DEEPWATER HORIZON OIL SPILL ALTERNATIVES FOR PROTECTING HERNANDO COUNTY COASTLINE

Purpose: The purpose of this document is to identify different alternatives for protecting the Hernando County coastline from the Deepwater Horizon Oil Spill.

Mission: To protect Hernando County's coastline from any and all impacts due to the Deepwater Horizon Oil Spill. To utilize every resource available to our county to ensure that our coastline and all designated sensitive areas are protected.

Scope of Work:

- Continue to monitor the oil spill in the Gulf and participate in conference calls.
- Determine, to the best of our ability, the extent of the impact to our coast.
- Determine the best strategy for protecting our coastline.
- Keep the citizens of Hernando County informed.
- Work with United Way to establish a volunteer base.
- Continue to work with USCG and DPW to protect areas identified in the ACP.
- Look at areas that have not been identified as sensitive and determine the benefit for protecting Hernando County's entire Coastline.
- Look for alternative funding sources.

Objectives:

- Maintain life and safety.
- Ensure a strong Incident Command Structure for Hernando County.
- Continue to evaluate EOC hours based on possible impact to shoreline.
- Keep all necessary officials updated on situation.
- Ensure that the public is kept informed with accurate information.
- Maintain a working relationship with United Way/Volunteer Florida.
- Work with agencies to minimize the impact to Hernando County.

Issues:

- Turbidity of water due to dispersants and oil components.
- The possibility of an impact greater than tar balls and mousse.
- The possibility of a tropical storm causing oil contaminated debris.
- The uncertainty of response time and response capacity.
- The uncertainty of payment for protective action.

Introduction: The Hernando County Sheriff's Office, Emergency Management Section, is committed to helping the citizens of this county. The Deepwater Horizon Oil Spill has challenged us to find alternative strategies to ensure that the impact to our coastline is as minimal as possible. Since the impact to our coast is unknown, Emergency Management, has been pro-active in identifying areas that could be extremely devastated or destroyed.

The following information is designed to assist Hernando County in compiling a comprehensive plan for protecting our coastline, and warrants further investigation into the viability of these products.

Alternatives and Conclusions:

Heavy Duty Oil Boom

- Suitable for use in open seas, harbors, and semi-sheltered waters.
- Available in sizes varying from 900 to 2000 mm high.
- Available in 50 or 100m sections.
- Constructed of 2 layers of synthetic fabric vulcanized together with synthetic oil resistant rubber outer layers.
- Resistant to the affects of oil and UV degradation.
- Equipped with galvanized ballast chain guaranteeing correct deployment.
- Sits symmetrically in the water which allows maneuverability.
- Quick and efficient inflation.

Oil Booms Open Water

- High buoyancy curtain booms.
- Suited for harbors and open water.
- Meets OPA 90 requirements.

Oil Booms Fast Current & Protected Waters

- Strong versatile containment booms.
- Meets OPA 90 specifications for use in rivers, streams, estuaries and near shore ocean environments where current is a factor.
- Provides high tensile strength through cables.
- Used specifically in fast water applications and towing.

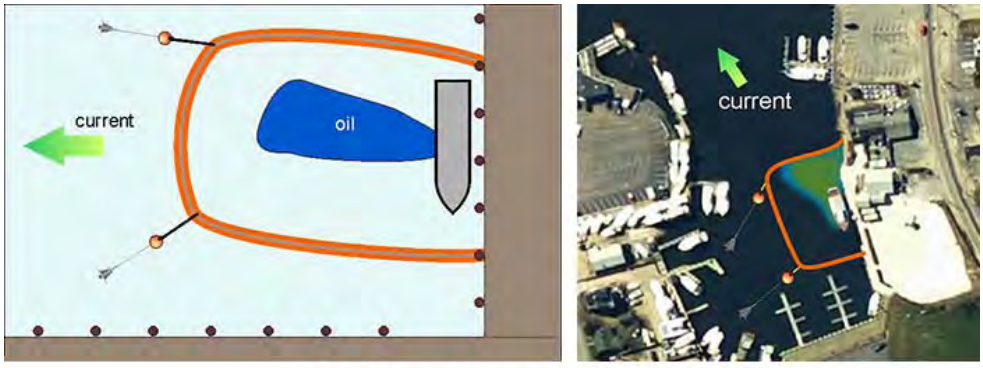
Boom Deployment

- Deployment depends on type of oil spilled, location, weather, time of day, and manpower and equipment available.
- Effective and timely deployment can lessen cleanup time and money.

There are three types of boom deployment:

- Containment
- Deflection
- Exclusion

Containment boom deployment for spill containment requires the placement of a boom in a moving body of water and involves several distinct operations. A simple spill in calm weather along with minimal current movement (<.75 knots) can be contained by stretching a boom across a waterway perpendicular to the path of the spill. Containment boom is also used to encircle or otherwise entrap floating oil so it can be accumulated and recovered at the spill location - a grounded barge, a vessel at anchor or at dockside.



Containment - partial encirclement

Deflection Boom

A deflection boom is used to intercept, deflect, or move a slick towards a more desirable recovery site. Deflection booming is a good option when strong currents are present, which make containment impossible. Entrainment or loss of oil under the boom begins to occur when a boom is placed perpendicular to a current of more than .75 knots. To increase the boom's ability to contain oil in a current, the boom must be placed at an angle to the current. Angling the boom has the net effect of deflecting the slick towards the shoreline where currents may be less severe.

Other Types of Deflection Boom

Cascade Boom

A cascade boom configuration can be used to remove, intercept, deflect, or move a slick towards a more desirable recovery site. Several booms can be deployed in this configuration when a single boom cannot be used because of fast currents or because it is necessary to leave openings in the boom for vessel traffic, etc. A cascade boom can be used in strong currents where it may be impossible to effectively deploy one continuous section of boom. Shorter sections of boom, when used in a cascade deployment, are easier to handle in faster water, thereby increasing safety and efficiency. Additional equipment will be required to set and maintain this system in comparison to the single boom configuration.

Staggered Chevron

A staggered chevron boom configuration can be used in areas with strong currents to remove, intercept, deflect, or move a slick towards a more desirable recovery site. While the closed chevron configuration is used to divide a slick for diversion to two or more recovery areas, an open chevron can be used where boat traffic must be able to pass. In the open chevron configuration the two booms are anchored separately midstream, with one anchor point up-stream or downstream of the other. An inverted chevron can also be used to funnel an oil slick to a marine recovery unit anchored mid-channel.

Exclusion Boom

Exclusion booming is largely a protective measure, the idea being to protect sensitive areas such as marshlands, water intakes and shorelines.

This technique requires the area to be completely boomed off, thereby forming a protective barrier. Conventional oil boom, tidal-seal boom, or a combination of each can be used to exclude spilled oil from a sensitive area. Typically, tidal-seal boom is employed at the shoreline/water interface on both shores and is secured/anchored into position. Conventional oil boom is then connected to the tidal-seal boom and is secured with additional anchor systems to form a barrier and to maintain shape. This technique is most efficient in low current areas. Freshwater outflow from a river or stream may assist in maintaining boom configuration and pushing oil away from the area inside the boom.

Conclusion

Ocean boom is designed for high seas and harbor boom is designed for sheltered waters. The primary difference is the strength of the material, size of the floatation chamber, and depth of the skirt. Hard boom can be towed behind boats and concentrate oil in the apex of the boom to allow for skimmers to recover it. Hard boom can also be anchored offshore of sensitive areas and exclude oil from reaching those locations.

Because booms can fail in winds and strong currents, often multiple rings of booms are placed to protect highly sensitive areas, therefore the amount of boom needed cannot be calculated using the linear miles of shoreline. Shoreline booming strategies are implemented to protect sensitive habitats and minimize the consequences of an oil spill reaching shore.

Once booms are deployed they are time consuming to manage, maintain, and relocate. Boom should be staged and ready but deployed only when verified that oil is approaching your area. That will ensure boom is in the optimal spot for the oil, whether it is the original site, secondary site or tertiary site. Once the boom is in the water, it is difficult to move.

Booming operations are sensitive to wind, wave and currents and need to be tethered and secured to keep from moving. Rough seas can tear, capsize and shred booms. Currents over 1.5 knots or even a wake from a passing ship can also send oil over or under the boom. Untended booms can be a barricade to wildlife. For example, booms can strand on shorelines and become a barrier to sea turtles adults and hatchlings. Boom anchors can damage corals and sea grass beds. Booms also can be a barrier to ship traffic. Marinas and navigation channels need to remain open for response vessels and other commercial traffic.

Silt Fence or Turbidity Curtain

Silt fencing is a temporary sediment control device that is designed to allow silt to pass through but can be used to trap all particles of sediment while allowing some flow to be maintained in a water body. This fencing is generally used on construction sites around areas where the natural vegetation has been stripped and rain water can cause runoff into protected areas. This fencing can also be used in the water to stop contaminated sediment from entering protected environments.

Turbidity curtains are better suited for swampy or marshy areas. They are relatively unaffected by rising floodwater or tide which could damage silt fencing. Turbidity curtains are non-permeable geo-textile cloth curtains that float in a water column, and have flotation at the top and anchoring at the bottom to keep it vertical. This curtain allows all turbid (dirty) waters to be retained within the curtain body. A turbidity curtain should never be placed across a water course, but always parallel to flow.

Conclusion

It is possible that silt fencing or turbidity curtain could be effective along the Hernando County Coastline depending on the type of impact. There would have to be more research done as to the effectiveness of its use in this type of situation. Based on current projections that we are only going to receive tar balls and mousse then it would be in our best interest to explore the ability and cost of these products.

Microbes or Bioremediation

Micro-organisms have been used for many bioremediation processes to degrade pollutants. Ultra-Microbes are cultivated from rugged environments such as volcanic activity or undersea vents. They are then bred and naturally enhanced using sweet Texas crude oil as its only food source.

These Ultra-Microbes will digest oil molecules and break the oil down into harmless byproducts of carbon, carbon dioxide and lipids. This naturally-occurring process is supercharged by adding these specific microbes to any oil spill. It infuses billions of microbes per gram into an oil spill location and within hours these microbes have reproduced from billions per gram to trillions. With Water, oxygen, and an organic food source such as oil these microbes will form vast colonies and digest and remediate oil on and in water, as well as oil on shorelines, beaches, wetlands, and marshes. After ninety days or so, the microbes will have digested and treated as much oil as they can before dying off.

Conclusion

Bioremediation, however, has not proven effective in the Gulf waters. A Florida company developing microbes for bioremediation, says that adding microbes to the site of a spill hasn't worked well before because the microbes haven't been adapted to the specific environment in which they need to survive. They are in the development stage of evolving microbes specifically to survive on oil from the Gulf spill but as of yet have not been successful in producing microbes that can survive. The use of microbes is not only risky but also cost prohibitive since they are at this time experimental.

Application of Sorbents and Solidifiers

Sorbents are inert and insoluble materials that are used to remove oil and hazardous materials from water through adsorption. The oil is attracted to the sorbent surface then adheres to it. Sorbents are made from organic products such as peat moss, straw, cellulose fibers, cork, corn cobs, chicken, duck, or other bird feathers. Sorbents have been known to work in very small oil spills and will not work on weathered oil or tar balls. The viscosity of the oil must be taken into consideration before any type of sorbent is used.

Solidifiers are polymers that have a physical attraction to oil. They have a porous matrix and large oleophilic (strong affinity for oils rather than water) surface area. Solidifiers form a physical bond with the oil. Oil's viscosity increases to the point that the oil becomes solidified into a rubber like solid. End product can range from a firm cohesive mass to a non-cohesive granular material. Solidifiers must have a specific gravity less than 1.00 and should float in both fresh and salt water.

Conclusion

Sorbents and solidifiers will not be effective in keeping Hernando County Coastlines protected due to the their inability to work in large scale efforts and their unknown ability to work on weathered oil and tar balls. Solidifiers or polymers degrade very slowly, and there are concerns that these products could be ingested by wildlife feeding on the water surface or in fauna living in sediments. Currently, there are no standard oil-spill treating agent toxicity test for an ingestion pathway for birds or mammals. There is a concern about exposure to solidified or partially solidified oil that remains in the environment after recovery efforts are terminated.

Skimmers

Skimmers are devices that sit on top of the water and catch oil or free product. A floating weir skimmer is attached to a sump pump and is capable of catching oil and debris and collecting it in a vacuum truck. It is best to connect the skimmer to an oil water separator so that the water that is taken in can be returned to the environment and the oil can be directed to the vacuum truck. Skimmers can be effective in small areas and more than one skimmer and oil water separator would be necessary. In order to make it more effective it would have to be used with boom in place and would have to be placed on the sea side of the boom.

Conclusion

Skimmers would be effective on some level as long as we were experiencing sheen of some sort. They will not be as effective with a tar ball, mousse or weathered oil situation. Taking into consideration that we would need more than one skimmer and oil and water separator the cost for both is in the $15,000 range and a vacuum truck would have to be rented.

Air Curtain Systems

Air Curtain systems can be used for sea wreck, sediment (dredge operations), oil spill and numerous other types of containment, on land and on water. The principle of this system is to release air underwater to achieve velocity. Once the velocity is achieved it will cause all matter from substructure to surface to remain on the surface. The main purpose for using an air curtain is to move a shipwreck from a channel or navigable waterway. Air curtain are also effective when you need to aerate a pond, lake or small body of water. This brings sediment to the surface and increases the oxygen and temperature levels.

Conclusion

As a protective measure from tar balls and mousse an air curtain would not be effective. The oil product that we are expecting in our area will not be on the bottom of the Gulf it will be floating. An air curtain would not only stir up the silt and sediment that is common along Hernando's shores it also has the ability to destroy protected grasses that are part of our ecosystem.

Situation Summary for potential Deepwater Horizon spill response

The following are key points that support immediate action by Hernando County:

1. Emergency Final Order by Florida's governor on May 12, 2010 finds that the Deepwater Horizon spill "has the potential to cause widespread damage" and has created "a state of emergency."
2. The declared state of emergency presents "an imminent or immediate danger to the public health, safety, and welfare to the citizens of the State of Florida."
3. The Emergency Final Order finds that "as a result of the emergency, immediate action by Florida's citizens and governments is necessary to prevent, contain or reduce damage to natural resources and property."
4. This order confirms BP as the Responsible Party for the spill and requires reimbursable activities to be conducted in a manner consistent with the National Contingency Plan (NCP) and the Area Contingency Plan (ACP). This finds that the urgency for action is such that normal procedures for obtaining authorizations must be suspended.
5. This order expedites actions that may be taken related to solid waste management, waters, wetlands, beaches, coastal systems and submerged lands (including booming, fencing and sorbents) and requires coordination with Florida Fish and Wildlife (FWC) on protected and imperiled species.
6. Hernando County has identified approximately 21,000 feet of sensitive shoreline requiring protection.
7. At least one endangered mammal, the Florida Manatee, is directly threatened by the spill. Manatees are protected under the Federal Endangered Species Act, The Florida Manatee Sanctuary Act and Section 12 of the Marin Mammal Protection Act.
8. The NCP and the Oil Pollution Act (OPA) describe appropriate actions, authorities and responsibilities for responding to a release or threat of release of oil. The OPA outlines the following measures:

    a. Authorizes the designated On-Scene Coordinator (OSC) to direct all federal, state, and private response activities at the site of a discharge.
    b. Establishes the unified command structure for managing response to discharges through coordinated personnel and resources of the federal government, the state government, and the responsible party.
    c. Establishes the general pattern of response to be executed by the OSC, including determination of threat, classification of the size and type of the release and supervision of thorough removal actions.

d. Authorizes the OSC to determine whether a release poses a substantial threat to the public health or welfare of the United States based on several factor, including the size and character of the discharge and its proximity to human populations and sensitive environments. In such cases, the OSC is authorized to direct all federal, state, or private response and recovery actions, and may enlist the support of other agencies or special teams.
e. OPA provides funding for response to oil releases under the Oil Spill Liability Trust Fund (OSLTF), provided certain criteria are met. The responsible part is liable for federal removal costs and damages as detailed in section 1002. Agencies assisting in a response action may be reimbursed.

9. Petroleum hydrocarbon contamination of sediments would threaten the proposed Hernando County dredge project, delaying or preventing removal and disposal.

Recommended Actions:

1. File a proposal to the BP, ESIS Government Claims Team, outlining the protective actions that are needed for Hernando County. They have an expedited process for local governments and a mechanism in place to prepay claims for appropriate response activities that are consistent with the NCP and within their established rate schedule.
2. Identify a Subject Matter Expert with proven experience in similar situations, and set up a briefing to develop operational awareness.
3. Develop an Action Plan, including a cost estimate that includes integrated management, preparation, response and recovery components and addresses the specific needs of Hernando County.
4. Submit the Action Plan and cost estimate to BP for advance payment.
5. Implement certain actions such as booming or tar screen installation. There must be longer lead times than the Coast Guards designated 72 hours.
6. Maintain accurate cost accounting for future claims and suits.
7. Designate a qualified Public Information Officer to address media interaction, including regular briefings on progress, setbacks, funding delays, goals and strategies. Include regular updates on whether BP is meeting the funding commitments and how that is affecting the Hernando County response.

Summary

As discussed within this report, there are many different options available for oil spill cleanup, however, few are viable for Hernando County. Our local challenges and concerns, like our immediate neighbors Citrus and Pasco Counties, include:

- shallow coastline
- habitat for protected species
- environmentally sensitive lands
- limited staging areas/limited boat ramps/access
- limited resources (vessels, coastal fueling stations, qualified personnel)
- limited funding

- limited expertise in subject matter

In researching our options and after engaging in lengthy discussions with numerous service providers, the one thing that was consistently evident was their reluctance to provide an actual proposal to protect Hernando County (including both a strategy and estimated cost). There are many possible reasons for their hesitation including a lack of knowledge concerning our coastline, unknown variables including event duration/severity, availability of materials and human resources and issues concerning reimbursement/payment. Finally, we can also presume that contractors are hesitant to devote countless hours to the development of a strategy and quote for Hernando County without an official request to do so or even the potential that such work will lead to an actual contract.

Although no comprehensive proposals were submitted, we were able to obtain broad range estimates from a few vendors. The cost of purchasing booming material with skirting runs anywhere from a rent-to-own price of $1.25 per linear foot (without installation) for 45 days up to $138.00 a linear foot with installation. This pricing does not include the cost of installation, boom maintenance, and disposal of the material. With an estimated 21,000 feet of area to be protected with boom the cost to purchase the material alone ranges from $1,181,250 to $2,898,000.

Given the above, Emergency Management recommends submitting a request to BP, through the State Emergency Operations Center, for technical assistance. While Emergency Management staff has expended considerable time and effort to research available protective options and in compiling a strategy, we have reached a threshold and require the assistance of a subject matter expert to review our plan for deficiencies. Finding gaps, we would then require a full analysis of all viable options as well as recommendations related to resources and vendors.