

RRT VI

Guidelines for Inshore/Nearshore In-Situ Burn

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Introduction:

In-situ burning is being considered with growing interest as a response tool for oiled coastal wetlands. Burning of wetland grasses has been practiced as a vegetation management technique for many years, but burning of oiled wetlands is relatively new. Deciding how to respond to an oiled coastal wetland is a complex issue for which there can be no single answer. In keeping with the pro-active nature of RRT VI, the following guidelines and checklist for quick approval of an in-situ coastal wetland burn are provided.

Environmental Considerations:

It must be determined if cleanup is necessary or desirable. A consultation with a biologist, botanist, or ecologist would be extremely helpful in accessing options. Cleanup in a wetland appears to be justified when oil can be removed with minimum impact, when other natural resources (such as migrating birds) are at high risk of being oiled, or when unassisted recovery is likely to be very slow.

Natural (unassisted) recovery may be the best option to follow when:

- Oiling is light and natural recovery is likely to occur in an acceptably shorter time frame
- Cleanup activities would detrimentally impact the wetland
- Wildlife are at low risk of being oiled.

In-situ burning as a spill response method may provide a means to remove the oil from the impacted area without resorting to mechanical cleanup methods, which may be destructive or impossible to carry out. In-situ burning may minimize both short term risks of further impact of the spilled oil, and long term risks of persistent toxicity to Marsh plants and biota.

In-situ burning has advantages and disadvantages. The following pros and cons should be examined when considering the in-situ burning option for oiled wetlands.

Pros

- Minimizes physical damage: Where access is limited or mechanical/manual removal has the potential to cause unacceptable levels of impact by equipment mobilization and trampling, burning can rapidly remove oil from sensitive areas.
- Provides an option when other options fail: It provides a response option when no other options are acceptable or feasible, or where oil residues will be unacceptably high with other options, including natural recovery.
- Removes oil quickly: It rapidly removes oil from the habitat when there is a time-critical element, such as a short-term change in the physical conditions which will likely cause loss of containment and further spreading (e.g., rain or flooding), or a seasonal increase in wildlife use, such as arrival of large numbers of migratory waterfowl.

Cons

- Plant damage: Burning can cause substantial initial plant damage because the above-ground/water vegetation is removed.
- Long term impact: Burning can cause long-term impacts to vegetation, when the fire is so hot or the water is too low, that the below-ground plant parts are killed.
- Oil penetration: There is a potential for burning to increase oil penetration into the substrate, when there is no standing water.
- Damage to biota: Any animals present and unable to escape (such as gastropods on clean vegetation above the oiled area) will be killed.
- Residues: Heavy fuel oils, when burned, may produce residues that are difficult to remove.

Resource managers have been conducting prescribed burns of wetlands to rejuvenate wetlands that have accumulated high litter loads; generate green vegetation or open spaces to attract wildlife; release nutrients for recycling; and to restore habitats in areas that are historically dependent on frequent wildfires to sustain these ecosystems. The presence of oil in a wetland may have two important effects: the high BTU of the oil may increase the temperature and heat penetration of the burn, and oil residue may remain after the burn which can cause toxicity. However, the experiences of fire ecologists and practitioners can greatly contribute to the development of guidelines for burning wetlands as

a spill-response strategy. Based on discussions with refuge staff with fire management duties, the following guidelines were developed for specific types of non-oiled wetland habitats:

Wooded Swamps (guidelines are from the southeast, Okefenokee Swamp)

- Burns in winter tend to cause less damage in terms of species mortality and diversity; only a loss of fuel occurs.
- Burns in late summer result in higher mortality to the larger plants and hardwoods probably because they are more susceptible to stress, and the soil conditions are drier, leading to higher acute mortality from heat.
- Spring and summer burns are more likely to cause changes in species composition; species that are promoted by burning tend to grow vigorously after the burn, out-competing the less fire-tolerant species.
- Moisture levels are extremely important. Although high moisture levels make starting the burn more difficult, these conditions are less likely to cause high plant mortality or a change in species composition.
- Greater damage to vegetation results from burns during dry seasons, when the fire is more likely to burn deeper into organic soils and cause higher damage to roots. When the soils are wet, only the above ground vegetation is burned off.

Fresh-to-Brackish Impoundment Marshes (data are from Merritt Island NWR)

- Prescribed burns should be scheduled for periods when they occur naturally, namely in the dry/lightning season.
- *Juncus* is killed if flooded after a burn.
- *Spartina bakeri* burns well, readily, and during most times of the year, even in standing water.

Based on the very limited data on effectiveness and effects of burning in oiled marshes, the following environmental guidelines are proposed:

- Make sure that it is possible to contain and control the fire; it is not as easy to put out a fire in vegetated wetland as it is with oil contained in a fireproof boom.
- Impacts to below ground vegetation are likely to be less if a

- water layer exists between the oil and the substrate.
- A standing water layer of just a few inches may get hot enough to kill the roots anyway. Little information on this relationship has been compiled and this type of data may be collectable during monitoring efforts.
 - Burning of oiled woody wetland vegetation (compared to herbaceous vegetation) should not be considered.
 - Not enough is known about seasonal effects on the ability of burned, oiled vegetation to recover yet burning in late fall to early spring, when the vegetation is dormant and prior to new plant growth seems to be the best time.
 - If it can be done with minimal impacts, heavy accumulations of oil should be removed by other methods in order to reduce the amount of burn residues and burn duration which may cause long-term impacts to both vegetation and animals returning to the habitat.
 - Light fuel oils and crudes burn more efficiently and generate less residues, which should reduce the potential for long-term impacts.
 - There is some concern that burning of muddy substrates could alter their physical properties (i.e., make them hard) thus degrading their biological productivity.
 - Every wetland is different in terms of wetland type, plant species composition, environmental parameters, and the known or estimated tolerances of that type of system to physical and chemical disturbances. Biologists, botanists or ecologists should be consulted prior to the use of burning as a response technique in a wetland.

Little data is found on the burning of oiled wetlands. The NOAA Scientific Support Coordinator may be able to coordinate with ongoing (funded) research to address site specific monitoring needs.

Safety Considerations

Because of the intense heat, the smoke plume usually rises several hundreds to several thousands of feet. It then levels off and is blown by the wind in a narrow, and often meandering band while dissipating. After that it moves about according to weather conditions at the time. Some parts of the plume occasionally dip back down toward the surface but the majority of the smoke usually stays well up in the air. If the wind is blowing away from a

populated area it is conceivable that a burn could be conducted immediately adjacent to the area. However, if the wind is blowing toward a populated area there must be reasonable assurances that people will not be exposed to excessive concentrations of pollutants.

Concentrations of small particulates in the smoke plume dissipate and are generally within the standard 150 micrograms per cubic meter of air, averaged over 24 hours, within one to three miles from the burn. In most cases, three miles from populated areas is considered to be a reasonably safe distance in case the plume dips down to land.

At night, wind conditions are usually more stable. Burning may be done under stable wind conditions, however, data on the inversion layer should be known. Optimal wind conditions are 5-10 knots preferably not exceeding 20 knots. Burning may be done with winds exceeding 20 knots, however the lofting effect will be reduced, and the smoke may hug the ground. This condition is acceptable if the plume is not expected over a population center. The risk that in-situ burning may pose to the general public located downwind should be considered before any burning is initiated. If the risk is deemed unacceptable in-situ burning should not be done.

Burning must be safe and practical in light of spill status and spill source stabilization. Make sure burning is compatible with mechanical cleanup operations.

It is assumed that the responsible party has implemented a site safety work plan with a section specifically addressing in-situ burning. Personnel conducting the burn should be trained, provided with the necessary protective equipment, and monitored as needed.

Operational Considerations

The type and condition of the oil must be sufficiently combustible. Very heavy or weathered oils may not support combustion. Some type of wicking agent might be necessary.

State/local air quality regulations for burning must be followed and the appropriate agency contacted. Burning may be restricted between 9:00am to 5:00pm. It is also recommended to call the FAA with proposed burn times and locations.

Oil Spill Response Checklist for Coastal Wetland In-Situ Burn

The following checklist is provided as a summary of important information to be considered by the Federal On-Scene Coordinator (FOSC) in reviewing any request to conduct in-situ burning in a coastal wetland. It may be completed by the Responsible Party with input from resource managers and/or SSC. If the Burn is recommended by the Responsible Party and the State and approved by the FOSC, the checklist may be faxed to the RRT (DOI, DOC, EPA, and State) for immediate consideration.

Name of Incident:

Date and Time of Incident:

Name of Product Spilled (specific gravity, API or MSDS attached if available):

Total volume of Oil Spilled:

Total Volume of Oil to be Burned:

Oil Thickness Over Water:

Wetland Type (e.g. salt marsh) and Dominant Plant Species:

Description of Incident:

Description and size of Area to be Burned (include location of proposed burn with respect to spill source, an attached sketch, survey or picture of area would be helpful):

Environmental Concerns and Recommendations, (include

environmental trade-offs, water depth in marsh, past management practices, possible impending weather, presence of wildlife, alternate or additional clean-up methods):

Local Air Quality Personnel Notified (name and number):

Land Owner Notified (name and number):

Distance to Nearest Population Center:

Environmental Review Personnel (name and number):

Site Safety Plan Reviewed:

Present and Forecasted Weather:

Status of Spill Source:

Description of Operations (include how the fire will be contained, controlled and ignited):

Method to Recover Burn Residue:

Monitoring to be Performed:

Signatures:

Federal On Scene Coordinator

Responsible Party

State Representative