economic. What else is weighed in there?
3 DR. HAY: Archaeological.
4 MS. BROCHI: Archeological,
5 cultural, economic. Then --
6 MR. JOHNSON: Capacities.
7 MS. BROCHI: Capacities is part of
8 the development. It's not really weighted.
9 MS. BURNS: Are these weighted in
10 any sort of fashion?
11 MS. BROCHI: No. The data is all
12 collected . The site screening process is what we go
13 through, evaluating where the sites are It's more of a screening tool that
15 we use. The final document will evaluate all of those
16 equally.
17 DR. BOHLEN: But -- I don't know
18 anything about evaluating documents. I'm saying if
19 you came in here and you said a site that you are
20 going to use is already full, that makes that
21 classification pretty way up.
22 DR. HAY: Similarly if you had a
23 site that's on a shellfish bed, that would be --
24 MS. BROCHI: Right. That's part of
25 the screening, too.

1 MR. HELBIG: Jean, Frank, Ron
2 Helbig.
3 COURT REPORTER: I'm sorry, sir,
4 your name again?
5 MR. HELBIG: Ron Helbig, Connecticut
6 Marine Trade Association, and the whole discussion has
7 been about physics and about the stress on the bottom
8 and site 6. Can either one of you talk to the effect
9 that why is site 6 not considered a very good site
10 based on all the data that you have here and the lack
11 of stress that's on that site and speak to the fact
12 that why that shouldn't continue to be a designated
13 site?
14 MS. BROCHI: So I will take that, if
15 you don't mind.
16 DR. BOHLEN: Yeah.
17 MS. BROCHI: So, again, so the part
18 of the effort is to look at all of the sites, and what
19 I had presented originally is we had started, you
20 know, just eastern, open wide. We decided to go to
21 historic sites, because we really weren't familiar
22 with what had gone on there and the Corps of Engineers
23 had helped us.
24 So we included historic sites. We
25 included active sites, which includes the currently,

1 currently used sites. And so part of the
2 investigation is to look at all of the data. This is
3 the first big chunk of data, and so we narrowed it
4 down to the six sites, and so all of those six are
5 going to be evaluated. So we're in the process of
6 collecting data on all of those.
7 MR. HELBIG: My only question to you
8 is just here tonight can you say from an educated
9 opinion that the site 6 is something that we should be
10 strongly fighting for because of the temperament of
11 the currents on the bottom and the ability for the
12 material to stay in that location?
13 MS. BROCHI: So what I can -- I
14 don't -- I can't prejudge, and we have to evaluate all
15 of the data as it comes in so what I can say is
16 based on the physical stress and what we set out in
17 the Notice of Intent to look at is a containment site
18 for the type of sediment that's in Long Island Sound
19 and based on the dredging needs report that the Corps
20 of Engineers produced in 2009.
21 Based on that report we determined,
22 when we came out with the Notice of Intent, that we
23 would look for a containment site. Cornfield Shoals
24 is clearly -- and this proves it -- a dispersive site.
25 So we're -- we need a containment site, and we're

1 looking at all of them, and we won't make a decision
2 until we evaluate all of --
3 MR. HELBIG: But you don't want to
4 share an opinion at least or --
5 MS. BROCHI: I do not want to share
6 an opinion.
7 MR. HELBIG: Okay. I get that.
8 MS. BROCHI: Sorry.
9 DR. HAY: Sir, go ahead.
10 MR. SHAPIRO: My name is Jeffrey
11 Shapiro. I'm from Cedar Island Marina. My concern is
12 with the grade size used for your modeling, as the
13 gentleman back here spoke about, was a sandy material,
14 and in my experience almost all of the material that I
15 see that goes out of waterfront facilities in
16 Connecticut is a lot siltier material. Siltier
17 material is going to be much more stable then the way
18 you were talking, much more stable on the bottom than
19 a sandier material.
20 So my only concern is with some of
21 the evaluations you have done that you might tend to
22 come to a conclusion that the material is going to
23 move when in fact if you had used siltier material for
24 your examples, you might come to a different
25 conclusion, the conclusion that the material is not

1 going to move.
2 DR. BOHLEN: Okay.
3 MR. SHAPIRO: Like I said in
4 Connecticut most of the material I see going out is a
5 lot siltier, because if somebody has a waterfront
6 facility and they have sand that needs to be removed,
7 they're probably not going to be putting it in the
8 barge and dumping it out to sea. They're going to be
9 selling it to somebody. So that's my comment is that
10 maybe --
11 DR. BOHLEN: I guess my response to
12 that is don't get ahead of yourself.
13 MR. SHAPIRO: Okay.
14 DR. BOHLEN: And hear what was said.
15 This is the study of the physics of the field and the
16 development of a model that allows us to evaluate
17 transport. You did a straw man evaluation. You went
18 and picked a number. It ain't 10 and it ain't 0. How
19 about 0.75? Where did 0.75 come from?
20 Joe Germano did some work down in a
21 site down in Long Island Sound, and his numbers come
22 up looking like 0.75. There is a study in the North
23 Sea that -- the numbers come up looking like 0.75.
24 It's not 1 and it's not 0.25. Okay. So we used it
25 for screening. If it was this absolutely, what would

1 we be seeing? It's the beginning of the process.
2 The next step in this whole thing is
3 to refine it, and that's where the model starts coming
4 in where you really do take a look at how the sediment
5 is responding. You give me a much more complete set
6 of data than grain size. I want both density, bulk
7 density, I want sediment characteristics that go
8 beyond simple grain size, and I can then talk to you
9 about not this particle-by-particle movement that you
10 were looking at in this first slide, which is
11 unrealistic given all of the sediments I have seen in
12 Long Island Sound but on the beach. If I'm off the
13 beach, I got gooey stuff even if it's sandy, okay?
14 We build that into the model, and we
15 come up with a much more accurate and quantitative
16 evaluation of the transport potential. What you are
17 looking at right now is just the beginning, screening.
18 It's the beginning.
19 MS. BROCHI: And I'm going to add to
20 that a little bit. So this effort is to designate one
21 or more or none disposal sites, right, dredged
22 material disposal sites. It doesn't mean
23 automatically that dredging will happen, that projects
24 will go out there. That happens from the regulatory
25 agencies on a project-by-project basis all the time so

1 we're very familiar. The Corps of Engineers are back
2 there, the EPA. I review the projects. We're very
3 familiar with the type of sediment in Long Island
4 Sound and the dredging needs.
5 Now, one thing I had mentioned
6 earlier is the DMMP effort, which is separate from
7 this. Well, as part of that effort they collected
8 information on dredging needs. They looked at upland
9 disposal and other beneficial uses and alternatives.
10 Those documents are also going to be used in this
11 evaluation. And so whenever they're, you know -- the
12 object is to try to use sandy materials beneficially
13 wherever, whenever possible.
14 DR. HAY: Okay.
15 MR. SHAPIRO: Not too often.
16 MS. MCALLISTER: Abbie McAllister,
17 Saybrook Point Marina. We're basing -- the people who
18 are going to be basing their decisions on things like
19 Cornfield Shoals based on your model that you
20 completed when it seems with all the data you have we
21 have specific data on what type of sediment has been
22 disposed at Cornfield Shoals for the last, I don't
23 know, 20 years --
24 DR. BOHLEN: Sure.
25 MS. MCALLISTER: -- because we have

1 all had to have that tested specifically. Couldn't
2 you plug those exact numbers into your model so that
3 we would get a more realistic idea of what's being put
4 into Cornfield Shoals rather than judging it as sand?
5 I know I'm not putting sand in Cornfield Shoal. It's
6 a fine sediment, and that's on record with the DEP.
7 DR. BOHLEN: I'm sorry, you're not
8 putting sand in Cornfield Shoal.
9 MS. MCALLISTER: It's a fine
10 sediment, because we have to have it tested every time
11 we dump there.
12 DR. BOHLEN: Well, you can get --
13 MS. MCALLISTER: Every two years we
14 dredge.
15 DR. BOHLEN: What's the use of the
16 Cornfield Shoals area? George?
17 MR. WISKER: Cornfield is a
18 dispersive site.
19 DR. BOHLEN: And what's the major
20 source of the material that goes into Cornfield Shoals
21 historically?
22 MR. WISKER: Connecticut River.
23 DR. BOHLEN: Connecticut River
24 sediment.
25 MS. MCALLISTER: We're not putting

sand --

DR. BOHLEN: I know you are not putting sand, George.

MR. WISKER: It's not always sand.

MS. MCALLISTER: We know exactly what has been put there. Couldn't we use those (inaudible)? Wouldn't that give us a better idea of just --

DR. BOHLEN: And we can also look at the mounds at New London the same way and the mounds at central Long Island Sound the same.

MS. MCALLISTER: We have done so much research it would seem that it would be easy to pull that into this whole thing.

DR. BOHLEN: I forgot to tell you 45 years. Did I tell you that?

MS. MCALLISTER: I believe it. I'm just saying it seems like you have taken such detail with everything else that it would be not that much more difficult to use what's been approved for that in the past.

DR. BOHLEN: And we are and we are.

DR. HAY: Yes?

MR. MCGUGAN: Hi, Christian McGugan, Gwenmor Marina and Gwenmor Marine Contracting. One

1 thing I was wondering -- I think this kind of speaks
2 to what Bill Spicer was talking about -- are any of
3 these proposed sites outside, because I don't even
4 know what the delineation is between a coastal zone
5 management area and a non-coastal zone management
6 area?
7 And the reason I ask are any of
8 these sites outside of the coastal zone management,
9 because I think the fear is that the recent trend of
10 DOS objecting to all the projects in southeastern
11 Connecticut, because Bill's was the first, and we have
12 heard the storms coming, and it seemed like it's
13 coming. They used to just sit on their comment for
14 180 days and then Army Corps would assume consistency
15 issue of the permit.
16 Well, things they seem to have
17 changed starting with Bill, and like I said we have
18 heard the rumblings that this is coming. So
19 effectively what they have done for private projects
20 is shut down the New London dump site, okay? Now, I'm
21 a dredge contractor. I have projects on the
22 Connecticut River including Abbie's.
23 I was telling her today next time
24 she dredges, Saybrook Point Inn dredges, you probably
25 are going to have to go to Central, because New York

1 is going to object. So I guess the fear is that you
2 guys do all this hard work and come up with this new
3 site or these new sites, and we say hooray. We have a
4 place to go.
5 We apply for our permits to dredge,
6 and New York can still just object, and that sets off
7 an appeal process and a legal process that no small
8 marina operator can bear, and no small marina operator
9 can bear to go to central Long Island with their
10 spoils, and I have been to some of those dredge
11 management meetings, but I can barely stomach it as a
12 dredge contractor, which I'm sure Jeff knows as well.
13 When they talk about alternative
14 disposal methods, I mean, there is electric cars
15 invented in the '50s, but we're still filling up with
16 gasoline. That's the best analogy I can make. So as
17 far as the affordability of getting rid of dredge
18 spoils in these other crazy ways that I have heard,
19 it's just not reality.
20 So anyway, I think that's the fear.
21 So are any of the proposed sites -- is there anyone in
22 this room from Army Corps? Are they all going to be
23 within the coastal zone management, and this could all
24 just be --
25 MS. BROCHI: So the zone site of

1 feasibility includes those sites. The 11 sites are
2 all within the coastal zone management consistency and
3 that's Connecticut and New York. So either Mike or
4 George, if you have any specific information? To my
5 knowledge there is no -- you know, there is no yardage
6 or mileage that, you know, gives you preference to
7 being able to object or not. It's whether it's
8 abutting and whether it's in danger.
9 MR. WISKER: I think what we're
10 getting is within Long Island Sound it's either, you
11 know, they're all territorial waters of one or the
12 other state. Boundary lines match. An example of
13 where you might be outside of the coastal zone is say
14 Rhode Island where you got far enough off into the
15 territorial seas beyond the state territorial limits.
16 Then -- and that may be where it would apply. You
17 would have to go quite a ways off shore, open water.
18 MR. CAREY: You have to get away
19 from Rhode Island's territory.
20 MR. WISKER: That's what I'm saying.
21 You have to go out and hang a right. So that would be
22 the one way you would avoid, because under the Federal
23 consistency laws the two states within Long Island
24 Sound if there is a reasonable, foreseeable effect of
25 a project in one state on another, that other state

1 has the right to remove that for consistency with that
2 program.
3 MS. BROCHI: Thank you.
4 MS. MCKENZIE: Tracey McKenzie
5 again. Just to follow up the question with you,
6 George, because the New London disposal site now, a
7 corner of it, the boundary of New York and Connecticut
8 goes right through, I think, like the lower third
9 corner of --
10 MR. WISKER: Southeastern.
11 MS. MCKENZIE: Southeastern corner
12 of it. If the site was shifted so it's not on the
13 boundary line, New York would still be able to comment
14 on the coastal action that Connecticut DEEP takes.
15 MR. WISKER: Right.
16 MS. MCKENZIE: I just want -- that's
17 all.
18 DR. HAY: Tracey, what is your
19 affiliation.
20 MS. MCKENZIE: U.S. Navy Subbase,
21 New London.
22 MS. BROCHI: Does that answer your
23 question?
24
25 MR. MCGUGAN: Just for the record,

1 to go to New London for Bill Spicer, the cost for him
2 to try to go to Central with the same material,
3 because I was his dredge contractor, and I'm not here
4 because I'm sore about not dredging this job. It's a
5 much bigger issue to me. The difference between going
6 to New London or going to Central with this stuff is
7 more than double the cost for a marina operator.
8 So it's going to be a huge burden on
9 the marinas in southeastern Connecticut, and the
10 Connecticut River is like coming. So I guess
11 somehow --
12 DR. BOHLEN: When you say cost, you
13 are including all factors in the cost. It isn't just
14 dollars.
15 MR. MCGUGAN: Right. Well, I have
16 actually done --
17 DR. BOHLEN: Is that right --
18 MR. MCGUGAN: We have done trips.
19 Ron, he couldn't because (inaudible) is too shallow.
20 So we did a couple loads and tried to be as nice as I
21 could, but, man, it's a long trip. It's 24, 26-hour
22 cycle to get out to New Haven and back. So it's just
23 -- that's the economics of it. It's just like, you
24 know, you are digging with a wheelbarrow in your yard.
25 You are going right there, and you are going to your

1 neighbor's house. It's just --
2 MS. BROCHI: All of the regulatory
3 agencies and cooperative agencies understand the
4 economic impact, but the State doesn't.
5 MR. MCGUGAN: Well, I think New York
6 and Connecticut needs to get along or -- maybe
7 Connecticut needs to understand what is acceptable.
8 DR. HAY: So it's 5 o'clock. We
9 started five minutes late so let's allow for five more
10 minutes, so maybe two more comments that are burning.
11 Sir?
12 MR. SHAPIRO: My name is Chris
13 Shapiro from Cedar Island Marina. Is just hasn't --
14 maybe there is an answer to this, but it hasn't been
15 entirely clear to me. You say, you know, in the
16 calculations, you know, there is going to be a lot of
17 variables, you know, such as economic, you know,
18 commercial, that type of thing. Who on your team is
19 going to be considering those variables?
20 MS. BROCHI: Well, there is
21 individual people at EPA as well as the Corps of
22 Engineers and all --
23 MR. SHAPIRO: Well, you guys are
24 scientists. Who from the business side is going to be
25 considering this? I mean, surely, you know, I'm not

1 going to get up here, you know, and talk about, you
2 know, the displacement or anything like that. So how
3 can you guys talk about business?
4 MS. BROCHI: You will have an
5 opportunity to comment about --
6 MR. SHAPIRO: No, no. Who on your
7 who is actually putting together the actual
8 recommendations?
9 MS. BROCHI: Yeah, well, so the
10 recommendations come from the agency and the
11 cooperative agencies, but the working group that was
12 set up for the DMMP has nonregulatory and nonagency
13 specific focus on it that we're going to tap into as
14 well.
15 MR. SHAPIRO: So there are people
16 from the business side, too.
17 MS. BROCHI: Yeah.
18 MR. SHAPIRO: Obviously this is very
19 important, you know, but there obviously needs to be
20 some professionals, you know, that understand, you
21 know, the economic, you know, impacts. I know that
22 you guys are probably very smart, but there needs to
23 be professionals, you know.
24 DR. HAY: We have an economist on
25 board as well.

1 MR. SHAPIRO: Can you give me their
2 names?
3 COURT REPORTER: I'm sorry?
4 DR. HAY: Ben Lieberman.
5 MR. SHAPIRO: Ben Lieberman?
6 MS. BROCHI: So on the working
7 group, Mark, do you know when the next working group
8 of the DMMP would be established or --
9 MR. HABEL: Probably about the time
10 we publish the draft of the DMMP.
11 MS. BROCHI: So Mike Keegan would be
12 the contact.
13 MR. SHAPIRO: Okay. I'd just like
14 to ask --
15 DR. BOHLEN: Did I hear -- Jean, you
16 said after the DMMP or after --
17 MS. BROCHI: No, the Dredge Material
18 Management Plan.
19 DR. BOHLEN: What's the date for the
20 release of the Dredge Material Management Plan?
21 MR. HABEL: It will be sometime in
22 the spring.
23 MR. JOHNSON: Of 2015?
24 MR. HABEL: Yes.
25 DR. BOHLEN: I know there was some

1 questions on that that had been circulating.
2 DR. HAY: One final question?
3 Comments? Okay. Thank you all for coming. Have a
4 great afternoon.
5 (Whereupon, this hearing was
6 concluded at 5:10 p.m.)
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21 CERTIFICATE OF REPORTER
22 I, Jacqueline V. McCauley, a Notary Public
23 duly commissioned and qualified in and for the State
24 of Connecticut, do hereby certify that the
25 Supplemental Environmental Impact Statement(SEIS) to

1 Evaluate the Potential Designation of One or More
2 Dredged Material Disposal Site(s) in Eastern Long
3 Island Sound hearing was taken on December 9, 2014 at
4 3:08 p.m., and reduced to writing under my
5 supervision; that this hearing is a true record of the
6 testimony given during the hearing.
7 I further certify that I am neither attorney
8 nor counsel for, nor related to, nor employed by any
9 of the parties to the action in which this hearing is
10 taken, and further, that I am not a relative or
11 employee of any attorney or counsel employed by the
12 parties hereto, or financially interested in the
13 action.
14 IN WITNESS HEREOF, I have hereunto set my hand
15 and affixed my seal this 18th day of December, 2014.
16
17 Jacqueline V. McCauley
18 Notary Public
19
20 My Commission expires: 12/31/2017
21
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25