OIL SPILL CLEANUP IN A MARSH ENVIRONMENT

Adapted from *Oil spills in coastal marshes: The Fine Line Between Help and Hindrance*

BACKGROUND

As Louisiana prepares for potential negative impacts to its wetlands from the BP oil leak that occurred on April, 20, 2010, it is important to understand what oil removal techniques are available, as well as the advantages and disadvantages of oil cleanup in a wetland environment.

Maintaining the integrity of the impacted habitat is of the utmost importance when responding to an oil spill. Some cleanup techniques may remove oil, but the removal process may be too aggressive and cause more damage to the marsh than would have occurred if a passive approach was utilized. This habitat is where all future fisheries will be produced. It is important to remember that some fisheries may be lost initially, but maintaining the integrity of the habitat ensures that it can act as a nursery ground for next year's crop. Careful consideration must be exercised before oil cleanup techniques are utilized in a marsh environment.

MARSH CLEANUP TECHNIQUES

NATURAL DEGRADATION/NO RESPONSE

- use when natural weathering and biodegradation are expected to occur quickly
- only way to eliminate physical impacts resulting from workers or mobilization of equipment if all other response equipment has not already impacted the wetland area
- natural degradation is often used as the last stage of a response since most physical removal methods reach a point where oil can no longer be effectively removed, leaving some level of residual oiling
- no-response option has an environmental cost when oiling is heavy and/or degradation is expected to be very slow (greater than one to two years)
- sorbents may be utilized to keep areas left to degrade naturally from contaminating other areas

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VACUUM

- physical removal of pooled oil on marsh sediment or water surfaces using vacuum or pumping apparatus has been successful at a number of marsh spills
- two main environmental impacts from using this technique:
    - physical impact of deploying the equipment and the workers to operate it can cause damage to the wetland habitat
    - potential to inadvertently remove plants or sediment along with oil
- large quantities of oil can be removed, but at some point residual oiling will remain after most of the heavy oil is collected
- can be successful when combined with low-pressure flushing
- must be carefully monitored to minimize impacts
- access to remote sites may also be difficult, although vacuums can be deployed from barges

SKIMMING

- used in conjunction with containment booms
- can be a very successful method for removing oil from inside a containment boom
- containment booms can be placed in open water adjacent to oiled marshes
- oil can be herded with low pressure hoses to containment booms from sensitive wetlands where oil can then be retrieved with skimmers

LOW PRESSURE FLUSHING

- used to help move oil towards collection points where other removal equipment is operating
- may help lift oil off the sediment surface when the marsh is not flooded
- difficult to apply correctly because slight changes in water pressure can turn a low-impact technique into a high-impact one – this may cause erosion of sediment as opposed to just lifting oil off the sediment surface
- foot traffic will negatively impact the marsh, and should be minimized, either by working from boats during high tide or by using board walkways

VEGETATION CUTTING

- clearing entire areas of vegetation by cutting plants near the base of the stem above the sediment
- should not be considered in the majority of marsh environments
- drastic consequences when used in the past (death of plants, increased erosion, and permanent loss of marsh)
- reserved for situations where erosion is not a risk, with plant species that are either very hardy, or with undesirable invasive species
- considered when oil is trapped in dense vegetation, making flushing and removal ineffective

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- cutting near the base of the plant can permit oil penetration into the sediment and damage plant roots

BURNING OF MARSH

- practiced as a vegetation management technique for many years, but burning of oil-soaked marshes can cause death of the plants, leading to erosion
- has not been well documented and many questions remain about the specific conditions under which burning can be successfully used in marshes without the loss of plants
- successful in removing large amount of oil, but studies of long-term impacts show there are impacts to the wetland habitat
- remaining questions about this technique include the conditions necessary to minimize burn impacts, such as water covering the marsh at the time of burning, how to deal with residues that may remain after the burn, and how to minimize impacts to plant roots and rhizomes that may result in slow recovery of vegetation

BIOREMEDIATION

- positive data from laboratory studies, but little information on its successful use in oiled marshes
- may be a potential low-impact cleanup technique for residual oiling of marsh sediments
- may create eutrophic conditions in marsh environments from the addition of fertilizers
- may create low-oxygen conditions in marsh sediments that may limit biodegradation
- successful bioremediation requires mixing the oiled marsh with oxygen which destroys the wetland habitat

SEDIMENT REMOVAL/REPLANTING

- a technique of last resort to be used with great caution, if at all
- example of destroying the marsh to save it, since existing vegetation and roots are removed along with sediment
- potential for increased erosion and a danger if sediments are not replaced
- changes in elevation due to sediment removal will prevent plant regrowth or cause a change in species of plants colonizing the area.

CONCLUSION

Deciding how to respond in an oiled marsh is clearly a complex issue for which there can be no single answer. Cleanup in a marsh is justified when oil can be removed with minimal impact, when other resources are at high risk of being oiled (such as migrating birds), and when unassisted recovery is likely to be very slow (more than two or three years). Natural (unassisted) recovery may be the best option in cases where oiling is light and natural recovery is likely to occur in a shorter time frame (

one year or less), where cleanup activities would detrimentally impact the marsh, and where wildlife is at low risk of being oiled.

References:

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Hoff, Rebecca Z. hazardous materials Response and Assessments Division, National Oceanic and Atmospheric Administration. *Responding to Oil Spills in Coastal Marshes: The Fine Line Between Help and Hindrance.* HAZMAT Report 96-1. Seattle Washington. 1995. Print.*

Also available online: http://response.restoration.noaa.gov/book_shelf/965_HelpHind.pdf

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