Barataria-Terrebonne National Estuary Program
Management Conference Meeting #66 Roll Call
Ellender Memorial Library – Multipurpose Room
9:30 a.m. – Thursday, February 6, 2014

BTNEP Staff		
Andrew Barron	Richard DeMay	Alma Robichaux
Matt Benoit	Delaina LeBlanc	Kerry St. Pé
Dean Blanchard	Michael Massimi	Jenny Schexnayder
Joe Dantin	Kristy Monier	Natalie Waters

Management Conference Member		**Member**		**Alternate**
American Sugarcane League		Flattery McCollum	X	Herman Waguespack John Constant
Bayou Lafourche Freshwater District		Hugh Caffery	X	Benjamin Malbrough
Coalition to Restore Coastal Louisiana		Steven Peyronnin		
Coastal Conservation Association of LA		John Walther		
Coastal Protection Restoration Authority		Jerome Zeringue		Kyle Graham
			X	Bren Haase
			X	Jim Paul
			X	Darin Lee
			X	Peter Hopkins
			X	Danielle Richardi
Commercial Fisheries	X	John Tesvich		Peter Vujnovicch Clint Guidry
Greater Lafourche Parish Port Commission		Chett Chaisson	X	Joni Tuck Davie Breaux
Iberville Parish		John Clark		
Jefferson Parish		Marnie Winter		Jason Smith
			X	Lily Zhou
LA Association of Conservation District		Brad Spicer		Jennifer Roberts Brad Lanute
LA Association of Levee Boards	X	Dwayne Bourgeois		
LA Department of Ag & Forestry		Joey Breaux		Carrie Castille
LA Dept. of Culture, Recreation and Tourism		Debra Credeur		Karen Leathem Linda Smith
LA Dept. of Economic Development		Paul Sawyer		Anne Perry
LA Department of Education	X	Ann Wilson		
LA Department of Environmental Quality		Christy Rogers		Gregory Waldron
LA Department of Health and Hospitals	X	Chasity Cheramie		Kathy LeBlanc
LA Department of Natural Resources	X	Charles Reulet		Don Haydel Sarah Krupa
LA Department of Wildlife and Fisheries		Marty Bourgeois	X	Brady Carter
LA Forestry Association				
LA Independent Oil & Gas Association		Randy Robichaux		
LA Landowners Association		Tim Allen		
LA Mid Continent Oil & Gas Association		Mike Lyons	X	Ed Landgraf
LA Oil Spill Coordinators Office	X	Brian Wynne	X	David Gisclair Karolien Debusschere
LA Science Teachers Association	X	Shannon Lafont		Tera LaPrarie Nathan Cotten
LA Wildlife Federation		B.J. Barney	X	Rebecca Triche

		Callahan	X X	Eden Davis Maura Wood
Lafourche Parish	X	Archie Chaisson, III		Charlotte Randolph Amanda Penick
LSU Ag Center & LA Sea Grant	X	Rex Caffey		Alan Matherne
LUMCON		Nancy Rabalais	X	John Conover Murt Conover
National Marine Fisheries Service (NMFS)	X	Rick Hartman		Rachel Sweeney
Nicholls State University	X	Gary LaFleur		Quenton Fontenot Zack Darnell
Plaquemines Parish	X	P.J. Hahn		Albertine Kimble Krista Clark
Point Coupee Parish		J.A. Rummler		
Sassafras LA		Alex Naquin		
South Central Planning and Development Commission	X	Kevin Belanger Jo-Anna Jones	X X	Martha Cazaubon Cullen Curole Simone Caesar
South Louisiana Economic Council		Vic Lafont	X	Simone Maloz
St. Charles Parish		Earl Matherne		Kim Marousek
Terrebonne Parish Consolidated Government	X	Al Levron	X	Nic Matherne James Miller
The Nature Conservancy		Jean Landry		Nicole Love Karen Gautreaux
U.S. National Park Service	X	Angela Rathle		Allyn Rodriguez
US Coast Guard	X	Charles Reed		
US Corps of Engineers	X	Susan Hennington	 X	Barbara Kleiss Mark Wingate Cheri Price
US Environmental Protection Agency	X	Doug Jacobson		John Ettinger Ben Scaggs John Bowie
US Fish & Wildlife Service		Ronnie Paille		Bill Vermillion
USDA/NRCS		Quin Kinler	 X X	John Boatman Ryan Johnson Alton James Andrea Moore Russell Richard Scott Edwards
USGS		Scott Wilson	X	Phil Turnipseed Kate Spear Susan Testroet-Bergeron Melissa Collin
Guest Organization		Guest		
Barataria-Terrebonne Estuary Foundation		Earl Melancon	X	Michele Beary
First Peoples' Conservation Council	X	Theresa Dardar		
UNO – CHART (Center for Hazards Assessment, Response & Technology)	X	Kristina Peterson		
Independent Environmental Services Professional	X	Rosina Philippe		
Ducks Unlimited	X	Leslie Suazo Joe Fifer		
Independent Educational Consultant	X	Dottie Hartman		

Management Conference members and guests were asked to introduce themselves by stating their name and affiliation. Those who had not checked in with Jenny at the door were asked to do so.

READING AND APPROVAL OF THE PREVIOUS DATE MEETING

A motion was made by Rick Hartman and second by Ann Wilson to dispense with the reading of the November 5, 2013 minutes and to accept them as submitted. Motion carried.

PROGRAM ACTIVITIES

Kerry introduced Natalie Waters, Coastal Bird Coordinator for BTNEP. She has been a volunteer for years and was recently hired as a full-time temporary employee.

There were a total of thirteen volunteer events since the last Management Conference meeting. Joe explained that Louisiana State University came out with 70 of their students and conducted a planting on the maritime ridge at Fourchon. Approximately 5,000 plants were planted which included some woody species as well as Seashore Paspalum. Matt added that yaupon, live oak, and railroad vine were planted. Following that event, they followed up with Nicholls State University students for an additional two day planting of another 3,000 plants for a total of 8,000 plants. Joe confirmed that it was a large scale planting that went extremely well considering it consisted of so many volunteers and covered a large area. Rick Hartman questioned how past plantings looked. Matt replied that they were starting to see woody species on the old ridge planted in 2005. Some trees are over 20 feet and many at 15 feet. He felt that the new ridge is behind and probably drought related but that the last two plantings were faring well due to much more rain. Andrew Barron explained a little about the mitigation site at Port Fourchon for those members new to management conference. It is a mitigation site at Port Fourchon where there was subsidence at Bayou Couchon and the Port built as part of their mitigation for port expansion. BTNEP has been going in and conducting plantings and attempting to reestablish woody species out there for migratory birds as well as other species.

Kerry highlighted a number of field trips listed in the agenda. BTNEP recently took directors from other National Estuary Programs on a tour of our estuary down to Grand Isle. This trip was requested by other directors while they were in Mobile, Alabama for the Spring NEP Meeting. Delaina LeBlanc and Richard DeMay presented at that spring meeting. The Program also had seven education events and six bird habitat related projects.

Kerry referred everyone to the media events listed on agenda noting that it only listed events related to the program. He noted plenty of outreach related to LaFete d'Ecology. This initiated discussion regarding the discontinuation of the festival after 17 years and considering different options. One thing being considered is Nicholls State University's Swamp Stomp. BTNEP currently helps to fund Tresors Du Bayou on the Friday of Swamp Stomp where students are bused in from schools all over the region. The program has considered partnering with NSU to bring part of La Fete. For organizations from Management Conference that host booths at La Fete, this would mean a Friday commitment rather than Saturday. Al Levron asked if this was a decision or recommendation. Kerry confirmed that it was a decision to discontinue the festival. Gary LaFleur, who has been involved with both events, stated that the difference in the events being that on the first day of Swamp Stomp, rather than families bring in their children, they specifically engage certain schools and they are bussing their kids in. This seems to be a better way to guarantee that kids are getting the message. The message is pretty much the same and many of the same people are seen at both festivals. The difference is that instead of talking to three kids with their parents at one time, you are reaching 15 to 20 kids at one time. It is also a great way to get more bang for the buck. Kerry's main concern is wanting the event to have the flavor of the estuary program. He felt that it was worth discussing with NSU. Herman Waguespack commented that one plus would be reaching more people. Kerry stated that our budget cuts were severely affecting decisions. One fact remains, La Fete or any other educational event that the program decides to do is an excellent place for management conference members to get their message and mission across to a wide audience.

Kerry addressed BTNEP calendars. He stated that the program hit upon a great idea. The calendars have a great educational component that is used locally as well as around the country that brings program notoriety.

Kerry noted a lot of interest in invasive species. People are inquiring about whether or not apple snails are being affected by recent hard freezes to the area. We are hopeful that many invasives are being destroyed but realize that not all will be.

Andrew Barron and Michael Massimi are both very active in The Louisiana Master Naturalist Program. They are instructors and have developed most of the curriculum. Some people have shown interest in developing one in the Barataria-Terrebonne National Estuary. BTNEP has spent plenty of time developing one in New Orleans and nothing is preventing participants from joining that group. Alma Robichaux noted that BTNEP also funded a Junior Master Naturalist Program with the National Park Service that they are starting in June of this year.

Richard DeMay invited everyone to participate in the Migratory Bird Celebration in Grand Isle from April 11-13, 2014. That event has been going on since 1998. They offer the opportunity for field trips and regular and kayak tours to view different suites of birds. There will be a guest speaker on the Saturday and vendors selling bird related products. He encouraged everyone to check out the website.

2014 Eagle Expo is February 20 – 24, 2014 in Morgan City.

Paddle Bayou Lafourche is April 3-6, 2014. Kristy reminded everyone that registration is now open through March 18, 2014. She reviewed the schedule of events. This year she is planning a game show/trivia night on Thursday rather than a presentation by Kerry. Organizations were encouraged to attend. More information is available on the website.

Bayou Lafourche Cleanup is on March 15, 2014 from 8 a.m. until noon. Alma announced that she had approximately 1,000 volunteers signed up at this time. Many of the site captains are returning and it would be wonderful to get great publicity. She is hoping that it will be a great success with less trash.

Kerry announced his retirement effective July 2014. He stated that it was very hard to retire and leave a program that you love. Rick Hartman commended him on a great job. Kerry talked about his early days with the program and his appointment as program director. He thanked everyone for their hard work as part of the Management Conference. He announced that Al Levron, Management Conference Chair, would appoint a search committee. Like other National Estuary Programs, the position will be advertised nationally. The candidates should have a good knowledge of the technical aspects of the program including the biology, ecology and hydrology. Doug Jacobson proposed developing a conservation award to be issued annually in Kerry's name to commend him on his long time service. It was motioned and second. Al stated that it would be explored with the motion carried.

SCHEDULE OF NEXT MEETING DATES

Reminder - May 8, 2014 – Century Room @ NSU Stadium

Approved - August 7, 2014 – Plantation Suite @ NSU Student Union
- November 6, 2014 – Plantation Suite @ NSU Student Union

DISCUSSION ITEMS

A. "A USACE Perspective on Mississippi River Diversions." – Dr. Barbara Kleiss, Director, Louisiana Coastal Area Science and Technology Office, USACE, Mississippi Valley Division and Mark Wingate, P.E., Chief, Projects and Restoration Brand, USACE New Orleans District (30 minutes)

Barbara Kleiss opened her presentation by stating that most of this presentation was presented by Brigadier General Duluca a few weeks back to the CPRA's Scientific Advisory Panel where it was well received. However, she stated that she was not sure that she would have the same panache as the General and she certainly was not at liberty to make some of his colorful remarks. She noted that USACE supports coastal restoration in Louisiana in any way, any viable methodology, and anything that will work. She did not want anyone to construe this as being anything negative against diversions. They do want to optimize the design, to make sure that everyone is well aware of all the pros and cons, the benefits and the costs, and to make these projects as effective and as useful as they can. Her presentation covered the value of the river, causes of wetland loss, what has been learned on how diversions work, thoughts on how we may want to quantify and mitigate for the future, as well as other alternatives that we should investigate. She explained that 60% of all agricultural commodities are shipped down the Mississippi River. The

south Louisiana port system by tonnage is the largest in the nation and we save 2.7 billion dollars in transportation costs by using river born navigation on an annual basis.

In terms of flood control, the flood of 2011 was an epic flood. We didn't hear very much about it because there was not a single fatality associated with the flood. It was by far the largest flood on record. In Greenville, USGS recorded discharges of 2.6 million cubic feet per second. It was the largest discharge measurement ever made in the continental United States. The flood control system in place prevented 234 billion dollars' worth of damages. 84% of those damages prevented accrued to the state of Louisiana. Since its inception in 1932, the Mississippi River and Tributaries Program has had a 44 to 1 return on investment. Today in actual dollars (not inflated dollars) they spent 14 billion dollars on the Mississippi River and Tributaries Project which ironically is the same as the Hurricane Storm Damage Risk Prevention System.

The wetlands in Louisiana have an incredible fish and wildlife value and commercial fisheries value. It is important to recognize that these are authorized, appropriated, and approved responsibilities that the USACE has for the river system. Although the Corps can do new things, they are not authorized by Congress to hand off any of the other responsibilities. Anything that they do new has to balance so they aren't in a position of saying navigation isn't that important so let's diminish navigation in order to increase land building. They are not in a position to trade off one for the other.

Barbara referred to a super bowl add referencing land loss in Louisiana due to levees on the Mississippi River. She stressed that it is only part of the story and that it is really important to recognize that it is one of eleven causes of wetland loss. It's important because history has shown us that if we over simplify something and there appears to be a simple answer to something, usually the solution for a simple answer is wrong. It is important to recognize the complexity of the situation and the interactions between the 3 of the 11 causes of wetland loss. If you take wetland loss that could be influenced by the Mississippi River, and compare it to areas that aren't affected by the Mississippi River, wetland loss is greater in areas that aren't affected by the river. More than half of the wetland loss occurs in places that don't have a significant fluvial impact. The big question is what has been learned from that? This has been intensely debated. What are the effects of oil and gas canals? What are the effects due to subsidence from fluid withdrawal? Some estimate that as much as 36% of overall wetland loss is due to that. She could not confirm that percentage because they are interacting, but we do know that a significant portion is contributing. USGS has done interesting work on losses caused by hurricanes. They estimate that 25 to 35% of wetland loss is due the hurricanes. Sea-level rise and local subsidence are also factors. She compared gauges at Pensacola, FL and Grand Isle, LA and the Grand Isle gauge showed more rapid changes. The Grand Isle gauge is the NOLA gauge so it is used as the standard. The USACE has tidal gauges on the river that show subsidence rates much higher than Grand Isle. That is about 9 millimeters per year. There are gauges on South Pass and Southwest Pass that are at 25 millimeters per year. That is one inch per year of subsidence. She showed and explained a figure from the State Master Plan indicating their best guess on subsidence. She stressed that all of the points were made so that everyone would be able to understand the complexity of the situation. There is need to understand how all of these multiple things fit together so that people understand that there is no one easy quick fix regarding the issue of land loss in coastal Louisiana.

She highlighted the work of several groups and the first noted were those working on the Mississippi River Hydro Project. The project team is composed of university folks, USGS, The USACE at the Engineering Research and Development Center, The Water Institute, and CPRA. They meet by telephone every two weeks and have been accomplishing some pretty amazing things. One thing discovered about three years ago, is that the sediment load of the river has declined significantly in the last 50 years. The thing they don't know is if the few measurements taken in the 1850 and 1860s is representative of natural background conditions or whether are not we had already artificially increased sediment load at that point because of land clearing in the Mississippi River Basin. Nonetheless, there is no doubt that sediment load has declined since the 1850-60s. What they did find was that most of the estimates of sediment load were based on the Tarbert Landing Gauge just south of Old River Control at river mile 304 and there were no long-term sediment gauges south of there. So it was assumed that anything from river mile 300 to head of passes was constant and nothing happened to the sediment load. They took a period of time from 2008 and 2009 which had now been expanded to 2012 (a five year period representing current conditions) and to their surprise they found out significant information: about 50% of the water and over 50% of the sediment that is in the river at Tarbert's Landing, never makes it to Head of Passes but is lost somewhere in that 300 mile system. It is terribly important in understanding what the seasonality and the resources they have to work with. She referenced Allison, et.

al., 2012. A water and sediment budget for the lower Mississippi-Atchafalaya River in flood years 2008-2010: J. of Hydrology for anyone interested in more instructive information.

They had Dave Meade and Charles Little doing a geomorphic assessment. This takes the long term records of the general cross section records and any specific gauge information to understand stretches of the river. Barbara explained a Reach Assessment from 1970s to 2000s graph. She noted that certain areas of the river are accreting material. The section south of Old River Control is very much trapping and accreting sediment and so is a section around Donaldsonville. Then it goes to a section that is degrading a little but then the lower part of the river is already aggrading so the lower 30 miles has filled in significantly since the 1970s. This information is critical when looking for optimum locations for diversions as a diversion in an aggradational section of the river may result in more rapid shoaling and expensive maintenance of the river.

Another piece of information Barbara highlighted was an analytical piece from Bob Dean and John Wells regarding the geology of sub-deltas. As the river system forms sub-deltas it has a life span. A break or crevasse in the river can build land but after a period of time the head differential changes and the land degrades. Even under a completely sea level rise condition, that is what happens. That paper is also available and she referenced Dean, R. G., J.T. Wells, J. Fernando, P. Goodwin. 2012. River Diversions: Principles, Processes, Challenges and Opportunities A Guidance Document. LCA S&T Program.

Barbara went on to discuss Wax Lake Outlet where we are actively building land on the coast. We essentially have a diversion there that is running 24/7, 365 days a year, has a deep channel, carries a significant amount of sand, and the particle size in the sediment is very similar to that of the Mississippi River. Yet, the delta has only grown about 250 acres a year since it emerged in 1983. Essentially, we are gaining 250 acres a year while losing about 10,000 a year. She questioned why these growth rates are so slow and what we should understand in order to improve the growth rate. She noted that some would say that there are deep waters there so it will take longer. She stated that she would later address where deep water has some advantages.

Another area Barbara covered in regards to land building was Fort St. Phillip on the left descending bank of river mile 24 across from Ft. Jackson. A study was done to answer when the crevasse developed and what amount of land building has taken place since the time that it opened. The results were quite a bit different than what was expected. Images of 1956, the oldest photography, showed no crevasse, the bank on the river bank is solid and the marsh is solid. In 1971 a few canals were seen but no crevasse and the marsh is solid. In 1978, the river is crevassed indicating the possibility of it being associated with the 1973 flood. We do know that it happened between 1971 and 1978. What was interesting was the amount of open water being seen there. By 1989, a significant amount of open water is seen. This was difficult to see in black in white so she showed a land/water interface. The colored image showed land changes from 1978-1988 where the river opened up, a natural crevasse developed with river water getting through and the initial reaction is land loss. In 1988 there was a little land gain but the bottom line is that between 1956 and 2008 the opening of the crevasse has resulted in a net loss of -58%. Perhaps the natural evolution of these systems would be consistent with what we see at West Bay. Perhaps the first stage is increased erosion because the increase level of flow creates an initial period of land loss. If true, then this needs to be known in order to design around it, to manage expectations, and insure that we can attribute the benefits/net cost over the appropriate period of time.

Barbara talked about the effects of nutrients. She pointed out Jim Paul in the room and that he helped to create a panel of experts and their final conclusions was that the studies done to date didn't have enough information in regards to freshwater diversions and nutrients. This is an area where more information is needed.

The energy budget of a sediment diversion was discussed. Barbara stated that most people have a conceptual idea of breaking a levee and introducing river water but many times the devil's in the details and the engineering component has to be done. This process has begun and she shared a few of those details. When water leaves the river, there is a certain amount of potential energy and that the kinetic energy is what carries sediment. It carries fine sediment for much longer than it carries coarse sediment. It is important to understand how the diversion structure and the pathways use this energy. There are four locations where there is a loss of energy. One is because we actually draw down the level of the river itself, we lose potential energy. The second is the loss of energy through friction through the structure itself. This is really important because of discussion about putting in baffles to prevent fish becoming entrained. The third is friction associated with the diversion channel. When moving the water into a trapezoidal or

square shaped channel, the sides of that channel will exert friction. The final and most significant is what happens when the water hits the marsh. It hits shallow water and it hits vegetation resulting in a significant loss of energy. All of those energy losses have to be accounted for. Summarizing energy budget constraints, Barbara stated that when they were first looking at the diversion channel, initial models used a sinusoidal diversion channel. However when run the first time, all of the sand fell out in the channel and never made it to the marsh so they had to shorten the channel. What was important about this was that the length of the channel and the depth of the water determine how far you can carry sand or course/fine sediments. They planned a number of diversion structures that would maximize the amount of sand and material from the river. However, by maximizing that, they minimized the active life of the diversion because the channel and marsh fill up to the point that it changes the head differential. The elevation of the land becomes higher than the water level in the river. Even if a diversion was designed for 30,000 cfs after four to five years, the structure can no longer carry that much flow. Barbara showed a simulation representing 10 years of wetting cycles, during the months of March and April. This showed the kinds of optimization studies that are just beginning. Sediment piles up at the end of the outfall channel and water backs up. The white shown on the simulation indicated the building of land during "low flow" periods. This indicates most of the sediment falling out one half to one mile from the end of the structure. This suggests that we maximize to get the most amount of sediment there but a more optimum solution would be to carry less sediment at that point but to make the diversion operational for a longer period of time. The other concept is to use the diversion to get sediment to a particular place which essentially becomes a sediment trap and look at alternate methods to move it to the places wanted. Part of the cost analysis should include mechanical means to rearrange the sand and would this make dedicated dredging more economically attractive.

Increased water levels in the vicinity of diversions are a potential impact that needs to be addressed. When diversions are working we are at levels of three to four feet but as land piles up the water too is backing up and piling up. By the end of a 10 year period, they are starting to see water at five to six feet above ambient water levels. There needs to be compensation for that. Kerry questioned the volume of water. Barbara answered 35,000 cfs. Angela Rathle questioned where. Barbara replied that this would be perceived as a hypothetical situation but in the vicinity of White Ditch. Kerry asked her to confirm how many feet the water level would rise with 35,000 cfs at White Ditch. She could not give an exact amount but felt it safe to say several feet.

Barbara talked about the unintended consequences of diversions and how we mitigate for those. There is a cost associated with mitigation. One that has been looked at in significant detail is when you take the energy out of the river, the river has less capacity to carry sediment. When it has less capacity, sediments fall out and this is called shoaling. She displayed a chart of Accumulated Deposition 2020-2079. An early product of the MS River Hydro project is the preliminary results of some of the 1-D model simulations of what the accumulated deposition in the river would be in a future without project (FWOP) and with one diversion of 75,000 cfs in the vicinity of river mile 60. This particular model run suggests that there could be an additional 80 million cubic yards shoaled in the river due to the diversion. However, 1-D model does not indicate where in the channel the deposition occurs. There is a big difference if the deposition is deposited in holes in the river or deposited on bars that are adjacent to the navigation channel that will have to be dredged.

Barbara discussed the ecological effects and she noted that this was an area that she felt that they were the farthest behind. Her slide was a visualization of the potential effects of diversions on shellfish. A group consisting of NOAA and Fish and Wildlife Service anticipated the effects of Davis Pond with a 15,000 cfs at Myrtle Grove. It showed that during the month of May, it is estimated that the 5ppt line in the estuary would be pushed south 5 to 10 miles and the favorable brown shrimp area would be decreased by 63,000 acres. Everything with this model was based on salinity but there are other factors. During certain times of the year, larval and small planktonic organisms have to be brought in on the tides. What happens if the velocity of the water coming out is too significant for that to happen? Rick Hartman asked if this was a component of the HSI model and she confirmed that it was a component. She stressed that it was a very preliminary, draft analysis and it was only being presented because there was nothing more substantial at this point. Another component is vegetation. Some species need certain vegetation types and hard bottom. If large amounts of silt are discharged will it change bottom characteristics?

Her final question was, "Have we fully explored alternatives?" Since 1976, we have created about 29,000 acres of wetlands from beneficial use of dredge material without a consolidated program or special efforts. That is pretty close to what is proposed in the State Master Plan with the mid-Barataria diversion at Myrtle Grove over a similar period of time. She questioned if there were things that were not fully examined and looked at ways to save funding. On the

negative side, she questioned if it was even where we wanted wetlands. This particular methodology builds wetlands most effectively and most efficiently near navigation channels. Will it work if it isn't where we want them? She wanted to put out the idea that we should be harvesting the bars in the river and that the vast majority of material actually exists in the river and we should be using those. She showed an image of the dredge scar from the low cell structure and took 6 million cubic yards during the drought to help minimize the salt movement northward. So there is a tremendous amount of material available but what is the ecological value of those bars. To her knowledge, this has not been studied. She questioned what will happen to the geomorphology of the river if we take that stuff out. Also, if you change the channel cross section and the flow dynamics, do we basically unravel the river by doing that?

One of Barbara's last slides was a conceptual model that she asked everyone to think about. It compared the true values of land created by diversion to land created by material placement. What we know with material placement is that at time zero it will have X number of resource units. We know as the material compacts and sea level rises that subsidence occurs that will diminish over time but your ecological service or benefit is essentially the area under that curve. We need these types of things for every potential restoration activity. With diversions, the first phase is an erosional phase. We have negative resource value for a period of time before it builds. Then we have absolutely no idea what the trajectory of that curve is. We know that it will eventually go down, but we don't know if it goes down over 100, 200, or 300 years. How can we do a cumulative resource evaluation and honestly compare two types of restoration without knowing that type of information?

Finally, the State has done the preliminary submission of two diversions. The USACE put together 8-10 diversion principles. She emphasized that it is necessary as federal agencies to balance competing uses of the river and river resources. It may not be necessary for a state or local entity but that is one of the important distinctions is that they are bound as a federal agency to seek balance. Another that is really important is evaluating a system of diversions as a portfolio rather than one at a time because the impacts will be cumulative and we need to look at the overall system and not just one at a time. We also need to figure out if there are ways to optimize the system by looking at various operations schemes and how multiple diversions could be potentially handled because of operational changes and operational abilities.

Barbara handed over the microphone to Mark in the audience regarding the two diversions the State of Louisiana / CPRA currently have permitted. He noted Bren Hass and that they were working closely with his office on trying to move the permits forward. He explained that there are two permissions needed, the first is from the Department of the Army - Section 10 Rivers and Harbors and Section 404 of the clean water act. Another authority is Section 408. The corps district office does approximately 1,000 per year. Most don't typically see those because it may be for signage to a river levee. These do not impair the usefulness of the project and are not injurious to the public interest. These are fairly easy to work through. Diversions fall under the same authority; however, they are considered a major 408 action. The role there is to ensure that the federal investment is not negatively impacted. With river diversions, we are removing or degrading sections of the main line of the Mississippi levee that provides flood risk management. The impact through the permit application would certainly have to be considered through the 408 process. This approval is at the headquarters level with Mr. Steven Stockton who was delegated that authority from the Assistant Secretary of the Army Civil Works. He makes the ultimate decision on the major 408 actions. Also, a Department of the Army Permit, that is Martin Mayer, he ultimately can't make a decision with the command of the New Orleans District until a decision is made on the 408 major activity. They do have guidance on the section 408 major process. They also have the diversion principles that Barbara covered in greater detail that have been provided to the State by General Peabody. They have also developed an application users guide specific to lower Mississippi River diversions which has also been provided to the State along with flow charts etc. As of now, the state has provided two permits, one is Mid-Barataria and the other is the Maurepas Diversion. For the Mid-Barataria, he noted key dates such as the permit application was submitted in July 2013 and shortly thereafter was the request to begin 408 activity in August. They are in the midst of reviewing early engineering work that is being provided to them through the State and are also working with the State to move forward on the required environmental document. He stressed that there are two major components of the 408 review which includes the technical work that Barbara has gone through. They will have to package that up to make a recommendation to the commander as well as the MRCMVD and their headquarters office. Along with that package, environmental documents are included. Mark talked about the need for funds. The Corps is working with Bren and Kyle Graham to figure out how to fund these major 408 reviews. They are going to be expensive and that is a hurdle.

The second application is the Maurepas Diversion and is a much smaller diversion somewhere between a 3,000 to 5,000cfs vs Mid-Barataria which is around 75,000cfs. The permit application dates pretty much track those of the Mid-Barataria.

Mark's next slide showed the impacts of the proposed Mid-Barataria Sediment Diversion Project. The slide noted the proposed channel location with 75,000cfs located in Plaquemines Parish discharging into the Barataria Basin. He reviewed some of the impact concerns notably the shoaling impact on the Mississippi River, an active permit application for the RAM Terminal, and the Corps' federal project that will have to go through and pierce structures already in place and last but not least maintain the purpose of the main line Mississippi River levee. He gave examples of going through a state highway, a railroad, and another federal levee project called the New Orleans to Venice Project. In addition, he noted that the project really gets interesting when they start discharging water into the basin and have to evaluate those impacts. So again, not only do they have to understand the engineering opportunities and challenges but also the environmental side as well. He showed another graphic in profile not only is it the structure once it is constructed but even during construction including cofferdams, how high guide levees need to be, where the railroad and state highways need to go, and some type of back protection for hurricane storm damage risk production system on the New Orleans to Venice Levee Project.

There were a number of federal projects potentially affected by planned State of Louisiana diversions. Some noted were dredging projects on the Barataria Bay waterway, projects in Grand Isle as well as other projects that they also have to consider how the diversion might impact that project. This concluded his presentation.

Rick Hartman asked whether 408 or 404 will be evaluating heavy metals in Lafitte on the estuary side and the impacts of the diversion. Mark replied that it would be reviewed in the permit application and the due process application. He explained that they have one project, one design, and one environmental impact statement. Whether it is 408 or 404 they have to figure out what those processes and impacts are. Mark stated that he failed to mention but Barbara touched base on in terms of the portfolio is how a system of diversions impact the receiving area as well as the river. It is not about the construction of the project but about the operation of the project that should concern us through the permit process. Rick asked if the user's guide would be shared with federal management resource agencies and Mark replied that that would not be a problem. Kerry asked if they were examining the effects of Myrtle Grove on the flow in the Gulf Intracoastal Waterway. Mark said that they would definitely have to study those impacts because the GIWW is within the modeling footprint. They are working with the State using a number of tools one being the hydro tool, Mississippi River delta management tool, 3D models, and ADH models that should be covering that particular area. It was asked if the state has a flow rate of maximum discharge in the permit application. Mark looked to Bren for a response on the Mid-Barataria application. Bren replied that it was an up to, but he confirmed that they have been using a 75,000cfs at this particular time. Mark made it clear that it is not the intent to flow 75,000cfs 7 days a week 24 hours a day 365 days a year. Michael Massimi questioned if 75,000cfs was for the permit plan. Mark replied no. For the permit process, they would need an operational plan.

Barbara stressed that one thing they discussed a lot is not basing it on flow even though it is most commonly talked about. They are basing on sediment load of the Mississippi River because one of the things beautifully illustrated during the 2011 flood is that it is usually the first flush that has the high sediment load. More sediment was carried during the 2011 flood in March than the big flood in May. USGS installed a probe in Vicksburg to try to understand what the sediment flows are in the river. Discussion followed regarding locations of gauges along the river.

John Tesvich stated that from a commercial fisheries stand point, he felt that a diversion is a weapon of mass destruction or certainly has the potential to be. From past experiences seen with Caernarvon and Davis Pond, one management plan was started but constantly changing. He felt that in the wrong hands, it could have horrible economic impacts. Mark responded that they were working with the State for the first round of scoping meetings within the next two months and that these comments would be welcomed.

Kris Peterson asked if the effects of climate change and the change of water amounts from tributaries were being looked at. Barbara responded that a few weeks ago they met with a representative from Great Britain, who has the leading climate change model in the world. Unfortunately, many of those climate change models are not great in terms of saying what will happen. They are doing model runs that will bracket the possibilities for climate change over the next 50 years and how those changes will impact operation of a diversion.

Kerry asked Barbara if the 250 acre per year estimate for Wax Lake was based on 1983 until now. She confirmed that it was. Kerry stated that the accreting delta at Wax Lake was constantly being used as a comparison of what was possible from the Mississippi River. He asked if that was a fair comparison. Barbara felt that if it was a comparison, then it was cause for concern. We have to learn from that — what has been the geologic process; what are the water depths; and what are the things that could have been done differently if our intent was to use that as a land building structure. Kerry asked if she thought we could get the same thing that we got at Wax Lake at Myrtle Grove using the same volume diversion. She explained that the sediment at Wax Lake is very similar to what we see in Belle Chase. Andrew Barron asked if anyone had calculated what they thought they should be getting as opposed to what they are getting. Her response was that she remembered hearing that Wax Lake was only capturing 10-20% of the sediment from the outlet but that was completely anecdotal but a very legitimate question. Darin Lee asked for clarification on the 250 acre per year average is of emergent marsh in the delta itself. That doesn't count preventing land loss so there are some factors possibly not captured in that 250 estimate. Bren thanked the corps for their presentation and noted that there are many questions that need to be answered. The State recognizes that and is working in coordination with the corps to answer those questions. He felt that one of the things not discussed was the level of acceptance regarding the impacts. One thing addressed was the impact on brown shrimp. If brown shrimp are affected in some way at a certain location, is that not ok, how much is ok, how much is not ok, and how much is ok in correlation with how much land is built or saved. He stated that they were on the same page with some of the diversion principles and do not want to do anything to jeopardize our flood control system or navigational system.

B. "Proposed Diversions in the 2012 Master Plan – Caveats and Questions" – Michael Massimi, BTNEP Invasive Species Coordinator (30 Minutes)

The genesis of this presentation was to present BTNEP's view on diversions to a new scientific advisory panel that the Water Institute of the Gulf (TWIG) had established to guide them in developing/implementing diversions in the Master Plan. With 15 minutes on the agenda, BTNEP took the opportunity to encapsulate everything mainly the caveats and questions of what was being presented in the 2012 Master Plan. He stressed that this was in no way throwing darts at the Master Plan. He commended the folks who put together the 2012 Master Plan and stated that it was probably the best effort to date put together by the State and that BTNEP greatly appreciated the fact that we have a Master Plan.

The panel was purposely selected with people from outside of Louisiana to give a fresh perspective to the Water Institute of the Gulf; however, some had ties to Louisiana. The panel is not regulatory. He stated that he did not coordinate with the corps but there is overlap in the presentations. Both of these presentations were given to the panel last month. He gave the panel information about BTNEP covering establishment under Section 320 of the Clean Water Act but stressed that he wanted the panel to understand that it is a consensus based grass roots bottoms up organization. He explained how he talked to them about the CCMP, action plans, and how BTNEP was one of the first groups to push diversions. Hydrologic restoration and freshwater sediment diversions are Ecological Management Action Plans I and II in the BTNEP CCMP. BTNEP gets colored as anti-diversion a lot and nothing can be further from the truth. The reason for that is that the concept of diversions has gotten much bigger over the years. At these scales, the program has encountered a lot of impacts and a lot of push back especially sociopolitical pushback. Obstacles to implementation usually increase with the scale of the plans and that is where the program is today. He showed a map of proposed diversions from OCPR in 2006 that were much smaller. There were plenty diversions and many of them were pretty small. Myrtle Grove was listed at 15,000 cfs and many were listed at 1,000 but most listed at a few thousand. He compared that to what is listed in the 2012 Master Plan ranging from 1,000 to 250,000 CFS. He noted that he was gratified to hear that they are now looking at a range of about 75,000 cfs for Mid-Barataria in comparison to the listed 250,000. He explained that when people open up the 2012 Master Plan and look at some of these numbers it is scary for those who live in the estuary outside of the flood protection systems. These numbers look like you are going to flood people. The folks who are writing the Master Plan are doing their due diligence to correct this for 2017 but felt that much of this is a PR issue. The folks with the State do not want to flood or scare anyone but by 2017 will have a much firmer grasp on the discharge they are looking at.

Diversions are supposed to put nutrients and sediment back into the wetlands but he questioned what the caveats are. He pointed out that it takes decades before land building gives coastal communities any appreciable storm damage. In the models being run for the Master Plan which look out over 50 years, the diversions come online in year seven. Some argue if this is realistic. The existing diversions in the state today, Caernarvon and Davis Pond, took much longer than that from proposal to flowing water. Abrupt changes to salinity regimes will impact fisheries, especially

the oyster fishery. These are costs that need to be calculated and he wasn't sure if they were calculated into the 2012 plan. There is the possibility of excess nutrients may weaken root systems of marsh plants. There is conflicting information out there regarding this so better control studies still need to be done. Large diversions are going to alter habitat to favor fresh water environments and a majority of our invasive species are going to benefit from that. Asian Carp are spreading because of flood control diversions that were opened up. Many invasives took a good hit with the freeze but haven't gone anywhere permanently. Invasive species was not an issue that was addressed anywhere in the 2012 Master Plan. Natalie Snider of CPRA did approach him wanting to address invasives but asked how to do it. He felt that BTNEP needs to work with the State to address this issue by 2017 and to apply these costs as they should be calculated. Induced shoaling must be accounted for in planning and long-term cost estimates also. Increased flood risks to communities should be of great concern. The costs to mitigate potential increased flood risk were calculated but another set of costs that weren't calculated were land easements rights-of-way, relocations, or disposals (LERRDs costs). For large scale projects with big real-estate footprints, these costs are going to be very expensive. When comparing costs of projects, all of this is about alternative analysis. Here is where BTNEP feels that we know what a diversion can do but can we do it better with fewer impacts for less money or more money with fewer impacts. This needs to be balanced out as we move toward the 2017 plan.

Another big concern is switching habitats to fresh marsh systems that are then susceptible to storm damage and salt water slugs that come in with storms. This happens in the late summer and fall and ideally for us the water is low during hurricane season. If we had a hurricane during a high river period it would mean serious trouble for us. He compared a hydrograph in New Orleans at Carrolton to the Davis Pond Diversion near Boutte during the exact same time period with a relatively low river and it showed that the David Pond diversion cannot flow when the river is below 2.5 ft in New Orleans. The river drops below 2.5 feet in New Orleans with some regularity. This indicates that the six diversions below New Orleans would be unable to flow even more often because of head differential. He showed that from January 2005 – July 2012, there are periods of a couple of weeks to several months where the river is too low to move water through Davis Pond which means it is too low to move water at any diversion below Davis Pond. The average stage of the river is lowest in late summer and early fall which is during the peak of hurricane season when the coast is most likely going to experience saltwater storm surges. Salt marshes can take fresh water but fresh wetlands can't take salt water, not for any length of time. He showed a USGS image indicating that storm damage was most severe in areas of freshwater input. This is mainly due a lack of consistently flowing freshwater. He talked about the Wax Lake Outlet and questioned if it was a fair analogy for Mississippi River diversions. It was dug quickly with little opposition. There is no control structure, so no one can argue operation, no communities to flood, and very few user or fisheries conflicts. A big point noted was that is has been continuously flowing for 70 years with very high peak flows from 100,000-200,000 cfs and in 2011 up to 300,000 cfs. He reviewed the pros and cons of diversions. BTNEP believes that diversions are an excellent sustaining strategy, but to use them as a backbone of a master plan as land building strategies is seriously questioned. He stated that given enough time, they can build some land and summarized the points that had already been made.

Michael addressed diversions with sediment delivery projects. Wetlands, islands, and ridges can be restored with this system possibly using some of the same infrastructure. When comparing the two, an acre today may be better than an acre tomorrow. He asked what would be the value of having restoration that you can walk on and plant on and watch plants grow on within a few years between proposal and completion of a project. What would be the benefit to coastal communities with storm protection relatively quickly with marsh creation projects? What is the time lag on a diversion project? He posed the question is an acre better here than an acre there? The down side to pumping sediment is that it gets more expensive as you go out but the benefit is that you can put the sediment exactly where you want it. You can strategically decide where you want restoration. Diversions are relatively limited graphically to the outfall of the diversion. There are also fewer user conflicts and obstacles to implementation. Implementation is what we all want. The Master Plan spends the biggest chunk, 20 billion dollars, on marsh creation and in about 50 years we get about 250 square miles of restoration out of marsh creation with some subsidence over the period ending with approximately 200 square miles. It is quite the opposite with diversions. The trajectory is upward ending up with 300 square miles. Spending 20 billion dollars to get 200 square miles with marsh creation or spend 3.8 billion with diversions to get 300 square miles. He felt that there are a lot of costs that go into water diversions that were not calculated such as land easements, right-of-ways, mitigation, and real-estate costs. Likewise, if there was a holistic program of restoration dredging, would cost come down. He noted that there are 41 marsh creation / barrier island projects with separate planning in the Master Plan. If some of the planning was piggybacked and infrastructure reused then costs would be brought down. According to the Third Delta Phase 2 Report commissioned by DNR years

ago, over 400 square miles could be gained in 50 years using five dredges. Those however were pre Katrina costs. Many color this report as being out of date but it was thrown in their for comparison purposes.

The big questions for 2017 are how much water can be diverted without wiping out fisherman or flooding communities, better resolution is needed on basin-side water levels because where is water going to stack up, and how do we transition marsh creation from a series of projects to a strategic program of restoration dredging. We need for all habitat types to be restored, not just freshwater-dependent ones. We need to maintain healthy salinity regimes to allow our fisheries culture to exist and it is the landscape restoration that allows coastal communities to exist. Michael ended his presentation by raising the question who are we restoring for.

Michael was asked how he felt his presentation was received when previously presented. He responded that he felt it was well received and definitely saw many interested faces on the panel. Panelists seemed to have a good grasp on sociopolitical impediments indicated by questions regarding other presentations. They seemed to care about folks on the coast and where the footprints of these projects are going to be. That theme seemed to come up several times.

John Tesvich stated that the master plan talks about transition and displacement, but have not put a value on that. The State needs to look at how that affects the community. If you don't have the fisheries, then the fisherman won't be spending money in the community and there is a chain reaction. The affects will be more widespread than just the effects of the fisheries.

Bren Hass stated that he looked forward to working with BTNEP on addressing the invasive species issues. He referred to Michael's reference to converting habitats and salinity impacts and would that apply to a system of smaller diversions in comparison to fewer larger scale diversions. Michael confirmed that that would be true if you do not have enough head to move a big diversion then the same would apply to a smaller diversion. Kerry noted that you can't look at a water tool alone. Smaller diversions would be used to sustain marsh creation. The estuary program is not looking at diversions as a land building tool, but as a land sustainability tool. Bren's also questioned what is a healthy salinity regime. He felt that many in the room had their own opinion about what that level should be. Kerry replied that in his 40 years of experience the question has always been to what level do we restore. We could never dream about restoring to 300 years ago. At what time period did we have adequate hurricane protection and a healthy estuarine system? He felt that a 1956 landscape was an excellent place to start. Rick Hartman agreed that BTNEP is not only about resources, but also about culture. One thing they were trying to push both through the management plan as well as comments to the corps on diversions is to try to get a good handle on what is doable and find out what is sustainable. In terms of landscape, Rick noted that lower Plaquemines Parish was dropped out of the master plan because it may not be sustainable. We need to protect user groups and the marshes that we can. We shouldn't look at a number but at what science tells us. We need to do as much as we can without damaging too many people. Kerry ended discussion by reminding everyone the reason behind Michael's presentation which is who are we restoring for. The CCMP that we all developed was developed according to a broad range of science and then passed through the wisdom of the people. It is a combination of science, technical aspects and the socioeconomic impact.

C. "Mississippi River Sediment Delivery System – Bayou Dupont (BA-39) Construction and Monitoring" - Danielle Richardi and Peter Hopkins, CPRA, New Orleans Field Office (30 Minutes)

Peter Hopkins explained that Bayou Dupont was a project completed in 2010 into a 500 acre receiving area. He showed images of the site from pre-construction to completion. His presentation included images of the dredging equipment and gave a brief description of how the equipment worked. The dredge power plant utilized six generators totaling 18,000 horsepower that burned 10,000 gallons of diesel fuel per day. He explained and provided photos of the slurry pipeline from the dredge to fill area consisting of floating pontoon line, sub-line, booster pump, crossings, welded joint pipe, flanged joint pipe and stabbed distribution pipe. Inside the receiving area containment dikes were constructed to keep sediment from flowing out into open water. He showed the multiple distribution lines that helped speed filling of the area. He explained that sediment flows approximately 300 feet and dozers have to come in and move the sediment as needed. The original project was 484 acres at a cost of 20 million dollars. Increment two was 84 acres at 4 million dollars. See presentation for more details. Alma Robichaux questioned the time it took to build the 568 acres. Peter responded that it took five months with some down time. Kerry asked about the distance. Peter responded five miles to the fill site and then another mile to the farthest extension. Alma asked if there was any significant change in the river noted. Peter did not have an answer to that but did state that 3.7 million cubic yards were taken from river. Darin Lee responded that from and engineering and design process the project had to be

modeled with the corps and none was noted. Peter stated that this particular borrow area was just about full and was going to be used for another project. Discussion turned to marsh elevation and subsidence of the project. Alma asked if there was any degradation since 2010. Peter responded that they have been inspecting it annually and the vegetation is growing and he turned the presentation over to Danielle Richardi.

Danielle explained that CPRA monitors projects that project goals are being met, to assess adaptive management should be implemented to reach desired outcome and to gather data that can be useful for similar restoration projects in the future. The goal of BA-39 was to create sustainable marsh in an area that was primarily open marsh using sediments dredge from the Mississippi River. The specific objects were to create 372 acres of marsh and to nourish 99 acres of remnant marsh. She reviewed monitoring elements and showed images of monitoring stations. She too showed pre-construction imagery. She covered land-water analysis from November of 2012. It showed that we currently have 458 acres of land with some water retention in spots. They have seen the same with previous marsh creation projects where it took several years for those areas to fill in with plants but they have completely filled. She noted that it will be interesting to see if the same will happen with this project. Danielle explained the marsh fill and sediment curve developed for this project. Very rapid settlement was seen in the beginning and the marsh fill was +2 feet +0.3 feet and the actual target elevation was set at 1.3ft. It is estimated that they will reach that elevation at year 10 and at year twenty to drop to 1.2ft. The target for this project was based on nearby elevation of spartina marsh and at 1.3 they will be getting the proper flow of water to support the type of marsh community desired. For this project, there were two plantings which included 21,000 plugs of spartina and 5,000 of paspalum. Vegetative surveys indicate that the top three species being observed are paspalum, distichlis, and typha and the total cover increased from about 40 percent to 64 percent. In conclusion, 458 acres of land have been created in the project area. The next analysis will be in 2018. Sediment is generally settling and is higher in some areas. Sediment is very inorganic but will change over time. Vegetative cover is increasing and though it is different from the local marsh community, it will likely transition over time. She provided a snapshot of CPRA's website where reports are available.

NEW BUSINESS

There was no new business discussed.

ADJOURN

The meeting adjourned at 12:30 p.m.