Fw: Barrier Report Emails

Barbara W Wainman To: Kendra Barkoff, Matt Lee-Ashley, Rodriguez, Julie, Betsy Hildebrandt 06/17/2010 10:01 AM

Cc: Suzette M Kimball

More email confirming our approval of the berm report

Barbara W. Wainman
Director
Office of Communications and Outreach
US Geological Survey
119 National Center
Reston, VA 20192

(703) 648-5750

----- Forwarded by Barbara W Wainman/DO/USGS/DOI on 06/17/2010 10:00 AM -----

From:	Vic Hines <vhines@usgs.gov>
To:	Barbara Wainman <bwainman@usgs.gov>
Date:	06/17/2010 09:55 AM
Subject:	Fwd: Barrier Report Emails

Barbara,
Paul followed up our discussion by forwarded the below chain FYI.
Vic

Vic Hines
Office of Communications
U.S. Geological Survey
Cell: 808-285-2833
vhines@usgs.gov

Begin forwarded message:

> **From:** Paul Laustsen <plaustsen@usgs.gov>
> **Date:** June 17, 2010 6:51:44 AM PDT
> **To:** Vic Hines <vhines@usgs.gov>
> **Subject: Barrier Report Emails**
>
> Vic,
>
> This doesn't say much... here's the original request to Bill and then an email to AB, from me, saying that it was approved. Bill handed me the report back and told me it was approved. I'll go look for it in my bag and see if he wrote anything on the report itself.
>
> Talk to you in a bit,
> Paul
>
> Begin forwarded message:
>
> > **From:** Paul Laustsen <plaustsen@usgs.gov>

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Date: May 28, 2010 7:43:42 AM PDT
To: Anne-Berry Wade <abwade@usgs.gov>
Bcc: Paul Laustsen <plaustsen@usgs.gov>
Subject: Approved

AB,

Approval on the Barrier Island's report. :) THanks for your patience!

Paul

Paul Laustsen
Unified Area Command
Deepwater Horizon Response
Joint Information Center Social Media Team
@Oil_Spill_2010
plaustsen@usgs.gov
1-713-323-0572

Begin forwarded message:

From: Paul Laustsen <plaustsen@usgs.gov>
Date: May 26, 2010 3:51:52 PM PDT
To: Bill CDR Travis <bill.travis@uscg.mil>
Cc: Anne-Berry Wade <abwade@usgs.gov>, Marisa Lubeck <
mlubeck@usgs.gov>
Bcc: Paul Laustsen <plaustsen@usgs.gov>
Subject: Barrier Report

Hi Bill,

The USGS wants to release a report tomorrow about the Barrier Islands.

It doesn't talk about BP, it doesn't talk about the well. It talks about the sand berm, long term monitoring, bathemetry of the waters surrounding the Islands, and talks about where the sand is.

It has been peer reviewed and briefed to US. F&WS and Salazar's office. The Corp of Engineers have also been involved in discussions, but not formally briefed.

USGS plans to release this as all other scientific reports are. No special treatment.

Please let me know if you have any concerns.

Please see attached.

Paul

Paul Laustsen
Unified Area Command
Deepwater Horizon Response

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Joint Information Center Social Media Team
@Oil_Spill_2010
plaustsen@usgs.gov
1-713-323-0572

Begin forwarded message:

Barrier Island Defense.doc

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USGS Fact Sheet: Barrier Island Defense: effects of building a barrier berm to mitigate the effects of oil on Louisiana marshes from the Deepwater Horizon oil spill

Background and potential sand resources

The State of Louisiana requested emergency authorization on May 11, 2010, to perform "restoration" work on the Chandeleur Islands and also on all the barrier islands from Grand Terre Island eastward to Sandy Point to enhance the capability of the islands to reduce the movement of oil from the Deepwater Horizon oil spill to the marshes. Building a barrier berm to protect the mainland wetlands from oil is a new strategy and depends on the timeliness of construction to be successful. Prioritizing areas to be bermed may increase chances for success. For example, it may be easier and more efficient to temporarily berm the narrow inlets of the section of coast to the west of the Mississippi River Delta temporarily than the large expanses of open water to the east of the delta in the southern portions of the Breton National Wildlife Refuge. This document provides information about the potential available sand resources and effects of berm construction on the existing barrier islands.

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The proposed project originally involved removing sediment from a linear source approximately 1 mile gulfward of the islands and placing it just seaward of the islands in shallow water (~ 6" where possible) in a continuous berm. Discussions within the USGS and with others determined that point source locations, such as Hewes Point, the St. Bernard Shoals, and Ship Shoal, were more suitable borrow locations since there is insufficient sand content along a linear track offshore from most of Louisiana's barrier islands (Figure 1). Further, mining sediment near the toe of the platform or edge of actively eroding barrier islands could create pits in the seafloor that will capture nearshore sand enhancing island erosion, and focusing incoming waves (through, for example, refraction) via creating hotspots of erosion. In the Breton National Wildlife Refuge, the berm as proposed would be continuous from the northern point just south of Hewes Point to Breton Island with the exception of several access points, and would rise approximately 6' above the water line and 300' wide at the base and have flanks that slope to the seafloor at gradients of 25:1. The proposed structure in the Breton NWR would require approximately 56 million cubic yards of sandy material. In the west, the berm would require approximately 36 million cubic yards of sand since there is less open water than to the east of the delta. The berm as planned is intended to protect the islands and inland areas from oil and will be sacrificial, e.g., it will rapidly erode through natural processes. It is not part the coastal restoration plan long discussed in Louisiana of rebuilding barrier islands for hurricane protection of mainland infrastructure and habitat.

Sand resources along coastal Louisiana are exceedingly scarce. Most suitable borrow material exists as point sources within modern littoral deposits, or buried fluvial deposits (Figure 2). For the Breton Sound segment of the berm project, the permit application recommends that sediment be mined from Hewes Point for the northern portions of the berm and St. Bernard Shoals for the southern portions of the berm in the Breton NWR.

Sand resources along coastal Louisiana both east and west of the birdfoot delta are exceedingly scarce. Studies of the Louisiana inner shelf show that most suitable borrow material exists either as point sources within modern littoral deposits, or buried fluvial deposits associated with earlier stages of delta formation (Figure 2a and 2b). The following paragraphs highlight the sand sources that may be most suitable for berm construction.

East of the Mississippi River Delta in the Breton Sound segment of the berm project, the permit application recommends that sediment be mined from Hewes Point for the northern portions of the berm and St. Bernard Shoals for the southern portions of the berm in the Breton NWR (Figure 2a). Hewes Point is an actively prograding spit that extends north of the Chandeleur Island chain. Analysis of geophysical and core data indicate that the spit contains 379×10^6 m^3 of sediment in total, and has a maximum thickness of 8.9 m (Figure 3). The core of the spit contains 97% well-sorted very fine-grained sand, decreasing to 90% 3.5 meters below the sea floor. Sand content also decreases to 50% along the flanks of the spit. Hewes Point has prograded northward over the edge of older delta platform deposits into deeper water, thus providing a sediment sink. Material contained within Hewes Point will likely not be returned to the littoral system naturally (Flocks, 2009; Twichell 2009)

The St. Bernard Shoals are a group of 61 individual sand bodies located in 20 meters of water approximately 25 km SE of the Chandeleur Islands. The shoals contain an estimated 200 x 10^6 m^3 of fine-grained, well-sorted sandy sediment. Individual shoals consist of as much as 97% quartz sand, but sand content decreases to 20% at the flanks and between shoals. The shoals share a common fluvial source to the Chandeleur Islands, and characteristics of sand from both Hewes Point and St. Bernard Shoals are similar to sand found on the barrier islands shoreline (Rogers and Kulp, 2009).

Hewes Point and the St. Bernard Shoals provide a finite amount of high quality sand material for restoration purposes. Removal of these sediment reservoirs for short-term protection of the barrier islands will reduce the amount of good-quality borrow material available for future long-term coastal restoration projects.

West of the Mississippi River Delta, the berm proposal includes a component along Louisiana's southern barrier island shoreline. Due to the fine-grained nature of the deltaic deposits, there are very limited amounts of sandy material in the area. The proposal recommends shoreline protection from a berm extending from Timbalier Island to Sandy Point. The western third of this area is composed of the Lafourche headland. The headland's shoreline is composed of prodelta mud and beach ridge sands. In the offshore area, the beach ridge sands have been reworked to form a thin transgressive sand layer overlaying the prodelta sediment. There is limited sand beyond the shoreface and none of the available sand meets the minimum criteria for berm construction (Kindinger and others, 2001; Kulp and others, 2006).

East of the Lafourche headland, from Caminada inlet to Grand Bayou Pass, the shoreline contains ebb-tide delta and shore face/barrier deposits that provide sandy material to the

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offshore. These deposits produce distinct sand packages in otherwise fine-grained shelf and deltaic deposits. There are potentially two surficial sand resource deposits in this reach, the distal ebb-tide delta deposits at Barataria and Quatre Bayou Passes. From Pass Abel to Sandy Point, two sand bodies (one surficial and one with overburden) are potentially available for berm construction: Empire and Sandy Point. A third (Scoffield) has recently been mined. The distal portion of Empire has potential. The best sand body of this area in proximity of the shoreline is Sandy Point. Sandy Point Sand Body is the largest and geomorphically most complex of the nearshore sand bodies. The Sandy Point Sand Body is overlain by 8 to 13 ft (2.4 to 3.7 m) of sediment. This overburden consists of numerous buried distributary channels filled with interbedded sands and clays. The large main sand body of Sandy Point has 20 to 30 ft (6.1 to 9.2 m) of 60 to 80% fine sand (Kindinger and others, 2001).

Issues related to the sand berm

Numerous considerations have been identified by the USGS and collaborators that must be addressed when proposing an alteration of the shoreface configuration:

- In light of the enormity of this project, it is critically important that the sand berm is constructed in a timely manner to ensure success. The most efficient means of achieving success will rely on prioritizing segments to be built in terms of potential ecological impacts.

- A second factor in priorizing is difficulty of construction. For example, after the recent hurricanes, barrier islands no longer form a continuous chain from the northern tip of the Chandeleur to Breton Island near the bird's foot delta. Even prior to hurricane Katrina approximately 50% of this reach was open water that the berm is intended to span. Here, the berm will be particularly vulnerable to destruction during low intensity and stronger storm's surge and waves. Building the berm in these open water areas will also require more mined sand to build the structure 6' above sea level, as designed.

- Studies of the Chandeleur Islands have shown that exceptionately large coastal changes can occur during storms (Sallenger, 2009) (Figure 4a). During even relatively low intensity storms it is likely that the berm material will be overtopped by waves and sand driven onto the island and possibly into the back bay (see for example the overwash of the Category 1 Hurricane Lili during 2002 or the Category 2 Hurricane Ike in 2008, (Figure 4b.). Such overwash during storms could transport oil and sediment across the island and into the back bays toward the mainland.

- East of the Mississippi River Delta, reduction of inlets during berm construction will reduce the capacity of the inlets to handle the amounts of water exchanged by tides. Flow velocities will be rapid, and changes to the berm and islands will result. Salinity gradients and turbidity concentrations within the back-barrier bays will be altered, affecting the present ecosystem.

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- With the profoundly fast timeline needed to provide oil spill protection, care must be taken to provide sufficient oversight and information regarding the adequacy of the borrow sites, and the positioning of pipelines and other obstructions that if damaged could exacerbate the ongoing spill, the effects on marine habitats, and the possibility that storms may remove the berm so quickly that it does not serve its intended purpose.

- The sand berm is intended to be sacrificial and although redistributing material with in the system as it degrades will be beneficial in the long-term, this project should not be confused with, and will not have the longevity planned, for true barrier island restoration.

- Sand resources along the Louisiana coastline are scarce. The excavation of this material for use in the emergency berm placement may compromise future coastal restoration efforts by reducing these resources. Efficient and well-managed extraction and placement of these resources will be necessary.

- Under these emergency conditions with no time for adequate environmental assessment, long-term issues of concern include (1) entrainment of oil in the sediment plume created during dredging operations, (2) sequestration of the oil in sediments only to be released years later, and (3) anoxic conditions in the borrow placement areas. Monitoring will allow characterization of these potential conditions.

Long-term monitoring

Finally, we recommend long-term monitoring of the berm to determine its performance and possible impacts and or benefits to the surrounding environment. Repeated surveys to update bathymetry, topography, sea bed characteristics and sea-bed images along with sediment sampling, should be done to document changes through time. The observations and analyses will provide data needed to identify movement of oil and oil-degradation through the system, determine impacts, and identify the processes involved. For example, monitoring changes in barrier topography, and bathymetry along with analyses of sediment cores and oil-residue changes will show linkages between oil mobilization and sedimentary processes. Monitoring turbidity and salinity within the back-barrier environment either remotely or in situ using boat-mounted sensors will provide proxy information on estuarine health.

Figures

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Figure 1. Location map of shoal features discussed in this document (a, top) east and (b, bottom) west of the Mississippi River Delta.

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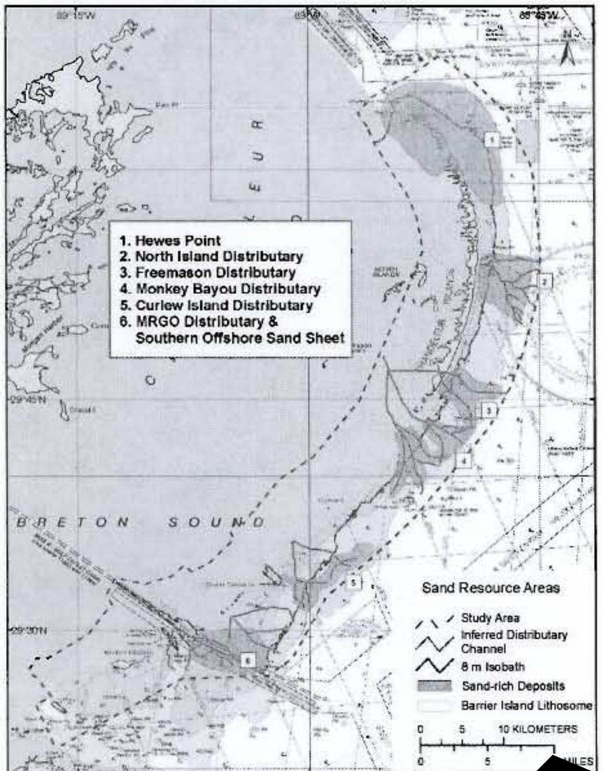

Figure 2a and 2b. Potential sand-rich resource sites to the east (a) and west (b) of the Mississippi River Delta.

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Table 1: Statistical summary of the twelve sand source bodies in the Chandeleur Island study area. Sand-rich deposits in bold are potential sand resource sites and the number corresponds to the sand body locations in figure 2.

Sand Source Body	*Surface area (km^2)*	*Average depth below MSL (meters)*	*Volume in millions of cubic meters; assuming 2 m thickness ($10^6 m^3$)*	*Volume in millions of cubic meters; based on cores and seismic ($10^6 m^3$)*	*Volume in millions of c. meters per u area of the barrier lithosome ar ($10^6 m^3$/km*
Hewes Point (1)	118	-7.0	236	379	3.2
Chandeleur Island	188	-3.3		284	1.5
Curlew Island	129	-4.5		220	1.7
Gosier Island	135	-5.7		212	1.6
Southern Offshore Sand Sheet (2)	36	[illegible]	71	75	
Breton Island	107	-4.4		224	2.1
North Island Distributary (3)	15	[illegible]	30	78	
Freemason Distributary (4)	17	[illegible]	34	98	
Monkey Bayou Distributary (5[illegible]	[illegible]	-8.1	44	55	
Curlew Island Distributary ([illegible]	[illegible]	-8.3	20	51	
Gosier Island Distributa[illegible]	4	-5.9	*8*	15	
MRGO Distributar[illegible]	[illegible]6	-6.8	*12*	25	
Sum	751†		455	1641†	
Mean		-6.6			2.0

† The majority (> 50%) of the southern offshore sand sheet is included in the Gosier Island subregion, therefore the sum volume (1641 * 10^6 m^3) and sum surface area (751 km^2) does not include the southern offshore sand sheet.

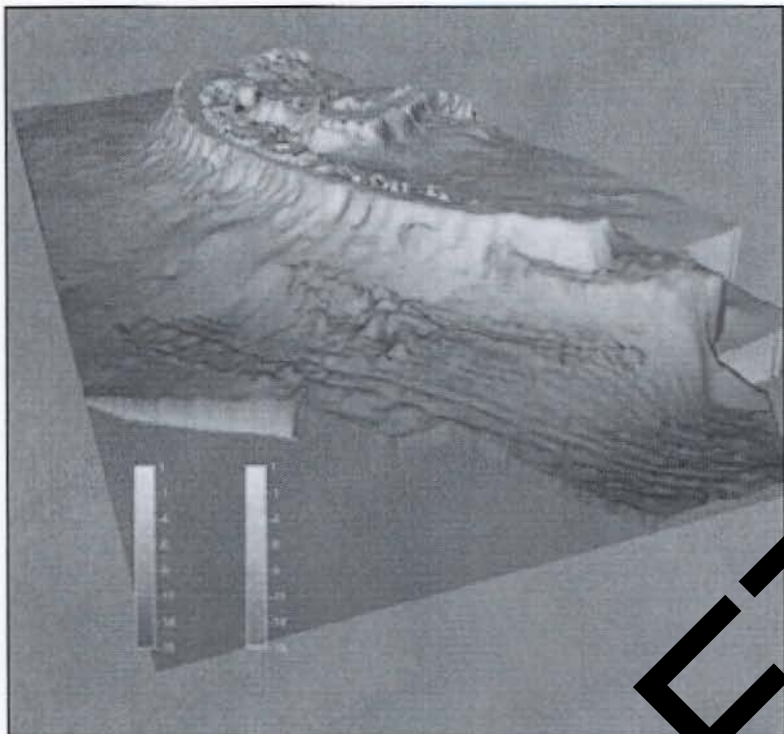

Figure 3. Hewes Point bathymetry map. Comparison of seafloor measurements collected over the past century shows the large accumulation of sediments north of the Chadeleur Islands at Hewe's Point (orange). Littoral processes are transporting sand northward where they are accumulating in deeper water adjacent to the modern barrier platform.

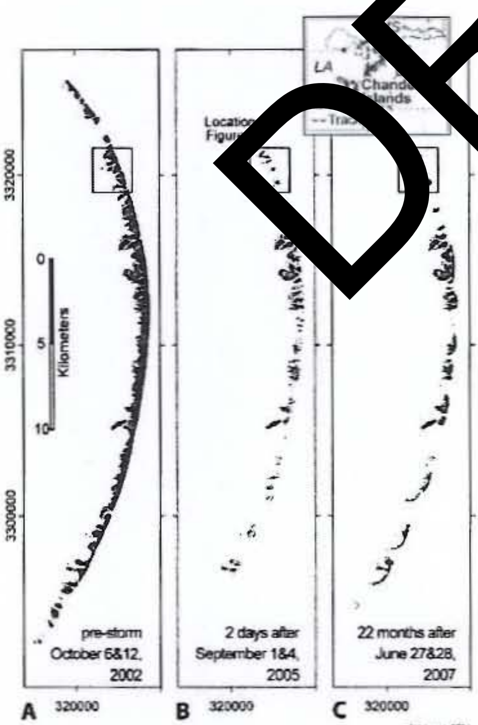

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Figure 4a. Airborne lidar maps of the Chandeleur Islands before Hurricane Katrina, two days after Katrina's landfall, and 22 months after. The islands lost 82% of their surface area during the storm and then struggled to recover (compare 2 days after land fall to 22 months after)(Sallenger, 2009).

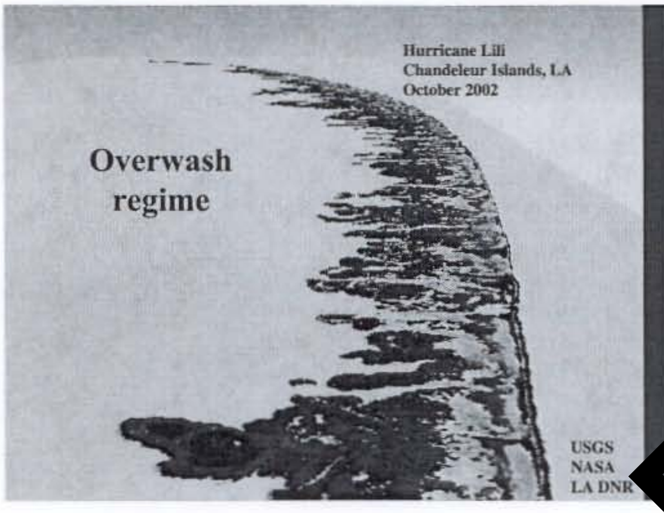

Figure 4b. Airborne lidar was used to map the Chandeleur Islands before and after Hurricane Lili in 2002. The two maps (before and after) were differenced: green is plotted as accretion and red as erosion. Wave runup overtopped the islands and drove the eroded sediment landward.

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