State of Louisiana

DEPARTMENT OF NATURAL RESOURCES

Post Office Box 94275 Baton Rouge, Louisiana 70804-9275

JOHN BEL EDWARDS
Governor

Thomas Harris
Secretary

RICHARD IEYOUB
Commissioner of Conservation

WATER RESOURCES COMMISSION
Eighth Regular Meeting

LaSalle Building
Labelle Room
617 North Third Street

Thursday, September 8, 2016
11:00 a.m.

Michelle S. Abadie, CCR
Certified Court Reporter

COMMISSION MEMBERS IN ATTENDANCE:

KYLE BALKUM
Office of Wildlife and Fisheries

GLENN BRASSEAUX
Louisiana Municipal Association

NORBY CHABERT
Chairman of the Senate Natural Resources and Environment Committee

MARK DAVIS
Tulane Institute on Water Resources Law and Policy - Louisiana Law Schools

ANTHONY DUPLECHIN, JR.
Capital Area Groundwater Conservation District

JOHAN FORSMAN
Department of Health and Hospitals

PAUL FREY
Louisiana Landowners Association

COMMISSION MEMBERS IN ATTENDANCE (CONTINUED):

EVE GONZALEZ
Executive Secretary of the Public Service Commission

JERRY GRAVES
Ports Association

KENNETH GUIDRY
Senate Natural Resources Representative
Residential Consumers

THOMAS HARRIS
Secretary of the Department of Natural Resources, Governor's Office

RICHARD IEYOUB
Commissioner of Conservation

CHRIS KNOTTS
Louisiana Department of Transportation and Development

COMMISSION MEMBERS IN ATTENDANCE:

BENJAMIN MALBROUGH
Residential Consumers

SHERRI MCCONNELL
Department of Economic Development

BRAD SPICER
Louisiana Department of Agriculture and Forestry

CHARLES SUTCLIFFE
Governor's Office of Coastal Activities

ELLIOT VEGA
Department of Environmental Quality

FREDERICK ZAUNBRECHER
Representative of the geographical area of the state underlain by the Chicot Aquifer

DAVID CULPEPPER
Geoscientist appointed by the Governor

ALSO PRESENT:

GARY SNELLGROVE
Executive Director, Environmental Division

MATTHEW REONAS
Education and Marketing Representative

STACEY DYKES
Administrative Assistant

SCOTT HEMMERLING
RYAN CLARK
Water Institute of the Gulf

BREN HAASE
Coastal Protection and Restoration Authority

JOE ACCARDO
Ports Association of Louisiana

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CALL TO ORDER

MR. HARRIS:

I call this meeting of the Water Resources Commission to order.

Mr. Reonas, will you call the roll, please?

ROLL CALL

MR. REONAS:

Yes, sir.

Mr. Balkum?

MR. BALKUM:

Present.

MR. REONAS:

Mr. Bishop?

(No response.)

MR. REONAS:

Mr. Brasseaux?

MR. BRASSEAUX:

Here.

MR. REONAS:

Mr. Chabert?

MR. CHABERT:

Here.

MR. REONAS:

Mr. Cormier?

(No response.)
MR. REONAS:
Mr. Cramond?
(No response.)
MR. REONAS:
Mr. Culpepper?
(No response.)
MR. REONAS:
Mr. Davis?
MR. DAVIS:
Here.
MR. REONAS:
Mr. Duplechin?
MR. DUPLECHIN:
Here.
MR. REONAS:
Mr. Forsman?
MR. FORSMAN:
Here.
MR. REONAS:
Mr. Frey?
MR. FREY:
Here.
MR. REONAS:
Ms. Gautreaux?

(No response.)
MR. REONAS:
Ms. Gonzalez?
MS. GONZALEZ:
Here.
MR. REONAS:
Mr. Graves?
MR. GRAVES:
Present.
MR. REONAS:
Mr. Guidry?
MR. GUIDRY:
Here.
MR. REONAS:
Mr. Harris?
MR. HARRIS:
Here.
MR. REONAS:
Mr. Ieyoub?
MR. IEYOUB:
Here.
MR. REONAS:
Mr. Knotts?
MR. KNOTTS:
Here.

MR. REONAS:

Mr. Leggett?

(No response.)

MR. REONAS:

Mr. Malbrough?

MR. MALBROUGH:

Here.

MR. REONAS:

Ms. McConnell?

MS. MCCONNELL:

Here.

MR. REONAS:

Mr. Pratt?

(No response.)

MR. REONAS:

Mr. Spicer?

MR. SPICER:

Here.

MR. REONAS:

Mr. Sutcliffe?

MR. SUTCLIFFE:

Here.

MR. REONAS:

Mr. Vega?

MR. VEGA:

Here.

MR. REONAS:

Ms. Zaunbrecher?

(No response.)

MR. REONAS:

Mr. Zaunbrecher?

MR. ZAUNBRECHER:

Here.

MR. REONAS:

We have 18 members present, so we do have a quorum.

INTRODUCTORY COMMENTS FROM THE CHAIRMAN

MR. HARRIS:

Thank you, Mr. Reonas.

Good morning. I'd like to thank everyone for joining us here today and agreeing to serve on the Water Resources Commission helping our state in our efforts to manage and protect our most precious resource, our water supply.

I think we all know that parts of our state recently have had way too much water. I know we all recognize the importance showing the long-term needs of our growing communities and developing businesses and ensuring that they have the water supply moving forward.

I'm grateful for this opportunity to be part of the process, and I look forward to working with all of you to that end.

Louisiana is a state with an abundance of water. More than 17 percent of our territorial area is covered with water, and we also have 11 major aquifers underneath the ground. But we need to be aware that an abundant supply is not the same thing as an infinite supply. This is the task that we've been given to identify issues and help the state address these issues before they become a crisis.

With that, I know we have a pretty full agenda, so I won't take up too much time, except to say thank you all, again, for being here and agreeing to be on the Commission and help the state move forward with where we need to go protecting our water resources.

ADOPTION OF THE PREVIOUS MEETING SUMMARY

MR. HARRIS:

Everyone, our first agenda item, I believe, all of you have been provided with a copy of the minutes from our last meeting.

Are there any objections or comments or additions to that?

(No response.)

MR. HARRIS:

Do I hear a motion to approve the minutes?

MR. SPICER:

I move.

MR. HARRIS:

Mr. Spicer moves.

Do I hear a second?

MR. IEYOUB:

Second.

MR. HARRIS:

Any objections?

(No response.)

MR. HARRIS:

The minutes from the previous meeting are approved.

RECOGNITION OF NEW MEMBERS

MR. HARRIS:

I would like to recognize, we do have some new members to the Commission. I'd like to recognize Senator Norby Chabert who is the Chairman of the Senate Natural Resource Committee; Representative Stuart Bishop is not here; to my right, Commissioner Richard Ieyoub; Johan Forsman

with Department of Health; Kenneth Guidry; Sherri McConnell; Elliot Vega who is -- there he is; and Anthony Duplechin. Thank you all new members, like myself.

A couple of administrative issues, we will have a public comment session towards the end of the meeting. If anyone is interested in speaking, please, fill out one of the comment cards on the outside table, fill those out, pass them to one of the agency staff, and we will be happy to receive your comments at the appropriate time.

CHANGE IN ORDER OF AGENDA

MR. HARRIS:

I do have one other order of business, we are -- due to travel conflict, we're moving Item 9, Progress on the Coastal Master Plan to Item 7.

Could I get a motion, please, to approve that change to the agenda?

MR. SPICER:

I'll make the motion.

MR. HARRIS:

Motion by Mr. Spicer.

MR. KNOTTS:

Second.

MR. HARRIS:

Thank you.

Any objections?

(No response.)

MR. HARRIS:

So moved.

Mr. Reonas, I believe you're next up on the agenda, Status Update on the State Water Monitoring Network.

STATUS UPDATE ON THE STATEWIDE WATER MONITORING NETWORK

MR. REONAS:

Yes, sir. I would like to note very quickly that we did have two members arrive, Mr. Davis, and Mr. Culpepper, so that brings us up to 20, which is a pretty full house for this Commission, so I would like to thank all of you all for making it here today.

And I'll go ahead and kind of pick up with my presentation which will really be fairly brief, but it's really an update on the Statewide Monitoring Network which we've labored with the past couple of years to find funding and find a long-term solution to it.

As you know, the status of the three-year expanded Groundwater Monitoring Network that was put in place in 2012, with the use of federal dollars, and then extended until June 30th of this year, was a major concern for the Office of Conservation and Department of Natural Resources over the past year and a half.

This Commission, likewise, saw the great value of the program which had, essentially -- in that time period had doubled the size of our Statewide Groundwater Monitoring Network, and this Commission, last fall, last October, actually passed a resolution to that effect requesting that the Governor and the legislature find funds to continue this program into the future.

Realizing, of course, the dire financial situation of the state, I think we understood it, that probably the likelihood of that was not very strong, and so, as a matter of sort of a last resort, this agency, the Office of Conservation, the Department of Natural Resources, went to one of our partners, the Department of Transportation and Development, particularly the Public Works and Water Resources Division headed by one of your fellow Commissioners, Chris Knotts, here. Our

thinking was that if we could work with the U.S. Geological Survey which had run the Monitoring Network and, with them, develop a much more streamlined network, we might be able to incorporate this program into the public works allocation for U.S.G.S. projects. And, again, this was sort of a matter of last resort for us. Fortunately, our pitch to Chris and his staff was well received, and I'd like here, in this public forum, to acknowledge the spirit of cooperation on behalf of DOTD that has enabled us to maintain this statewide network in place at a fairly substantial size to its former size.

The main issue for us was streamlining the network to bring it into a manageable size that would fit within the allocations that DOTD had available, primarily, that was identifying areas for savings in the well sampling regime, the monitoring regime, moving from real time, hourly, in some cases, semiannual to annual, quarterly to semiannual, those kinds of dates, limiting points of potential overlap in some of the coverage in areas, and so on. We really wanted to tighten up the framework, maintain the footprint as much as possible, but also make the network a little bit

more lean and cost efficient, which were sort of the by-words when we were working with U.S.G.S. particularly, John Lovelace who oversaw sort of this network, and in north Louisiana, Ben McGee with U.S.G.S. who was kind of the man on the scene for looking at the Carrizo-Wilcox and Sparta aquifers.

So real quickly, the absolute number of water-level network wells, we lost about 40, so the absolute number went from 358 to 318. But, again, working with U.S.G.S., I think those are areas where there was ample coverage already or where there was potential overlap in coverage, and so the decision was made to kind of cut those in certain places and, if necessary, come back and look at those at a later date.

Also, in looking at the program, U.S.G.S. made a decision to discontinue 26 of the more expensive hourly and real-time well measurements and substituted quarterly measurements in those places.

The absolute number of chloride network wells actually increased by three. So saltwater, we wanted to make sure that we had a strong saltwater network. The issue there, again, is the

sampling regime, and we moved the semiannual samples of the chloride network to just an annual basis. So you're basically cutting out one measurement a year, but you still have the framework in place, the footprint of the network in place, and you're still collecting data on a yearly basis. It's just, again, the number of data points have shrunk somewhat.

So, overall, we were very pleased with how it worked out. Again, we've lost a lot of the bells and whistles of the program we had from 2012, through earlier this year, 2016, in terms of the water use reporting, the water quality reporting, but we've maintained the footprint so that in the future, as needed, we can bulk up this network to respond to any particular crises or developments.

Particularly, our thinking was -- such as in the Haynesville Shale in northwest Louisiana or potentially the TMS, the Tuscaloosa Marine Shale, across central and parts of southeast Louisiana, if that energy development picks up again, we'll be in place to sort of expand this network as needed to do water level monitoring, water quality monitoring, those kinds of issues.

So we feel real good about it.

Again, our goal in the Office of Conservation, with its responsibility for groundwater sustainability, was to maintain this network pretty much at all costs. If we had to trim it to the bare bones, we would do that, but we wanted to maintain the skeleton or the framework in place, that footprint. We did not want to lose that, and that was really our main goal when working with U.S.G.S. and DOTD, so we're very pleased that that has worked out.

We did also talk with U.S.G.S. in kind of open talks with John Lovelace, who, unfortunately, couldn't be here today, about long-term planning, a five- and ten-year planning horizon, so that we can prioritize specific issues for study or specific areas for study down the road so that, with this funding, we can target specific areas or specific needs in sort of a prioritized way, in a staged way so that we're not necessarily responding to crises always but actually sort of mapping out things that we need to address and areas we need to come back to perhaps down the road. And that's some good conversations we had with John Lovelace, also,

with the regional director of the U.S.G.S., Scott Gain, who came down and we had some good conversations with him, as well.

There's also several other opportunities that John had noted, and these are driven from the main U.S.G.S. office in D.C. Particularly, they're looking at doing some multi-state programs, and one of them being the Mississippi River Alluvial Plain program, which is funded nationally and which would conceivably include parts of Louisiana. He's -- I know John has had several discussions with his counterparts in that program about including in the funding part of Louisiana's network, which will again free up some dollars for U.S.G.S. to work on other projects, water resource projects, in the state while letting that monitoring be picked up by the central U.S.G.S. office. So there are opportunities like that, and we'll continue to kind of keep you all apprised of them going forward.

I do have a couple of maps that John had prepared for us, and these are included in your folders. Again, not to go over those in too much detail, but they will show you sort of the extent

of the program, the number of wells, where they're located. Let's see. It's difficult to see in here, the lighting. But the former network -- obviously, U.S.G.S. has sort of kept several networks in place, the DNR-expanded network, the old DOTD network. Capital Area Groundwater Commission had its network. There was also some monitoring in red out at Fort Polk in western Louisiana. So all these networks were sort of in play as part of U.S.G.S.'s work.

The green in the -- 2017, it's the slide to the right -- or image to the right, the green network is the expanded network as it will exist today and going into 2017.

So, again, a lot of -- we lost about 40 wells, but, again, the coverage is very robust. We feel very strong about where we're at with this program. And the same with the chloride monitoring network. And, again, these are included in your files for further review.

And that's essentially where we're at with the network.

Again, I'd like to thank the Commission for understanding the value of this program and making it a priority in what this Commission does.

And, again, I'd like to thank DOTD, Chris Knotts, for recognizing the value of this and working with us and U.S.G.S. to put this network on a firm footing going forward, again, very streamline, very lean, but still the footprint is in place and it can be expanded as needed in the future and as funds perhaps become available. But, again, our main goal was to meet that need to maintain that footprint in place.

So I'll take any questions, or, Chris, if you have any comments? Not to put you on the spot, but...

MR. KNOTTS:

Yes. I want to thank Matt and Gary for working with us. We were very happy to participate and make sure that the program remained viable. We know it's not as robust as we would like it, but as Matt pointed out earlier, we are also with some constrained funding, but I was willing to make our funding go as far as we could. So I think we did the best that we could with our available funding.

MR. HARRIS:

Thank you. It's very much appreciated.

MR. DAVIS:

I just want to really commend you for the work that you've been able to pull together. I mean, this is really -- it's been a rodeo ride. You know, this is a hard horse to stay on.

But I can tell you, when we get into another part of the agenda, one of the critical lessons that we're learning as we have to manage water, and I think we're learning this also from, you know, the recent flooding, is that it's very difficult to manage water if you're not measuring water, and we are at a -- at the minimum threshold, and I think it's absolutely essential that we maintain this capacity. And I do commend you and the Department for, you know, being able to do what you've done in extraordinarily difficult times, and so -- you know, I do want to make sure that everyone understands that the future is probably going to -- you know, we're going to have to find ways collectively to build on this because there are so many decisions that are going to have to be made across the state that are really going to depend upon having a more robust knowledge base; otherwise, we'll be shadowboxing, so nice job.

MR. REONAS:

Thank you, Mark.

I do want to point out for our new members, this was a subject that we've discussed, I don't know, at least for the past three or four Commission meetings, wouldn't you say, Gary, in terms of like where do we go from here and what the future would be?

Just for our new members to understand, the expanded network, again, essentially doubled the size of our existing network at the time, in 2012, but that money had come from federal dollars, so it was a limited amount of time. We had three years. We were able to extend it a year, but the feds had said, that's pretty much it. So we're really on our own in terms of trying to find additional funds to fit this program in. Otherwise, again, we'd be losing ground in terms of the size of the network and going back to a very limited understanding of what was going on with groundwater levels around the state. So for us, maintaining -- again, maintaining that footprint had been a huge priority, and fortunately, we were able to sort of put together the pieces to do that.

MR. DUPLECHIN:

Matt?

MR. REONAS:

Yes, sir.

MR. DUPLECHIN:

We were in Lake Charles this weekend, and there was a news article on KPLC about some efforts and studies that the geoscience department at ULL is doing on sustainability, water levels, and chlorides --

MR. REONAS:

Right.

MR. DUPLECHIN:

-- saltwater encroachment, do you know if they're using the data from this network, or do they have their own information network that they're getting that from?

MR. REONAS:

Yes, that's David Borrok who has presented at the Commission a couple of meetings ago. We actually have him -- I've talked with him about presenting probably at the next meeting, which I'm assuming will probably be in December, for this group. I know school was back in, so I think early September would probably have been a bad time for him. But, yes, they're doing some

great work to utilizing the U.S.G.S. network and some other sources, as well. But, hopefully, we'll be able to put him on the agenda come December. I'm assuming that's probably when the next meeting will be, not to step too far out of bounds, but we would like to have them back because they have made some pretty significant strides in what they've done and are in a place to kind of showcase some of the things they've come across.

They were doing a little bit more -- they were kind of mixing some technical work, along with, I guess, some social work, as well, in terms of trying to understand how water is used and who uses it and how best to sort of -- maybe what are some options for alleviating some of those issues over in southwest Louisiana.

MR. DUPLECHIN:

Right, right.

MR. REONAS:

So -- but that's about as much as I know of it.

MR. DUPLECHIN:

Good. I hope you can get them on the agenda.

MR. REONAS:

Yes, yes. They do great work.

MR. IEYOUB:

Matt, first of all, I want to congratulate you on the great work you're doing for the Office of Conservation, and we really appreciate it.

You mentioned that we're on a lean system now?

MR. REONAS:

Yes, sir.

MR. IEYOUB:

It's not what you would call full strength. I don't know if you can answer this or not, but how long can we maintain this on a lean system without affecting its -- you know, damaging its effectiveness, I mean, in the way of being an adequate monitoring system? Do you see what I'm saying?

MR. REONAS:

Yes, sir. I think right now we feel pretty good about the scope -- and the size and the scope of the network. At one point in the '80s, it was even more substantial, but it had been cut pretty much to the bone by the early

2000s, and it -- in 2010, I think the number was about 180 wells in the network. Today, we're well over 300, so, again, it's essentially doubled.

And as I've always explained it in my very limited way, it's essentially the eyes -- our eyes in the ground. You know, those monitor wells provide us the information we need to understand what's going on in the aquifer systems around the state, the groundwater systems around the state, and so the more -- obviously, the more you could include in the system, the better your understanding of what's going on in local areas is going to be, but in terms of understanding the broad contours of how these groundwater systems are operating and what -- in sort of a very broad way, the system, I think, is in good shape.

Now, again, we've lost some of the bells and whistles. We've lost some of the data points, so in many of the wells, you've gone from collecting data four times a year to two times, or from two times a year to only one time a year. Now, is that sufficient? Probably for right now, again, not seeing a lot of major groundwater issues at this point in time -- I mean, there are

ones that we know about, and certainly, you know, the Lake Charles area, that's always going to be at issue, Alexandria, we, you know, are kind of trying to understand what's going on there, Baton Rouge area, understanding -- but in terms of grave crises right now, I'm not sure that we have those. But I think at that point in time, this will give us enough sort of warning signs to enable us to put more resources, if needed, to critical areas.

Our main goal, we didn't want to lose too many wells in the Sparta and north Louisiana. But, again, as has been reported recently, Sparta aquifer in north Louisiana is actually doing very well. It's almost I won't say sustainable, but across the board, it's getting into the sustainable range. Now, you do have certain areas within the Sparta district that are still running in a deficit, but across the board, it's -- there's been great improvement. But we still -- we don't want to lose our eyes up there, you know, just because it's -- you've gotten good news in one place, it doesn't mean that that's going to hold out for a long term, and still there are water resource projects that would help alleviate some of these issues.

I know in north Louisiana in the Sparta district, the Union-Lincoln Water Initiative to utilize surface water out of Lake Darbonne, that would draw several million gallons a day from surface water that's being pulled currently out of groundwater systems. So those are things that would help, but for right now, we feel pretty good about how robust this system is and the coverage we're getting.

And, again, we have to sort of rely on the experts with U.S.G.S. and sort of balance the costs versus what we're going to get in return, so -- and they feel good about it, so...

MR. HARRIS:

Thank you, Mr. Reonas.

MR. BALKUM:

Matthew, you mentioned some of the real time wells, I guess, have come off line. At what frequency will our existing network system record information? Did you say some of them were quarterly?

MR. REONAS:

Right. And that was one of the main areas in terms of field time that we had to cut, so -- and I can get those numbers for you in terms

of like the frequency of reduction from quarterly measurements to semiannual or from semiannual to annual, so you're going from four to two or from two to one. Or in the case of those real time wells, which are more -- several of those were in the Sparta, and I know there's folks in the Sparta district they liked having those for public relations value, but in terms of -- we're still getting data from those wells, it's just not something you can pull up any time of day and get the actual -- you know, an actual reading. You're still getting quarterly readings instead of, you know, 365 readings a year. So it's, again, one of those efficiencies. Now, those are -- obviously, because of the technology, much more expensive to run versus actually just sending out a field tech, you know, two times a year or four times a year to run measurements in wells, so...

MR. BALKUM:

Well, again, I think job well done.

And, again, these are all groundwater wells, correct?

MR. REONAS:

Yes.

MR. BALKUM:

U.S.G.S. obviously operates several stream flow gauges across the state which also is beneficial to our program.

MR. REONAS:

Yes, sir.

MR. BALKUM:

Thank you.

MR. HARRIS:

Any other questions?

(No response.)

Mr. Reonas, thank you, Matt.

MR. REONAS:

Thank you.

PROGRESS ON REVISION OF STATE COASTAL MASTER PLAN

MR. HARRIS:

Our next agenda item is Bren Haase with CPRA who is going to give us an update on the progress on revisions to the Coastal Master Plan.

MR. HAASE:

All right. Good morning. Thank you. Members of the Commission, Mr. Chairman, I appreciate the invitation to be here and speak with you today, and I also certainly appreciate your flexibility in adjusting your agenda. I've got to be in New Orleans no later than about 1:45

today, so I'm in a little bit of a crunch.

But I want to talk with you a little bit today about the 2017 Coastal Master Plan, the progress that we're making and sort of where we've been and where we're heading as it relates to that, so let me jump right into it.

Before I get there, though, I wanted to talk a little bit about some of the progress today. It's always good to talk about our plans, but it's probably more important to talk about some of the work that we've done and what we've accomplished.

Since 2007, you can see the numbers here, about $18 billion has been secured for Coastal Louisiana, much of that has been associated with the work associated with the hurricane risk reduction system around New Orleans, but a good bit of that, as well, has related to coastal restoration along our coast.

You see some of that borne out of the numbers following that. 112 million cubic yards of dredge material have been moved along our coast to build marshes, ridges, barrier islands, and so forth, that's impacted about 31,000 acres of land across our coast. And when I said "land," of

course, I'm referring to wetlands, coastal wetlands. 274 miles of levees have been improved, and 52 miles of barrier islands or berms have been constructed or under construction, again, since about that 2007 timeframe.

So, hopefully, most of you are aware that we have a Master Plan, the 2012 Plan that is in place. And just by way of background, it was built on world-class science and engineering. There's really an unprecedented effort to make this a technically-sound document. It evaluated hundreds of projects and concepts that have been part of the planning in Louisiana for nearly 100 years, planning -- restoration planning in Louisiana goes back to, you know, about the 1920s.

So we looked at all those previous plans, CWPPRA projects, and so forth and mined those for ideas to go into the 2012 plan. We incorporated extensive public review and input process as part of this plan, so this was certainly not something that was done in a -- behind closed doors. It was a very public and transparent process.

And one of the biggest factors, I guess, associated with the 2012 plan is that it's

resource constrained, and this is a very different approach that we've taken to planning in Louisiana in the past. You know, in the past, we typically planned in terms of what we aspire to, what we would like to do if given sort of an unrestrained conditions, but this was an attempt to be a little bit more realistic in terms of what we felt like we could accomplish. So the plan, again, was constrained based on funding and natural resources, as well, so water, sediment, and so forth.

So I think it's an honest plan. It doesn't promise everything for everybody. It is realistic, I think, in terms of what we feel like we can accomplish for our coast over the next 50 years.

So this is what that 2012 plan looked like, a number of different projects here. There are structural protection and nonstructural protection projects. I'll refer to that a little bit through this talk. Nonstructural protection projects is home elevations, floodproofing of businesses, and so forth, so when I refer to that, that's what I'm talking about. You can see the other project types here, bank stabilizations,

shoreline protection, barrier islands, marsh creation, sediment diversions, and so forth.

So the Master Plan is really more than just a list of projects. Certainly, that's an important aspect of it. It's a list of our priorities, what we think we want to accomplish across our coast in the future, but it's really a framework to help us make decisions, as well.

So, as you can imagine, this is a big, complicated problem. There are analytical challenges that you see here. First, our coast is a complex landscape. It's very dynamic and certainly varied. We're talking about a 50-year planning horizon, that's a long way out to try to make predictions about what we ought to be doing or what might happen if we don't do anything. Those future scenarios are uncertain. We, you know, have issues predicting the weather next month, it's difficult -- or next week, excuse me. It's difficult to predict what our coast might look like 50 years out.

And we're talking about multiple project types, so how do you compare a levee to a marsh creation project, for example. In many ways, they're apples and oranges. And there are

certainly diverse community needs. And, you know, the bottom line on that right column there is that there's no right answer. There's no optimal solution, so your answer might be different from our answer, might be different from somebody else's answer down the road. So there's just not one single correct answer to address the issues that we face.

In terms of objectives of the Master Plan, these are those. We want to protect our citizens from flooding. We want to harness the natural processes that have built coastal Louisiana in the first place to help restore it. We want to provide coastal habitats that are important to both recreational and commercial species of fish and wildlife. We want to preserve our cultural heritage, of course, it's very important. It's something that's very near and dear to us here in Louisiana. And we want to provide for a working coast. Louisiana's coast, as you all are well aware, is not a place that we simply visit on the weekends and maybe take a fishing trip to every now and then. It's, indeed, where we live, where we work, and in addition to where we play.

So why are we updating the plan? Why another plan? Well, the first reason is, it's required in statute. We're required -- the legislature required us to update the plan every five years, and I think it was an excellent idea, personally.

It allows us to respond to changes in the landscape. So, as I mentioned, our coast is certainly a dynamic place. It's always changing, and a plan today is not necessarily an appropriate plan for the landscape that we might face in 20, 30, 40 years from now. So it allows us to go back and respond to that change in landscape, but also to innovations in technology. Obviously, as we build projects, we learn from those, and we learn how to implement them better. Science and engineering gets better, and policies change, as well. And it helps to advance the integrated approach of risk reduction and restoration, as well, as we update the plan every five years.

So what's different between 2017 and 2012? So I mentioned, you know, the ability to improve our technical analyses and science and engineering, and certainly, that is the case. The ink literally wasn't dry on the 2012 plan when we

started to think about what would we have done differently had we had the time, the resources, and so forth. How can we improve our analytical tools to do a better job in 2017 than we did in 2012, and we've done much of that.

We've incorporated new ideas and information. So I sort of mentioned that we sort of took a retrospective look at 2012 in terms of projects that have been proposed along our coast. We actually went out with two open calls for new project ideas for 2017 to be considered, and that was quite successful. The response to that was impressive. We got hundreds of new ideas for projects, many of which are being evaluated as part of the 2017 plan.

There's an increased focus on flood risk reduction and resilience, and that, again, gets back to that structural and nonstructural that I mentioned earlier, and then a renewed emphasis -- or an increased emphasis on our coastal communities.

This is just the planning team. I'll skip through this pretty quickly. In terms of the technical team that is actually delivering the plan, this is the NASCAR slide we say of those

folks, the logos. Over 70 experts are helping to develop this plan and deliver it on time.

In terms of the actual development, this is sort of a schematic of how that's worked. So I mentioned we put a call out for new projects. We're also evaluating the projects that are currently in the 2012 plan. So we're taking a look at all of those again, in addition to the new projects. Those projects are evaluated through our predictive models. We use a planning tool to help us organize and understand the outputs from those models and develop alternatives, which are simply groups of projects that might be in the plan, which are then run back through the predictive models, compared, and ultimately we develop and produce a draft plan.

So these are the projects that are being evaluated for 2017. As I mentioned, this includes the 2012 projects, in addition to the new ones. This represents, I think, 209 projects, 135 of those are restoration projects and they're the same types of projects that I showed you earlier for the 2012 plan. There are 20 structural projects. Those are sort of the pink or red lines that you see along the map. And then there are 54

nonstructural projects that are grouped in different areas across the coast.

Moving in to the predictive models, so we -- again, we evaluate those projects with these models. There are really sort of two aspects to them. There's the integrated compartment model, and I don't want to get too deep into the weeds on this, but that's essentially the ecosystem outputs. What are we doing to the landscape in terms of hydrology, wetland morphology, and so on. You see those things listed there. And then what are we doing in terms of storm surge waves and risk reduction or risk assessment. And then we model all of those against future scenarios, and I'll get into that a little bit more in depth here.

So in order to assess the effectiveness of the plan and of the projects that we intend to develop, we've got to have an idea of what we think the future is going to look like without those, right, and then we can evaluate the future landscape with those projects on it and the difference is, essentially, our benefit.

But one thing we know, as I mentioned, with that 50-year planning horizon is that we're

going to be wrong in what we predict in terms of what the future holds, especially if we try to nail it down to one number. So what we've attempted to do in 2012 and what we're doing for 2017 is evaluating the projects over a range of possible future scenarios, and you see those listed at the top here. The primary difference between those is sea level rise and subsidence. And, you know, as I mentioned, we have to update the plan every five years. All of the information that has come out since the 2012 plan has indicated that sea levels are rising and that that rate is increasing, and so this is one of the things that we've been able to update as we move forward for 2017. There are a number of other factors listed there, but that's a primary driver.

So we talk about relative sea level rise. This is really the combination of the water level elevation increasing through sea level rise and then the land sinking underneath us through subsidence. And just to illustrate how those two things interact and how they're different across our coast, I put this up here. So these are different zones across our coast, Chenier Plain, Terrebonne, Bird's Foot Delta down at the mouth of

the river, and the North Shore, and you can see the sea level rises for the low, medium, and high scenarios listed here.

And then you look at the subsidence rates for each of these areas, and they're different depending on where you are. If you're on the North Shore, subsidence is not too big a deal. If you're in the Bird's Foot Delta, it's a huge deal, and it impacts ultimately what your water levels will be into the future. And you can see the two stacked on each other and the compounding effects that they have. And, again, the point here is that this is variable across our coast. It's not the same at all points across our coast.

I should mention -- let me back up -- in terms of this scenario planning, that our goal, again, is not to plan -- to develop a plan that is successful for one of those scenarios. The goal is to develop a plan that is robust across that possible range of futures. Again, if we were planning toward just one of those futures and we were wrong and we hit a -- you know, we realized a different future, then we'd be really, really wrong, but if we can select a plan, again, that is

composed of alternatives and projects that are robust across that range of futures, then even if we're wrong in our predictions into the future, we should be in fairly good shape.

So this is the output of the analytical models that I was talking about earlier related to land change in the -- in 50 years. So this is what it looks like. Red is land that is currently here today that would be gone in 50 years under that low future environmental scenario. I'd point out that there is some green on the map, but I never miss a chance to point out that those are two areas of our coast, Wax Lake and Atchafalaya Delta and then around that Bird's Foot Delta, two areas of our coast that are still connected with the river. I don't think that's coincidental.

And then if you look at the medium scenario in 50 years, obviously, we start to see more red, more land loss. And if you'll look at the high scenario in 50 years, you can see that it's pretty striking. This represents about 4,200 square miles of land loss over the next 50 years. And this is just it stacked up. This is it through -- the land loss through decadal time

periods, so this high scenario, your 10, your 20, 30, 40, and 50.

I mentioned risk reduction, and that's, again, certainly an important factor of this Master Plan, how well can we reduce risks in terms of flooding from -- resulting from hurricane storm surges, and so you can see those here. This is the year 10. This is the low scenario, not the high scenario, but for 100-year event, and you can see that there's some significant flooding, particular in the southeastern portion of the state once you get east of the river in terms of, you know, water levels over 15 feet. Obviously, that can go way higher than 15 feet. We experienced that with Hurricane Katrina, of course, back in 2005. This is year 25 100-year event, and your 50 100-year event, and so you can see, as the landscape deteriorates, those flood elevations increase and move inland at the same time.

So I mentioned the planning tool, and again, the planning tool is really a method for us to organize the -- as you might imagine, the tremendous amount of output that is coming from these analytical models and so forth. And there

are two major decision drivers, and I've harped on those a good bit, but it really boils down to the land that we can build and the risks that we can reduce.

Under those constraints, you can see there, again, sediment and other natural resources.

And, of course, funding is probably the number one constraint. It's certainly at the forefront of our thinking.

But there are other things that we consider, as well. It's not just those two, and you can see those in the metrics side of this slide, in terms of community metrics and environmental metrics. So there's things like, you know, how do we affect agricultural communities, traditional fishing communities, and so forth, so we can look at our plan as it relates to a single resources, like blue crabs or shrimp. And, again, the output put through this planning tool allows us to view that output through the different lenses. If we're concerned with shrimp, we can develop a plan that is basically most beneficial to shrimp or any one of these metrics that's out here. But what it helps us do is, all

other things being equal, if we have a suite of projects that can be beneficial to shrimp and it's roughly equal for all these other metrics, then, of course, we would pick that -- you know, that plan and move forward with it. I was harping on shrimp there, but that's certainly the case for any of these metrics.

And then moving into the development of the final plan, I'll get into the timeline and that a little bit here in a minute.

So there are a lot of folks working on this, many of -- I mean, I see some faces on this Commission, in fact, that are involved in the development of the 2017 that weren't involved in the 2012 Master Plan, as well. But, essentially, we've got a core planning team, I threw that up there earlier, that reports to the CPRA, and then we've got a number of advisory groups and a number of stakeholder groups you can see listed here, and I'll get into some of those in a little bit more in depth. But really, the take home here is that, you know, none of this is being done, again, in a black box. There is an awful lot of transparency and an awful lot of outreach and engagement that's going on as we're advancing the plan.

Another NASCAR slide here, Framework Development Team, of course, has been very much a group that has been really important and really, really helpful in terms of developing the plan. This is a group of varied stakeholders and interested parties, essentially, and it ranges from academia to fishing interests to commercial interests, energy and industry, you know, interests, and so forth. That is a group that can -- that generally we report to, here is sort of the information that is hot off the press as we've been moving through the analyses and developing the plan. We can bounce ideas off of, and they can essentially give us advice and say, hey, we think you're heading in the wrong direction, maybe you should be considering X, Y, or Z, and so forth. And so, not only do they do that and provide that for us, but they also serve as representatives of their individual stakeholder groups and can go back to those groups, discuss what we're doing and ensure that those folks are informed and also provide feedback to us from them.

We have some focus groups, in addition, for some -- dealing with some key areas that we

know are major concerns, obviously, communities, industry -- excuse me -- energy and industry, fisheries, landowner focus group, and navigation focus group. There are representatives of the Framework Development Team on each of this group, but it also includes other members, and these groups serve really two purposes. One, we can drill down into those specific issues associated with each of these focus groups that's not being covered in kind of that larger Framework Development Team-type setting, and it's also sort of a safe place, if you will, for folks to discuss their issues and hopefully folks that might be reluctant to speak out in a larger Framework Development Team-type setting might be willing to do so with one of these focus groups.

There is a tremendous amount of technical oversight. We've got a Science and Engineering Board. I'll just say that this is kind of our group. This is our initial attempt at peer review. This is just a group of really smart folks that, again, are kind of looking over our shoulder and reacting to and providing advice to the things that we're doing. It's been very good.

We've also got some advisory committees.

I'll skip through much of this.

And then in terms of citizen engagement, we've done a tremendous amount of that already, but this fall we're hosting four community meetings. We're partnering with local organizations to invite us in and sit down in a little bit more of an informal kind of a setting, perhaps over dinner, to discuss the Master Plan and talk about their issues and where we're headed and how they feel like things are going.

We're also, obviously, engaging the parishes directly. We've had a number of round-table with those folks already, and are going to continue to do so. You see some of the upcoming dates associated with those.

In terms of our timeline, we're right there in the middle of this slide. We're modeling alternatives and comparing those. We're kind of toward the end of modeling alternatives, I guess, and getting ready to start to compare those, all driving us to that beginning of next year kind of timeframe. Draft plan, January of 2017, formal sort of public meetings and outreach in that same timeframe, and ultimately, the plan is submitted to the CPRA and then to the legislature in around

that April timeframe of next year.

So I know that was a lot of information, but I'll stop there, and certainly, I'm happy to answer any questions that you all may have.

Thank you for your attention.

MR. HARRIS:

Do we have any questions from --

MR. ZAUNBRECHER:

Were there ever any models developed, say, 15, 20, 25 years ago that were used to predict subsidence and sea level change, like the one you have now; and if so, were the predictions of the model in reality the same?

MR. HAASE:

So the -- I will say that the suite of models that we're using now are state of the art. They're certainly current.

In terms of what was available 15 years ago or so, honestly, I'm not aware. I'm sure that there were some predictive models at that time, but I'm not aware of the accuracy or really what those were at the time.

That's an interesting question, and I hear where you're headed with it. It's certainly something that would be interesting to know, but

I'd have to do a little research to really answer that question well.

MR. HARRIS:

Commissioner?

MR. IEYOUB:

You've shown a map of how the coast will look in 50 years.

MR. HAASE:

Yes, sir.

MR. IEYOUB:

Is that how it would definitely look, despite the things that you all are doing to try to prevent it?

MR. HAASE:

No. And I'm glad you asked that question, and I should have raised that point, that those predictions are assuming, one, that those scenarios come to fruition that we talked about in terms of sea level rise and so forth, subsidence and so forth, and, two, that we don't do anything about it. So that's -- I'm very glad you asked that question, that's a point I should have made in my talk, yes.

MR. HARRIS:

Mark?

MR. DAVIS:

A good presentation, thank you.

One thing that strikes me, especially when you look at the projections of what might happen to the coast and all the areas that become wetter, that's actually more saline, more marine environment encroaching. Of course, there's agriculture. There are towns with drinking water supplies or industries that use, you know, fresh water for processed water and the like.

Clearly, you know, we need to be thinking in terms of how overall water management fits into the plans, not only for restoring the coast, but, you know, keeping as much of the coast functional, you know, during these times of transition. So I think it's really important as we go forward that the work of this Commission become, I guess, more informed by the work you're doing, because the Coastal Master Plan is fundamentally a plumbing plan. It's, you know, trying to plumb for it to prevent the worst aspects of saltwater intrusion and to manage for the benefits of fresh water management.

And the second thing, at the last Governor's Commission for Coastal Protection and

Restoration, which focused on insurance issues, one of the guest speakers who was from the insurance industry noted that, you know, she fully expected that subsidence management was going to become a bigger part of what the insurance industry is looking at in coastal areas. For places like New Orleans, you know, flood risk is driven far more by, you know, the sinking of land than it is the rising seas, and that's increasingly true in other places.

Subsidence can be driven by any number of things, some natural, some induced, but we do know that fresh water withdrawal is one of those things that can and has. And I think, you know, it would be very helpful for us, you know, as a Commission and working with CPRA to make sure that we understand, you know, the role that fresh water withdrawal may play in, not only preventing the worst from happening, but keeping as much of our coast financeable and insurable for as long as possible.

You know, do you have any thoughts for what we can do from our side as a Commission -- you know, obviously, we don't have a big, robust program right now, but looking forward to make

sure that we're working on the same page?

MR. HAASE:

Yes. Well, so the point is well taken on both counts, I think, first of all.

And you're right, you know, I think there's a tremendous opportunity for, you know, this Commission's mission and CPRA's and the state's. Again, this isn't CPRA's plan. This is the state's plan to certainly dovetail.

I think you hit it on the head as it relates to, you know, whether you want to call it water table management or subsidence management or fresh water withdrawal management. But I think that, you know, insurability of our citizens is where the rubber meets the road as it relates to all of this. I mean, that is where it hits all of us, where we live, and then certainly in our pocketbooks, so that is the -- to me, one of the biggest aspects of this plan and of what we hope to accomplish, you know, in the future in terms of allowing our citizens to be able to live where we want to live.

So, you know, as it relates to things like, as you said, sort of subsidence management within those fast lands that are being protected

by the types of projects that we and the locals are implementing, I think that's a very nice area where our goals and thoughts, you know, need to overlap.

MR. DAVIS:

I would point out to those of you who don't get to hang around the New Orleans area, there was a recent study out of NASA that showed that some industrial withdrawals in New Orleans, you know, from a power plant had induced significant localized subsidence, including for some flood walls. So it was an issue that, again, data is your friend you're just trying to manage.

MR. HAASE:

Sure.

MR. DAVIS:

So I think that that is -- you know, I'm glad to hear that.

MR. HAASE:

Well, I mean, as you've alluded to, flood management within our flood protection systems has affected that, as well. I mean, the -- for hundreds of years, our goal has been to get as much water out of the system as we possibly can in case we get those tremendous inputs from

rainfall and so forth, and I think we understand better now that that impacts our soil surface elevation tremendously and can have catastrophic results during a catastrophic event.

MR. DAVIS:

Thank you.

MR. HAASE:

Thanks.

MR. HARRIS:

Are there any other questions for Mr. Haase?

(No response.)

MR. HARRIS:

Bren, thank you very much, excellent presentation.

MR. HAASE:

Thank you all, again, and we're happy to come back at any time. Thanks.

REPORT REVIEW - WATER RESOURCES ASSESSMENT FOR SUSTAINABILITY AND ENERGY MANAGEMENT

MR. HARRIS:

Our next agenda item is going to be from the Water Institute of the Gulf, Scott Hemmerling and Ryan Clark, Water Resources Assessment for Sustainability and Energy Management.

MR. HEMMERLING:

Good morning. I'd like to thank you all for having us here again. It's been a while since we were here. But today we're going to give an update on the Water Resources Assessment that we did.

We had previously gone through some of the preliminary data and really went through the framework. I'm going to reiterate that because I know some of you are new here, and I know some of the audience members are new, also. And this project was -- came through the Office of Conservation. There was funding from U.S. Department of Energy, so there is an energy component which we'll talk about later in the presentation. And it was also with CPRA. We did engage a Technical Coordination Team which included David Borrok with ULL, Charlie Demas and John Lovelace with U.S.G.S., and Gary Hanson for LSU Shreveport, and Pierre Sargent with U.S.G.S. helped tremendously on the project, also.

Just to kind of go into some of the project goals that we had with this, part of what we wanted to do was establish a standardized set of measures. We wanted to evaluate regional water

supplies. Really, we wanted to -- we're setting up the water budget. What we really want to do is set up a framework, what goes in, what goes out, what we have existing data for in Louisiana, what data is missing. So we really wanted to create a modular framework that piece could come in, pieces could go out, as more accurate data became available. So, again, we wanted to develop the framework using available data that is useful to decision makers and use this to gauge the sustainability of water uses in light of present and projected uses.

So we define sustainability here really as a balance between use and supply that causes no impairment to water resources or it maintains or improves the current health of the system, so, basically, looking at inputs and outputs, and really, do our outputs exceed the inputs.

There were four activities that we went through with this project. The first one was to develop the framework itself. The second was to review the existing data that's out there and then use that data to select hydrologic units that we could use to access the framework to see if the framework functions as we wrote it up.

Third, we wanted to conduct the appraisal using these selected units. We took the selected units and ran it through the framework to make sure that we could see inputs, outputs, pluses, minuses in the system, and then prepare the report, which I believe most of you have been supplied with already.

This is kind of a graphic overlay of the framework. The left-hand side of the framework really looks at what are the inputs, and a lot of this is kind of your standard water budget. We have precipitation coming in. We have runoff coming in. We have in-stream flow. We also have water that's infiltrating down into the shallow groundwater and the deeper groundwater.

Also what we want to look at is the outputs. Obviously, in a standard water budget you have your evaporation and evapotranspiration, but we also have to talk about things like water transfers, when you move water from one hydrologic unit and transfer that to another. We have outflow, how much goes out of the system.

We also talk about the public withdrawals, and that's a big part of this, especially in Louisiana. We look at public use,

industrial use, agricultural use. And understanding that some of that water, when it pulls out, some makes it back into the system whether it's through leakage, or in the case of some industries along rivers they'll pull some of the water out. They'll use some of it. Some of that water is consumed and some is returned to the system. It also acknowledges that, in some cases, groundwater is pulled up and used and then that consumptive use goes into the surface water. So there is that connection where some of your discharge goes into surface water, but the original supply was groundwater.

We also talk about some of the quality impacts which a lot of it was alluded to in the last presentation. We talk about salinity, change in capacity, the subsidence. When you -- you know, when you compact your aquifer, in some cases, you permanently lose storage in that. So these are things that, in a lot of these cases, we actually need better data on this. In some cases, we could use coefficients to estimate this, but, you know -- but these are constraints on the system.

One of the constraints is minimum

ecological flow, how much water do we need for the ecological functioning of our coast. So, while we might have inputs and outputs in balance, is that water enough to sustain the ecological functioning of the coast.

We took the framework that we just looked at and we applied it, we first looked at it at a pilot study area in southwest Louisiana. We estimated surface and groundwater supply and usage, and then we looked at projections of future supply and usage based mainly on urbanization and population growth estimates. And once we ran that initial pilot area, then we applied it our northwest study area and our southeast study area.

This slide just kind of gives you an idea and just really reiterates that we are looking at groundwater and surface water. In the case for this study when we were operationalizing it, we operated at the HUC8 level, so it's a fairly large study area. Obviously, as better data becomes available, we can move down to the HUC12 and start, you know, fine tuning it, but for this assessment, we've operated at the HUC8 level.

Here you can see the three study areas that we picked, the southwest area which is the

east half of the Chicot, northwest study area included a portion of the Carrizo-Wilcox, southeast, the West Southern Hills area.

Now, we selected these areas really for a number of reasons. One, of course, was data availability, where can we -- for example, there is no groundwater availability models -- or not a complete statewide, so where do we have data where we can at least estimate how much groundwater is there. We also wanted to look at areas of mix of usage or big agricultural areas, whether it's rice agriculture in the southwest or industrial usage in the Baton Rouge area. But we also wanted to make sure we're covering different regions of the state. We wanted to make sure that our framework could work in different portions of the state.

I'm going to go over some of the results from our pilot area, from the southwest study area. Again, like I mentioned, that was the Chicot -- the east half of the Chicot Aquifer, includes Teche, Vermilion, and Mermentau surface water basins. And this was a good area to pick because we do have a mix of demand uses. We have agriculture, including rice which is a huge draw, especially in the western half of this. There is

also a livestock industry. Lafayette is there, so we have big urban water withdrawals or domestic withdrawals in some of the surrounding areas. And there's also a coastal aspect to it. So as we mentioned before about saltwater, this is an area where we could actually try to estimate how much of our water might be unusable because of salinity regimes.

If we look at kind of the population areas, and this is in acre feet per year that we estimate based on the number of households within the four HUC8 units in this area. Obviously, for household demand, Lafayette is a huge draw, and you can see that number really kind of dwarfs the other areas. Really, if we look, it shows that with --household demand isn't -- you can see kind of in the patchiness underneath that the HUC8s are really large, but they kind of agglomerate, but there are smaller localized regions where we have higher levels of withdrawal.

A part of what we did -- and we're obviously not going to go through all of the numbers and formulas up here, but this is the water balance equation. We took that graphic that we used at the beginning that we showed, the kind

of graphic output and created this water balance equation where we can plug in the different portions to estimate the sustainability of the water.

Now, really, what we're looking at here is kind of the unallocated water, and that's really the difference between our inputs and outputs in the system. So are we using more water than is coming in on an annual basis?

Now, we used a lot of tools to do this. The primary one we used was the U.S.G.S. groundwater toolbox, which used the hydrographic data and some of the hydrographs from the surface water units, and was able to estimate the different aspects of the water budget using groundwater separation. So we were able to estimate groundwater recharge and precipitation values. So the groundwater toolbox really pulled a lot of the different data sources together, so we were able to estimate base flow and runoff, but we could also get precipitation, groundwater recharge near the surface, evapotranspiration rates.

Now, we took the groundwater toolbox outputs, we were able to adapt it using some global coefficients to really estimate deep water

aquifer recharge from precipitation and what infiltrates downward through vertical leakage, get down to really the deeper aquifer levels.

And, again, we won't go through all of this, but we did every -- these are the existing data sources that we used to plug into our model, and some of it -- like I said, we used coefficients. In some cases, the deep aquifer recharge, we used kind of a global percentage that's estimated to infiltrate down. In other cases, when we start talking about the human usages and consumptive uses, we're actually able to use Louisiana-specific return flow rates based on industry, where you can estimate how much consumptive use occurred and how much was returned. So, in that case, we used broader Louisiana coefficients and applied it to the different industries in the regions.

So for our study areas, when we ran all the numbers through, we could come up with overall water balance results. In this case, what this shows -- and this is surface water and groundwater combined -- is that there is more water coming in than is being pulled out for usage. Now, looking at it broadly like this, surface water and

groundwater combined, tells a little bit of a different story, because if we look at the next slide, you see those numbers come up slightly higher.

In this case, with surface water, there's a lot more surface water, so, you know, we're not pulling out as much surface water as is coming in. So it's been refreshed a lot more. There is a lot more surface area. There's a lot more volume of water, and it refreshes a lot more quickly than groundwater, which we'll see on the next slide.

Now, we can also look at the bar charts here, and it's difficult to make out, but in the Bayou Teche and Vermilion, the light blue on there, that's power supply. So some of that water is returned as return flows back into the system. The green is agriculture, largely rice in this area.

Now, if we'd look at the groundwater, we can see, especially in Mermentau, Mermentau Headwaters, hydrologic units, we're pulling out a lot more water than is estimated to be replenished. And this is groundwater we're looking at here. And, obviously, as the bar chart

shows, a lot of this water that's being pulled out is for agriculture, particularly rice.

Now, you will note the -- with these values, these are the model outputs, so the percentages look overly exact, but, you know, they're really, as kind of Bren mentioned with the Master Plan, we're really kind of looking at ballpark here. But it still shows us that in these areas we are pulling out a lot more groundwater than is being replenished. And in some cases in -- you know, in Lafayette, we're pulling out -- you know, there's some public supply, there's things like that, but really, especially in the western portion, we see a lot being pulled out for rice.

We mentioned some of the constraints and quality impacts, so part of those percentages we looked at before did not take into account a level of salinity in the water. So when we're looking at some of that, the water levels for surface water and then we look at what portion of that hydrologic unit is actually in salinity zones, we can see that, especially in kind of the bottom two, half of those units are in high salinity zones.

I'll also note that up by Alexandria, you see that -2 percent, that's actually the very southern tip down in St. Mary Parish where you see a portion of that hydrologic unit, it's a long, thin unit. So that 2 percent loss is actually in the very southern tip of that hydrologic unit.

Some of the other constraints we mentioned are under clean water and impaired waters. Now, levels of impairment are often based on things like dissolved oxygen, especially in Louisiana, which for ecological functioning, dissolved oxygen is a powerful indicator. But part of what we need to take into account when we're talking about these water quality constraints, really, there are differences in what water can be used for. If there's a low DO count, then it's probably perfectly fine to be used for some industrial purposes or for drinking water purposes. So that's kind of one thing that needs to be taken into account when we're thinking of these constraints on water usage, is that there's -- different of levels of impairment have different impacts on whether it's agriculture or ecological functioning or public drinking water.

And I mentioned that we look at the

impacts of population growth and urbanization on supply and demand. So part of what we did, we used population change estimates and then looked at, with this additional population and assuming that water level -- water usage is the same as it is today -- I mean, obviously, in the future, we could see improvements in technology, improvements where that could change, but making the assumption that the same level of water usages occur in the future as today, we can see areas where we expect to see growth, particularly around Lafayette.

But part of what we also want to think about is, when we have population growth, it tends not to grow vertically. It tends to spread outward. Especially if we're not in a really dense urban setting, we see population kind of sprawling out, building on the outskirts of cities, and what's going on there is you're adding more impervious surface, you're paving over some areas, in some cases, and especially depending on the development. So we have to think about population growth also from a spatial perspective, and what -- how does that affect the inflow of water to the system. Now, in some cases, that's going to increase runoff that's going to go into

the surface water. It's going to decrease some of the water that actually infiltrates into the groundwater.

Now, when we look at population growth versus urbanization and kind of make that comparison, what we actually see is the change in groundwater inputs due to this urbanization -- kind of the red areas we saw on the last map growing out around the cities -- actually accounts for very little change in the water inputs to the system. Where we actually see changes in the water budget or in the outputs that human population coming in using the water is a much greater impact on the sustainability of our aquifers than kind of the development of some of the impervious surface around the cities.

Now, I'll go into kind of one last part that we talked about. As I mentioned, this was funded by Department of Energy, so there was an energy component to it. So what we looked at when we did this analysis is we took a lot of things in the water budget and attached energy values to it, what are the kilowatt hours needed to treat water, for example. So here we talk about the embedded energy, the amount of energy that is used to

collect, convey, treat, and distribute water to the end users, and the amount of energy used to collect and transport water for treatment prior to discharge.

So we use, again, some of the nationwide standard. It's based on the size of the water treatment plant, for example. We have surface water treatment plants at the graph on the right, and then wastewater treatment plants. So we can look at the cost of what it takes to treat water in terms of energy.

One thing that we looked at was the total energy consumed by public water supply systems. So we looked at the different water supply systems here and then, based on those coefficients that we saw earlier, estimated how much energy in kilowatt hours it takes to, for example, run a water treatment plant, and to withdraw energy from domestic wells. So, in this case, we made some estimates about the size of a household well, looked at the depth of the well, and then estimated how much energy it would cost to pull the water up.

And part of the importance of this is to realize that one of the main constraints on a

water budget, in addition to water availability, it's economics. As the water levels go down deeper and we have to -- it's going to cost more to pull that water up. And then if we start talking about desalinization, which, obviously, we're not, it's not big in Louisiana at this point, but there are -- that's really going to be some of the future constraints on water, our -- the costs of energy used to treat and convey the water.

So, in summary, what we did here was really we created the framework. We showed the framework. We showed the framework formula. It's got the bits and pieces that we can plug in. And we applied it and tested it to see how that shows the sustainability in these areas. We tested it on areas with available data, and we used existing studies for comparisons. So the values that we got, we went and compared to some of the more localized studies that had been done to make sure that our results are in the same realm that some of these other previous runoff studies showed.

We wanted to make sure that this could be applied to other areas of the state with sparser data and fewer existing studies.

As I mentioned before, we made it so it's modular. As better data becomes available, we can plug it in, put that data in, replace the data. We can also change -- we can also run scenarios on it. We can change some of the -- you know, if we want to change some of the precipitation inputs we can do that, see how it runs through the system, how that is going to affect the outputs.

So that kind of brings us to the path forward. So we've developed the framework and have the report out, but now how can we refine this more? Obviously, better data is always going to provide enhancements and improvements. Part of what we're talking about now is how do we take this down to the HUC12 level? How can we use, you know, the output data that the U.S.G.S. has? How can we improve some of those coefficients? Really, how can we refine the water use data?

And I know that some of the work at ULL, they're doing a really good job with some of the agricultural stuff and really breaking down those areas into the different crop types and looking at how much water the crop -- different crops use and really localizing. So I think things like that

are what we need to do to, taking into account some of -- seasonal scale, for example. Right now we look at annual water budgets, but we know, especially with the agriculture and other industries, there's a seasonal aspect to it.

And one last thing is minimal ecological flow estimation, and that's really kind of an important part of this, which there is not a lot of data on now. I know Nature Conservancy, as part of their fresh water assessment, have an oyster toolbox built into it where they can change the salinity levels in -- you know, at a dam on the Sabine and, you know, see how that affects oysters down at the coast.

And Ryan is working for some of the Master Plan data, the ICM model that Bren showed earlier, and looking at, okay, how can we change the -- if we change water flows in one hydrologic unit, how can that impact the habitat suitability in the hydrologic unit below. So we actually just started working on that project in the Amite Basin a couple of months ago, so I guess the hydrologic flows might be a bit different now, but that's really the path forward.

How can we take what we've done -- the

framework works. It operationalizes everything. It shows us inputs versus outputs. It shows us where we have excess unallocated water, where we have water that's being pulled out more than it is being refreshed. So really, the path forward is, how can we refine this and keep moving forward and getting better data to really plug in and really make sure that Louisiana really, you know, leads -- I know taking advantage of the scientific expertise in the state, how can we build off of this framework and really get at some of the issues that are affecting the different locations around the state.

So if anyone has any questions, I'll be glad to answer them.

And thank you.

MR. HARRIS:

Thank you very much, Scott.

Do we have any questions from the Commission?

(No response.)

MR. HARRIS:

Scott, thank you very much. We appreciate it.

MR. HEMMERLING:

Thank you for having me again, and I will be around after, and if anyone has any specific questions.

MR. HARRIS:

Thank you.

MR. HEMMERLING:

Thank you.

WORK OF THE WATER CODE COMMITTEE OF LOUISIANA STATE LAW INSTITUTE

MR. HARRIS:

Our next agenda item, our very own Mark Davis is going give us an update on the work of the Water Code Committee.

MR. DAVIS:

Thank you very much, and I'm going to invite my colleagues, Chris Dalbom and Dean Boyer, to sit at the table because they're going to help with this.

And I'd also like to take this moment to introduce our newest post-graduate research fellow Katherine Van Marter. So, Katherine, if you could stand and wave, because you'll get to know her over the next couple of years.

(Ms. Marter complied.)

MR. DAVIS:

Thanks for letting us, you know, bring you up to date on, you know, the work that the Louisiana State Law Institute and Water Code Committee is doing.

As I think most of the Commissioners know, a couple of years ago, the legislature asked, not only this Commission to look into how water could be understood and managed comprehensively, but they also asked the Louisiana State Law Institute to develop a -- you know, a comprehensive Water Code for consideration in Louisiana, and, you know, I was asked to chair that committee. And we have had three meetings during the course of this year, and I'd also like to make a -- you know, point out that some of the work that this Commission has made possible, like, you know, Scott's water budget work, it's fundamentally, you know, where we're starting a lot of our work.

As you all know, lawyers and legislators don't need to be informed by science or anything else when they write what they write, but it's a real good idea if they are. So we have not begun by writing what we think might be a pretty Water Code. We've begun by trying to understand, you

know, the waters that Louisiana has, how they're used, how they need to be used, including, you know, for the Coastal Master Plan and other uses, and we will begin, you know, coming up with some draft language probably in the next year, but, you know, we would very much looked forward to, you know, keeping this Commission involved. And I'd like to acknowledge Commissioner Gautreaux who is a member of our committee, and I'd also like to note that Paul Frey has attended most of our meetings. And the meetings are open, and we would welcome anyone, but we also view the members of this Commission to essentially be pretty fundamental stakeholders in anything we do.

A water code is not a water plan. It does not come up with allocations. In some ways, you know, what may come out would be analogous to what was done in 1989, when the state created the legal framework where -- embarking in coastal conservation and restoration. You know, it didn't decide what the plans were, but it did make that a mission and began making it someone's responsibility. So our work thus far has been focusing on, you know, what might that look like, which involves a fair amount of comparative work

to see how other states -- because we are hardly the first, and I'm going to have Chris walk us through that. And the other is, well, who would manage whatever comes out, and we don't know the answer to that, so we will be looking for input.

With that, I'm going to, you know, turn it over to Chris Dalbom who can explain kind of the -- briefly, you know, what the status of the work is and where it's going. And then I'm going to ask Dean Boyer, who is a post-graduate fellow with us, to talk a little bit about how water fits into some of the financing options that the state is going to have to consider. We have all sorts of ideas for bold projects, whether they're flood control projects, navigation projects, coastal restoration projects, all of which require money.

And one of the places that we have seen -- looked at as a source of new revenue is water. Now, we're not advocating that, but the fact of the matter, it is on the table, you know, so much so that there's a bill in Congress right now introduced by Congressman Gohmert from Texas but co-sponsored by our own Congressman Boustany that would relax certain federal rules that restrict the transfer of water between states, and that's

only there for one reason, and since -- it's specific to Louisiana, Arkansas, and Texas. So they're not judging us, but I'm just telling you, and I think Scott just alluded to it, you know, that there are going to be pressures to use Louisiana water in places and in ways that we've never done before. We need to be thinking about those, and so that's one of the reasons, you know, I've asked Dean to come and present just so you'll see, you know, how some of these things are starting to fit together or not.

Chris?

MR. DALBOM:

Thank you, Mark.

Yes, as Mark said, we've had three meetings of the Code Committee so far, and the work on this code effort has really taken -- been along two fronts. There's been a lot of legal work and a fair amount of technical work. And the legal work has been done both in our shop and also with LSU Sea Grant legal with Jim Wilkins and Melissa Daigle who were kind enough to loan us their summer research interns this year.

The work that we've been doing on the legal side, as Mark mentioned, is a fair amount of

comparative legal of figuring out who we can learn from, how can we avoid reinventing the wheel, and finding out, not just what other states' water laws are, but how they instituted them, what issues they ran into when instituting them, things like takings claims, as well as how they administered them, and then you're getting into, again, sort of agency construction and who is in charge of what and how these really groovy laws that you come up with actually get put to use and enforce.

So with those kind of three specific topics in mind, we've done a fairly deep search into approximately 15 other states. These are states that usually have either something directly in common with us, be it the Lower Mississippi River Valley or the states that we think have done recent overhauls of their water law and states that have been especially informed by the model Regulated Riparian Water Code. So this includes, you know, several states across the south, as well as the Mississippi River Valley, and states that we can -- are on similar footing to us, at least in terms of size and economy. So, you know, that means we looked at places like South Carolina and

Virginia, but also all the way up to Minnesota. And we can look at places like Texas, California, and Florida because they might have similar issues with us, but we can also learn what not to do from them, as well, as well as the -- how differently those states are, the size of their economies and the things that they can do. And like California has tried to, you know, manage surface water, at the very least, and all the way to depth, but they've completely ignored groundwater, and therefore, no matter how much water they -- how much money they spend on their water management and how robust and complex their water laws may be, their actual results are pretty poor. Those are the sorts of things that, obviously, we hope to avoid when -- with our water code.

Additionally, we've looked -- we've kind of done just a basic kind of surface skimming of all 50 states just to see what all is out there. And we, you know, found that well over 30, a little close to 40, states have undertaken some sort of water code reform, that about 36 states have all taken, at the very least, conjunctive water management within their water law. And what I mean by "conjunctive water management" is, at

the very least, like, within their legal system acknowledging that surface water and groundwater are connected and often times the same thing. Louisiana is one of the 14 states that has not done that.

Initially, we've done some -- looked at specific issues with Louisiana water law trying to figure out exactly what Louisiana water law is, where we stand, what it is that we're building off of, that work has gone on for years, both Mark's work and Jim Wilkins' work at LSU, that's been happening for at least a decade, I'd say. And I believe we're kind of pushing those and finding out some specific, you know, real time issues that are coming up right now, and again, that's where we're lucky enough to use the LSU Sea Grant Legal Summer Intern Program this year.

On the technical side, I'm really glad that we got to present after Scott and after Bren because, especially on the technical side, but even on the -- how we're going about this entire effort, well, those are kind of the shoulders we're standing on. You know, it turns out that there's -- a fair amount of work has been done as far as water modeling in the state. We've got,

you know, between the Water Institute of the Gulf and CPRA and the Coastal Master Plan, between -- among people at LSU, like Frank Tsai, Doug Carlson, and the work that the Nature Conservancy has done with their fresh water/surface water modeling and applications and decision-making tools, we've got a fair amount of the state covered.

You know, it's -- it's kind of a super, super simplified version of the -- Scott's presentation with the hydrologic cycle and all the different aspects of it, and its framework, but the one that Ehab Meselhe has shown, he's had to dumb it all the way down for me to get it, but it's three rectangles, right. There's a rectangle of fresh water on the surface, a rectangle of saltwater on the surface, and a big rectangle of groundwater underneath, and that's basically what our water is. And we've got, it turns out, really good modeling so we can know, not only what we've got, but predicting the future of what we're going to have for each of those three rectangles, in one way, shape, or form. But the kind of connections between those rectangles, the flows from surface to ground, the flows from salt to fresh, where the

isohaline lines will be. Those are where we don't have so much, especially if we're talking about modeling and if we're talking about trying to make these predictive tools. And the reason we want those tools is, as Mark said, you know, lawyers can write laws, legislators can write laws, but it's really helpful if they're actually grounded in the reality and the science of our state. And so that's what we're trying to do.

And without kind of figuring out how all of those three rectangles fit together and having tools to predict how they're going to continue to fit together over the next 50 years when we're looking at those maps that Bren was showing with all of the red, how can we, you know, make -- or ground our water law in water science without that level of knowledge.

So it's been a real pleasure to work with all of the hydrologists, the modelers, on trying to combine their work. Nobody is being territorial. Nobody is -- everybody is really enthusiastic about this project, about trying to put these different models and these different aspects of water modeling together in Louisiana. And so we're at the point with them where we've --

everybody has kind of figured out what everybody has and what the pieces are that need to be put together and how they need to be put together, and we've got -- picked out a pilot -- "we," like I was the one that picked it, right -- however, the hydrologists have picked out a pilot study region in southwest Louisiana. Again, we're back to that HUC8 language. I believe four HUC8s are what are in their sight, and the idea of being able to take these different aspects of modeling, to take fresh water surface modeling, to take groundwater modeling, to take coastal modeling, and find a way to put them together for one comprehensive model, because if we want to have a comprehensive water code, which is what -- exactly what Senate Resolution 171 asked for, we probably should have comprehensive science underlying it.

So where we are with them is, we've got all of these really great pieces that all costs hundreds of thousands, if not millions, of dollars to build in the first place, and we're trying to figure out how they're going to fit together and where we're going to find the funding to fit them together. So I keep saying I'm not asking anybody to get out checkbooks, but I am asking you to

think about it, where -- you know, where do you think we could probably -- possibly find financing, the way that you all found financing for Scott and Ryan's Water Budget Framework. It's that exact same kind of need to take that next step as far as the science, the water science, that could underlie and make a comprehensive water code, not just a reality, but really useful and accurate going forward.

And we've got -- we don't have our next Water Code Committee meeting scheduled yet. It will probably be early 2017, right, Mark?

MR. DAVIS:

Right.

MR. DALBOM:

But those are all of the wide variety of things we've been up to since the last time this Commission met. We've been doing outreach, both our shop, as well as the people at the Water Institute of the Gulf, such as Ehab Meselhe and Scott and then Ryan, as well as Bryan Piazza at the Nature Conservancy, to try and kind of, not only get people to understand the need of -- for integrated water science, but also this integrated comprehensive water code.

And so far, the reactions have all been positive, and we weren't trying to present this as -- you know, this isn't about, we are doing the water code, so we can decide who gets water and who doesn't get water. I think we're trying -- we need to do this water code so we actually have the legal mechanisms in place to assure that everybody does get their water.

Let's go ahead and turn it over to Dean to talk about the financing side of this.

MR. BOYER:

All right. Thanks, Chris.

So, as Mark said earlier, what we're doing is looking at water marketing as part of a bigger picture of how do you finance the Coastal Master Plan and also other projects that are complimentary to the Coastal Master Plan. So we're working on -- Financing the Future is the title of the report, and this is actually the third report, the third installment. So I'm going to quickly go over what we did in the first two.

So in the first report, we just looked at, you know -- the price tag that's put forward in the 2012 Master Plan is -- $50 billion would be the cost to complete the projects in the Master

Plan. When we looked at that, we took out, you know, the CPRA spending projections and adjusted it for inflation, and what you get is actually closer to $91.7 billion when you factor inflation and over 50 years.

And now, you might be thinking, well, you know, inflation is always going to be working on any sort of government spending, but your revenues are also going to be adjusting with inflation. Unfortunately, for most of the revenue streams that CPRA has in their annual plans, they're not actually going to be adjusting with inflation. So the big one, obviously, the Deep Water Horizon oil spill settlement, that money is what it is, that money is not going to be indexed to inflation.

GOMESA, the other one, revenue sharing from the outer continental shelf, that money has a hard cap on what gets shared with the state, also not indexed towards -- with inflation.

So what we did after we took the $91.7 billion was looked at, again, the CPRA's annual plans, just taking their numbers at face value and projecting how much money we actually have over the 50-year time period. So the number that we

came up with was $20.6 billion, that's the money that we can sort of count on, and I use that loosely. A lot of that money -- or a lot of that projection depends on -- as you can see, GOMESA is a big chunk of this slice. And as I said, not only is that not indexed to inflation, there are also a number of factors that could work to make that less than $140 million per year. So that's dependant on, one, the federal government continuing to share those revenues, and in the last two Presidents' budget proposals -- the Obama administration has actually proposed redirecting that OCS revenue to a larger national program, that hasn't happened yet. There hasn't been a ton of traction, but the fact is that the proposal is out there to take the money away from the Gulf states and then move it to larger national programs.

At the same time, you also have just the economics of it. GOMESA depends on, again, offshore oil and gas revenues continuing to be productive, and in the near term, you know, we've already seen sort of anemic lease sales in the last couple of rounds in the Gulf. Again, over 50 years, there are going to be fluctuations like

that, so counting on exactly $140 million a year is not necessarily a sure thing, but, again, we took at face value the sort of projections that we have.

And the other thing that's important to see from this slide, and I hope it kind of comes up, but the ones that are shaded, those are the recurring revenues. So those are the ones that are going to be happening annually. The rest of them, you can see, a little over 50 percent of the pie is revenues that are only one time. So, you know, you've got Deep Water Horizon, you've got the '07, '08, '09 surplus money, and those are, you know, again, significant chunks of money, but are things that have already been spent or will be spent by the end of the year. So when you're looking at what kind of revenue you can depend on yearly, that's a much smaller slice of the pie then we need it to be, I would say.

So going forward, again, that's -- a $71 billion dollar funding gap is a pretty significant gap. So we've looked at, you know, given that there is this sizable hole we need to fill, what we've done is basically tried to create a menu of options that the state should consider, and these

are irrespective of the sort of political realities of getting these through, the technical realities, really just setting out all the options that are available, probably that -- we might have forgotten a few, but some of the more promising options that are available to the state to consider.

And we sort of broke it out into what options are there at the federal level, what options are there at the state and local level, and then what options are there for private enterprise for public/private partnerships.

So one of the things at the federal level -- I mean, we're all very familiar with, obviously the Army Corps of Engineers' Civil Works Program has been and will continue to be a major player in the region. But the Army Corps project selection process is very time consuming. You have to get, you know, authorization for a study, then an appropriation for that study, then an authorization for the project, then an appropriation for that project. And currently, there is a pretty significant backlog of projects, and the way it works is that the first -- you know, the projects that have been on the books the

longest are the ones that get funded first. You know, you have to wait your turn in line, basically. And so, you know, we're looking at projects getting built that are taking 10 to 15 years from sort of conception, from when somebody says, you know, this might be a good idea, to actually turning dirt.

And right now, there is sort of an informal ban on earmarks in Congress which means that you can't jump queue. So even if a project is important, you know, our Congressional delegates, our Senatorial delegates, can't tag something and say, we need to push this to the front of the line. Again, that's not a law, but that's sort of been the practice, and if that persists, we're going to have a very tough time getting projects that are -- you know, we need built now through within -- you know, within five years. That's very, very unlikely.

And as Mr. Haase pointed out earlier, you know, we are -- funding constraint, I would also say one of the resources that we are really constrained by is time. We do not have a lot of time, so when you're looking at a possibly 15- to

20-year development period for a project, that starts to be really problematic.

So one of the things we looked at was, well, how does the sort of national security aspect play into this and how can that be used to speed along some of these processes, not only because, obviously, as this slide points out, the natural security budget, the Department of Defense budget, is deep. It's a major portion of federal outlays every year, and it also tends to have a certain urgency, right, if you can tag something with the fact that, well, we need this for defense, we need this for national security, it tends to speed things along.

And so here we have -- obviously, we have military installations in the coastal zone, but it's broader than that, and the Department of Defense has already been looking at this, it's not just bases and troops. It's also your ability to ensure troop mobility, depends on petroleum, depends on access to petroleum. We have the strategic petroleum reserves here, as well, as well as the offshore oil platform. And then, on top of that, we have -- you know, the Port of Louisiana provides what the DOD calls national

economic security, so a function of natural security is continuing to be economically competitive and getting your goods to and from market. It's a major portion of that, and, obviously, the Port of New Orleans plays a vital role in that.

And one of the reasons that we looked at sort of how do you put a national security gloss on this, if you will, is because there is some precedent for it. So in the '40s, in 1944, Congress called for the creation of the National Highway System, which we have today, but it took -- even though everybody agreed that there was a need for a national highway system, it took ten years of sort of political arguing to actually get anything done. And what was sort of the straw that broke the camel's back was, they changed it from the National Highway System to the National Defense Highway System.

One of the -- you know, one of the reasons -- one of the justifications being, well, in the event of an atomic attack, in the event of a nuclear attack, we need a strong highway system to be able to evacuate and move our population. And so, again, the plans for the highway system

didn't change, you know, the funding options didn't change, the sort of philosophical arguments that had been going on in Congress didn't change, but attaching that sort of national security angle to it really helped push things through. And that's not, you know, the only way we're going to get federal money, but it is something that we should be looking at again because there are real national security interests on Louisiana's coasts, and it's a largely untapped area of funding, but -- you know, we could be going after. Again, it's also a very deep -- deep funding pocket.

But, essentially, you know, as I said, the Corps is timely. Obviously, if we're going to take time to develop this national security aspect -- and it's time that we don't have in spades, and that's why what we're really putting forward in terms of options is what the state can do, because the state really needs to take the lead on this. I mean, even with Corps projects, there's always going to be the cost share, so irrespective of if you get the federal government to do most of the work, the state is still going to have to come up with a lot of that money and come up with a lot of it up front.

So here are some of the things that we've put out, again, on our menu, as Mark mentioned, water marketing. So, obviously, after the floods -- and I'm from California and I get a lot of people say, oh, you know, you guys have so much water, if only we could move some of that water over here. Well, we do have an abundance of water. We are a water-rich state. It is a resources that we are currently not really monetizing and not using as a commodity, but abundance doesn't necessarily mean surplus, so -- and that's why the work that Scott and Twig (phonetic) are doing is so important because to really -- if we're going to use this as a sort of resource to generate revenue for the state, we have to know what we are using our water for first and what we need to be using and what we're going to be using it for in the future. So that's something that we address as an option, but, again, before we go, you know, full steam ahead with that, we really need to understand what we're working with and what we have to give other states before we start committing this.

A pipeline tariff is another option that we've looked at, so taxing oil and gas that moves

through the state. This has been tried in the past. The First-Use Tax in '78, the Coastal Wetlands Environmental Levee in '86, and there was another attempt that died on the Senate floor in 2000. It is possible. Again, we looked at these sort of irrespective of the political difficulties. I think after '78, there was a feeling that it -- because it got shot down in the Supreme Court, there was a feeling that this thing could not pass constitutional muster. I don't think that's true. I think that there's a way to structure something so that it's more like a bridge toll so that the pipelines -- the people who use the pipelines are being paid to sort of maintain, not just the pipelines, but the wetland infrastructure, the natural infrastructure, that protects them.

A cap and trade, a carbon tax, again, irrespective of the political issues around it, this is something that you see -- you know, it's not just liberal economists calling for this anymore. You've got the IMF saying, this is the smartest way to go forward. You've got, you know, hedge fund managers with $90 trillion worth of assets under management who just came out and

released a letter -- you know, joint letter say, this -- a carbon tax is the most sensible way forward. And, you know, it's something that, even if were to just do, say, power plant emissions and put a very minimal -- like a dollar per metric ton, we're talking millions of dollars that we could be raising every year in this state, and it's something that other states are already doing.

Again, the Clean Power Plan, as that winds its way to the Supreme Court, that will sort of set the stage of how quickly we go through with this. But I think in 20 to 30 years, this is going to be the norm rather than the exception, people are going to be monetizing carbon. And if it is something that can raise money, it's something that we need to be looking into.

The other thing that we looked at was a revolving loan program, and we looked -- neighbors to the west, Texas, has a sort of similar existential challenge, although it's the flip side of the coin. Their biggest issues are, you know, they want to grow to 50 million in the next 50 years, and they just don't have the water to do it. So they've been looking at, well, how do we

pay for all these challenges and how do we meet our water needs in this time. And again, it's similar to the Master Plan. It's a 50-year timeline. They update it every five years, and -- they're going to be coming out with a 2017 Texas Water Plan, and their price tag that they've pegged it at is $62 billion, so it's a similar financial challenge that they're looking at.

And one of the things that they did was, they took $2 billion from their rainy day fund and set it aside to a revolving loan program, and so regional water -- the state is broken up into 16 water regions. Each one of them proposes projects that they want to build, and then the Water Development Board selects projects and gives them money. And what they do is, they provide either cash to help them build it, but more often what they do is provide them subsidized rates on their interest, so they're paying no interest or very, very low interest or they pay no interest for the first 20 years. But this has allowed a lot of projects to get off the ground that otherwise would have had to wait around for funding, or otherwise, the municipalities would have had to develop the funding.

And so we have, you know, money is going to be coming to the parishes through GOMESA and through RESTORE. I know the state is already developing a matching program for RESTORE dollars. I think they should think about doing the same thing for GOMESA dollars. But if you could provide money up front for some of these political subdivisions along the coast to get projects off the ground sooner, that could really make a difference, you know, that could be the difference between the town being there and not being there in 30 years really.

And one of the reasons is, we talk -- we look at those maps, and -- so 50 years, certain cities along the coast are going to be under water, given those projections. But before that -- you know, they're actually physically under water, they're going to be financially under water. There's going to come a time before the seas come up to their door where insurance agencies cease to give them, you know, favorable rates, cease to give them affordable rates, and credit rating agencies cease to, you know, give them favorable ratings so that they can borrow.

And with the credit rating agencies,

this is just starting to come onto their radar, and this is a quote from a report that Fitch put out, I believe, in April or March of this year. So, as you can see, they are not saying that we are already factoring this in, but they're saying that, in the future, we could definitely see how this factors in.

So if you've got, you know, a parish or a town that is looking to do a project and looking to borrow and, you know, all of a sudden, a rating agency downgrades them, if they could get access to either matching money from the state or to, you know, borrowing on the -- you know, on full faith and credit of the state, basically, that would also help catalyze projects, get things off the ground sooner. And, again, as I said, time is really one of our major limiting resources in this case.

And then the other one is public/private partnerships, and this is something that gets talked about a lot. There's definitely a place for, you know, the private sector. What you hear is that, well, the private sector can do this cheaper, more efficiently, and faster, and if that's the case, that's great. We need to be, you

know, selective going forward. And the real issue is public/private partnerships are not a fundraising mechanism in themselves, right. They turn it over, but the money still needs to be raised and it needs to be paid either, you know, as the project is being built or after the project has been proven successful. So I think public/private partnerships is an area that certainly holds promise, but, again, it doesn't really get us away from the fundamental question of, how are we going to raise money to pay for all these ambitious plans that we have in place.

And that's what we're looking at, and a report should be out in two months.

MR. DAVIS:

Thank you, Dean. Thank you, Chris.

I mean, clearly, we undertook this work because we just are too popular and we don't want to be as popular.

But I wanted to follow up on one of the points that Dean just made and why I think this is important for this Commission to kind of follow this work. The way we manage water is going to have a profound effect on the ability of the state and its political subdivisions to essentially

finance their future. Because it's not just when you go underwater -- for example, when we spoke to the Water Authority -- Utility in New Orleans, their biggest question to us was, can you tell us if and when we may have saltwater at our fresh water intakes. This already happens down river, but they don't have a backup plan, and they need to know. Because a city that doesn't have a potable water or industries that do not have a dependable water supply are problematic.

I mean, we have already seen this elsewhere. Sea level rise is only now starting to affect the way bond raters and others and investors look at opportunities. Water supply is already there. There are communities, you know, in California and elsewhere where the inability to show that you have a water supply that will fuel your growth throughout the repayment period of a bond has affected the rating. It makes it far more expensive.

So we just wanted to make sure that -- we understand that the work of this Commission actually, you know, touches on the way all of Louisiana is going to live and prosper. And I think the other side of that is -- I think as Dean

also noted, Texas plans to continue to grow. There are things that they can't -- they can't grow if they don't have water.

Louisiana has to realize that water is not just a risk factor. It is an asset, and if we do not find ways to manage it for value, there are others who will.

MR. HARRIS:

Thank you, Mark.

MR. IEYOUB:

Mark, you mentioned a bill that's presently in Congress that was introduced by a Congressman from Texas, as well as our Congressman from Louisiana, about transferring water from one state to the other. Can you elaborate on that a little bit, please?

MR. DAVIS:

Sure. It's House Resolution 5430, and I'd be happy to give you a copy. There's a fairly vintage federal law called the Lacey Act, and it was designed to prevent the importation of invasive species -- problematic invasive species from one state to another. And, you know, obviously, when you're moving water from one state to another, particularly from surface water

sources, you can take, you know, all sorts of things, it can be zebra mussels, there can be, you know, salvinia, all sorts of things that are problems.

The bill would relax the application of the Lacey Act. It would essentially say that, if the species exists in both places already, you don't have to worry about it. And that may be fine, but it doesn't -- the way it's written anyway, it doesn't -- it's not nuance.

For example, if Texas has one zebra mussel and the Mississippi River water has bunches of zebra mussels, technically, you know, you would waive the Lacey Act.

If you're busy trying to eliminate an invasive species, you know, investing all of that effort, this would, you know, in many ways, perhaps negate that.

So, you know, this bill, I'm pretty sure, is not going to pass in this Congress. It may never pass, but I only wanted to bring it to your attention because the efforts to knock down the walls to interstate importation of Louisiana water and Arkansas water -- there is already a permit pending in Arkansas to transfer Mississippi

River water to Texas. Now, they aren't acting on that because they don't yet know how to determine surplus in that context for the Mississippi River.

But I just wanted to point out to you that, you know, others are not waiting for us to do our work, so we need to kind of keep an eye on what we want to do and what others are doing, and the game is already afoot.

MR. IEYOUB:

Well, would it be constitutional for Texas just to create a pipeline from the Mississippi River and divert water from the Mississippi River into Texas?

MR. DAVIS:

Constitutionally, yes. It doesn't mean that there aren't statutes that they would have to deal with. Right now, there's, you know -- and Louisiana, in this context, would have to grant its permission. Because water in the Mississippi River, when it hits Louisiana, become a Louisiana public thing, and public things are not alienable, although now that we have the cooperative endeavor agreement -- arrangement, you know, which we put in place several years ago to accommodate the fracing industry, in part to relieve pressure on

groundwater, there is no way that we can say, we'll allow constitutionally Louisiana water users to use surface water but nobody from out of state. That is facially unconstitutional, unless you can really explain that you have bona fide public interest, you know, and reasons for doing that, and right now we don't.

In fact, if you go back into the 1960s, and it's kind of circling back to complete the loop on coastal restoration planning, one of the things that led to the development of the coastal restoration movement in Louisiana and the development of the science was a proposal by Texas to import 13 million acre feet of water per year from the Mississippi River to Texas. The question was then raised, do we have it? And that's when some of the science -- people in this room probably know Woody Gagliano and a few others, that's when they really began their work looking at, well, is this surplus water, and the one thing they concluded was, it's not. We have a coast that is collapsing because we're not using this water, and the plans didn't proceed.

But the interest in Texas has never gone away, and it's not just Texas. We have to watch

an entire watershed, and there are plans to take water out of the Mississippi River system -- you can go to the Tennessee River, you can go to the Missouri River, you can go to the Red River, the Arkansas River, there are plans to use that water elsewhere, and if we are not planning for the water as we need it, then I can promise you we will not be in a position to defend them.

So this issue is not merely is it constitutional. There are plenty of things that I think are barriers to that, economics being one. It's staggeringly expensive to move water, but it's also increasingly valuable to do it, and I think that's what we should be anticipating.

And so it's, again, one of the reasons that we're looking at this from both the water management side and, you know, the finance side, because we have to understand -- not only do we have infrastructure to build and maintain, but we actually have to find a way of acknowledging that water has value, not so we can sell it necessarily, that may be, in fact, the stupidest thing we can do, but we at least need to know that others need it enough -- and the Great Lakes have been through this, by the way. They have an

interstate compact on the Great Lakes, and the premise was, we don't want water being exported from here. If you have ideas that really need water that badly, bring your brains and your ideas to the Great Lakes, don't send our water to your idea.

MR. HARRIS:

Chris?

MR. KNOTTS:

Yes, sir. Just to follow up on what Mark mentioned, there's another entity at play here with the Red River Compact Commission, and it involves a federal compact with Louisiana, Arkansas, Texas, and Oklahoma. We each have two commissioners on that compact. I happen to be one of them right now. Louisiana will host the Red River Compact annual meeting next spring, so we are setting up those details right now. I will be sure and make the Commission aware of where that will take place next spring. It's looking like it's going to be in the Shreveport area.

But one more comment to Mark's, that permit that was pending in Arkansas, when that hit the Red River Compact Commissioners, it resonated because everybody realized what it meant.

Arkansas got very concerned, in that -- and I understand it's one of two. There's a second one following that. But that first one was 10,000 cubic feet per second by a private entity in Texas at an estimated cost of $10 billion, and they got the permit. They were ready to go. So there is a tremendous value for water.

MR. CULPEPPER:

I was just thinking about your funding, Chris, and what you brought up. I remember I think it was last year that the Commission made some kind of resolution or something like that to request funding through the legislature or some -- I can't remember the exact mechanism. But one thing I was thinking is that it seems like it would be of vital importance to the Department of Energy from our oil and gas infrastructure to make sure that we have a good understanding of all this. That might be one neutral source of funding.

Also, I understand that highway infrastructure is also getting a big push now nationally and so possibly the Federal Highway Transportation fund or something like that, looking at, like, infrastructure to -- like,

Highway 1 down to Port Fourchon or something like that could -- maybe you can get some pieces from different sources to kind of help out with that.

MR. DAVIS:

Thanks, David.

MS. GAUTREAUX:

I was just going to go back to the permit that Mark and Chris have referenced and that, if you haven't had an opportunity to review the state response to that permit, I think it's an excellent summary of the cross-section of concerns for our water resources and, to me, just going through that made the idea that has been put out today to combine those models, have the strong science foundation, while we're working, and I really appreciate Mark's leadership in the Water Institute Code Committee. It think it's really important that we move forward with the science, so if we don't have a complete legal structure, at least we have good science to defend good ideas that may be coming from out of the state.

And so I think it's a really, really priority issue for us to support finding some funding to complete that work from public and private section, so thank you.

MR. DAVIS:

If I could respond to that, and also to Chris' point, because I think it's worth mentioning that, you know, Louisiana is a member of two compacts, the Sabine and the Red. Those are federal laws, which, in fact, give us rights to do certain things with that water, including sell it or not, but state law -- you know, we might not be able to do it under regular state law and the U.S. Constitution.

We need to be recognizing how those tools, you know, can be used. There's a major Supreme Court case about two years ago between Oklahoma and Texas, you know, over the compact, over the Red River compact, and what powers it gave Oklahoma.

We need to be anticipating what we want to use these compact structures for, and quite frankly, they're fairly fundamental to the work that this Commission, you know, is undertaking. These are tools, and the responsibility is already in the toolbox, so we should be thinking about that and making sure that whatever we're developing, you know, we're touching base with those people.

And the second thing is, we all know that there's a future coming where we're going to go to our neighbors and explain why the laws or policies or practices could change, and it's not going to be an easy conversation. For example, as Chris mentioned, in California, which has a very extensive and expensive water management program and it's also not terribly effective because they were not managing surface water and groundwater conjunctively. They've only begun the process the process of managing groundwater.

Managing groundwater requires measurement. One way or the other, we are going to have to -- we, as a state, are going to have to start measuring water usage, not so we can restrict it necessarily, not so we can charge for it, but so we can manage for it. I think as you have heard earlier in the presentation on the modeling and the budget, if you take water out of some streams and some -- you know, some aquifers -- in some places people do it either way, it's unified water, at some point -- the ability of an aquifer to recharge can be eliminated. You have to understand that, you know, aquifers are not all created equal. They don't recharge the same way.

And even if you have an abundance of water in the aquifer as a whole you could have a critical localized shortage. We need to understand that.

One of the reasons I think we are very interested in the New Orleans area is that, when you have subsidence rates, and this seems to be induced, you can be -- affect, not only flood control structure, but navigational structures, structures that, quite frankly, we depend upon, but right now it's no one's jurisdiction to manage. So that's one of the things I think we have to understand, that we're not looking to manage water because we have nothing else to do. We have to be thinking in terms of managing water purposefully.

MR. BOYER:

Mark, on that kind of note, I would circle back to what Matt was presenting earlier in this meeting about the well monitoring. I mentioned that we've got, you know, people like Doug Carlson and Frank Tsai, and whether you do groundwater or surface water modeling, well, those models are calibrated on actual measurements, and those actual measurements come from water monitoring. Water monitoring is exactly what, you

know, Matt was talking about today. And so it's just all of these things, they kind of -- they all end up grouping back together, and they all end up reinforcing each other as to why they're important and why we need them.

MR. DAVIS:

We're probably all going to be ambassadors to various communities and constituencies before we're finished here, and that's probably the day I want to step away from this committee.

Thank you.

MR. HARRIS:

Are there any other questions from the Commission members?

(No response.)

MR. HARRIS:

Thank you, Mark.

Thank you, Chris. I appreciate it.

CURRENT ISSUES FOR LOUISIANA'S PORTS

MR. HARRIS:

Our final -- well, not final, our next issue on the agenda is Joe Accardo, Executive Director, Ports Association, with a report on current issues. Thank you.

MR. ACCARDO:

Thank you for giving me the opportunity to make a presentation. I'm Joe Accardo, Executive Director of the Ports Association of Louisiana. I'm going to talk to you about water in a different respect because ports of our state, of course, utilize the water.

The Ports Association is trade association, nonprofit trade association, of public ports, 31 in all at this point from all portions of the state. As you can see from the numbered -- the numbers appearing on the state map, they're located at all points in the state, the deep water ports along the Mississippi River and the Calcasieu, the coastal ports along the coast of Louisiana, the river ports along the Mississippi River, the Red River, and the Ouachita.

Louisiana ports carry 25 percent of U.S. waterborne commerce. The ports touch every economic sector of the state.

The five Mississippi River ports comprise the largest port complex in the world, and the ports enable key industries to flourish in Louisiana. These industries have located in

Louisiana because of our waterways. We have the agriculture industry, the oil and gas industry, coal, petrochemicals, food manufacturing, fabricated metals, wood and paper products. They comprise direct spending of $96 billion with economic output of $182 billion, personal earnings of $32.9 billion, and pay state taxes of $2.4 billion, local taxes of $1.8 billion, and are responsible for 525,000 jobs in the state of Louisiana. These numbers come from an economic study done by Dr. James Richardson, the substance of which is on the handout I've given you.

I'll go on. The economic impact of ports, as I mentioned earlier, Louisiana with global and national trade, create 525,000 jobs, and their employees earn $32.9 billion. Port-reliant industries, as we mentioned earlier, comprise one in every five jobs in Louisiana. The direct spending by ports, tenants, and the businesses that are locally-owned ports account for 4.1 billion in personal earnings, and, actually, there are 77,000 jobs at these port facilities. This is 40 to 45 percent more than the oil and gas industry. These businesses pay $298 million in state taxes and $335 million in

local taxes.

Ports connect and enhance markets for major industries, transportation and warehousing industry, the manufacturing industry, the oil and gas industry, and agriculture. These industries could exist elsewhere, but they would exist at a much higher cost, and they won't be as competitive as they are located in Louisiana because of the lower freight costs to be able to move that material, particularly, on the waterways of our state.

Most of these industries are high-volume exporters and importers, so locating in the state at our deep water ports are an important factor.

There are 60 ports, Lake Charles on the Calcasieu, which, as all of you already know, probably that they're the center of $70 billion in natural gas-related industrial development and the thirteenth largest port in the U.S.

The Port of Greater Baton Rouge right outside of this window is at the head of the deep water navigation on the Mississippi River, which gives it a very competitive way to move cargo coming from barges to ships, ships back to barges.

The Port of South Louisiana just south of

us on the Mississippi River is the number one ranked port in the whole United States accounting for 216 million tons of cargo.

The Port of St. Bernard -- the Port of New Orleans, rather, handles containers, breakbulk cargo, and serves as a cruise ship terminal.

The Port of St. Bernard below New Orleans is a bulk and breakbulk port, and the Port of Plaquemines has more than 100 miles of deep water draft access, and it's the closest to the mouth of the Mississippi River from the ocean.

The coastal ports of our state, Port Fourchon -- I'm not going to be able to go through all of them, but Port Fourchon, as all of you know, services 90 percent of the deep water production and 50 percent of all of the shallow water production in the Gulf of Mexico, which accounts for 18 percent of all U.S. oil supply.

The Port of Morgan City also is, again, an oil/gas industry port, service port. It ships agricultural products.

And the Port of Iberia which is home for 100 companies providing component parts and building structures to the offshore oil industry. There are 3,000 people working at that port at

this point.

The Port of West Calcasieu anchors the Gulf Intracoastal Waterway and enables the safe movement of cargo from Texas to Florida.

The Port of Terrebonne, again, is another oil and gas-service port, home to marine fabricators and oil and gas service companies.

Vermilion -- Port of Vermilion is a salvage/refurbish offshore port -- refurbishing offshore facilities.

The port -- inland and offshore ports are the largest producer of oil and gas -- I said that earlier. Louisiana's inland and offshore industries are the largest producers of oil and gas in the U.S., and Louisiana is the second largest producer of natural gas.

The inland ports of our state, Central Louisiana Regional Port, which formerly was the Port of Alexandria, is the center for its ability to transport military equipment, particular when it comes by barge on its way to Fort Polk. It's also a center for removal of fertilizers and bulk materials.

The Port of Caddo-Bossier is an industrial center. There are 1,000 employees

working at 20 companies located at the Port of Caddo-Bossier.

The Port of Lake Providence on the Mississippi River is the largest tonnage inland port for agricultural products.

The Port of Krotz Springs, this is a huge oil refinery, an oil refinery with 300 employees.

Inland ports link farmers to national and global markets. They provide warehousing and valuable added services. They attract manufacturing and distributions to these areas.

How have ports financed their infrastructure? You'll see in the center a graph which shows "Capital Improvements-Historical Funding Mix." About 20 percent of the funding comes from the Port Priority Program. The historical average has been about $20 million coming from the Transportation Trust Fund. This year, Governor Edwards and the legislature recognized the importance of ports and in infrastructure that needs to be built appropriated $40 million. The state receives $8.00 in taxes and job benefits for every $1.00 it invests in this Priority Program. There's also a current

backlog of $125 million. There are 18 projects which will cost $450 million that will create $1 billion in economic benefits and create over 2,000 jobs when they are completed.

As an aside, as you see from the graph, only a small portion of the funding for port infrastructure historically is coming directly from the state. Some of it comes -- a large part of it comes -- a large part of it comes from the ports' own revenue and from public/private partnerships.

There are 21 ports in our state with 92 projects, improvement -- public improvement, infrastructure improvement projects, totaling $1.2 billion. This represents a need for $360 million over five years. The Louisiana Transportation Plan recommends $7.6 billion for ports and channels during the next 20 years.

Our ports need these deeper channels for future opportunities. Deep water ports on the Mississippi River and Calcasieu to serve as the Panama Canal expansion of trade. The coastal ports to be able to serve the deep water vessels and production facilities as they go deeper into the Gulf. Again, the structures that's on vessels

become bigger, and, therefore, the channels need to be deeper. River ports will continue -- need to be, particularly the Red and Atchafalaya River, needs to have their channels increased 12 feet in order to handle their increased barge traffic.

The Panama Canal Expansion, as you have probably all read, opened in June of 2016. Studies suggest that, with the opening of the Panama Canal, container traffic of 12 to 15 percent increases will happen. Deepening of the canal from 39 to 50 feet means that the Mississippi River which is now authorized to 45 feet must also be deepened if we're going to be competitive. There's an ongoing economic study to do that, and, hopefully, it will be positive.

Under the 2014 water bill, the state of Louisiana will be responsible for approximately 50 percent of the $300 million estimated cost, $150 million, for the initial deepening of the river. The good part about the water bill of 2014 was that it removed the responsibility from the state for inlets (phonetic).

With the expected volume increases and expansion of the Panama Canal, a recent study found that five million plus TEUs for the Gulf

will probably be heading to the Gulf ports, Houston, which is, of course, the largest container port on the Gulf of Mexico is expected to get the greatest number. This is a graph that shows that. It shows that by the year 2028, it's expected that there would be 25.4 million containers coming through the Panama Canal, of which 66 percent will go to the United States, and that's the 12 percent to the Gulf, 54 percent to the east coast ports.

This slide is out -- it's out of place. It should have been, you know, in the slide when we were discussing the need for deeper channels, particularly the coastal channels. As you see this illustration, as production in the Gulf got farther and farther into deeper water, the structures became larger and as a result the structures that were being constructed to build -- to be able to service the offshore industry and the vessels were required to be bigger. Some of our ports do not have deep enough channels. For instance, the Port of New Iberia has a plan to deepen its channel. It's $150 million plan, and if it doesn't -- if we don't find the money to do that, then this port will find itself not as

competitive as it used to be and much -- a lot of the deep water business will go to Texas, Mississippi, and Alabama, and sometimes Mexico.

I'd be happy to try to answer any questions if you have any.

If you take home the brochure, it gives the substance of that to Richardson's economic report.

MR. HARRIS:

Thank you, Mr. Accardo.

MR. ACCARDO:

Thank you.

MR. HARRIS:

Are there any questions from the Commission members?

(No response.)

MR. HARRIS:

Thank you for coming. Thank you for your presentation and information.

Matt, do we have any cards from the public requesting an opportunity to speak?

MR. REONAS:

No.

CALL FOR PUBLIC COMMENTS

MR. HARRIS:

All right. Is there anyone in the audience who care to speak, have any issues, questions, comments?

(No response.)

ADJOURN

MR. HARRIS:

Do I hear a motion to adjourn?

MR. KNOTTS:

So moved.

MR. IEYOUB:

Second.

MR. HARRIS:

Thank you, Chris.

Second?

MR. IEYOUB:

Second.

MR. HARRIS:

Commissioner Ieyoub.

Any objections?

(No response.)

MR. HARRIS:

Hearing none, this meeting is adjourned.

CERTIFICATE

I, MICHELLE S. ABADIE, Certified Court Reporter in and for the State of Louisiana, as the officer before whom this testimony was taken, do hereby certify that this hearing of the Water Resources Commission was held on September 8, 2016, in the Labelle Room of the LaSalle Building, Baton Rouge, Louisiana; that the hearing was reported by me in the stenomask reporting method, was prepared and transcribed by me or under my personal direction and supervision; that the foregoing pages, numbered 1 through 130, inclusive, is a true and correct transcript to the best of my ability and understanding; that I am not related to counsel or to the parties herein, nor am I otherwise interested in the outcome of this proceeding.

_____

MICHELLE S. ABADIE, CCR #24032

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