INLAND STRANDED OIL HABITAT FACT SHEET FOR RESPONSE:

Calcareous Fen

Indicator Species

Brook Lobelia
Lobelia spp.

Lesser Fringed Gentian
Virgata spp.

Ohio Goldenrod
Solidago spp.

Sterile Sedge
Carex spp.

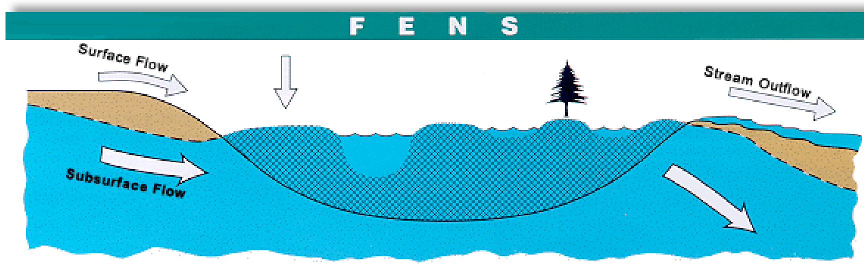
I. Habitat Description

Calcareous fens are one of the most rare habitat types in the United States. They typically form on or near slight slopes from upwelling groundwater trapped by a layer of peat. Like bogs, fens are characterized by a peat substrate, but are fed by a supply of cold, oxygen-deprived groundwater rich in calcium and magnesium bicarbonates. As they occur on sites of cold water seepage, active springs and trout streams are often associated with fens.

Calcareous fen in Wisconsin

II. Sensitivity to Oil Spills

Fens take millennia to form, and consequently are highly sensitive to oil spills. Poor drainage allows oil to accumulate and persist in layers of organic material. In drier hydrologic regimes, peat deposits are highly absorbent of hydrocarbons, making it difficult for clean-up without removing this valuable material, which provides vital substrate for rare plant and animal communities. Light refined oils with high amounts of water-soluble fractions can cause acute mortality to animals and plants. Heavier oils tend to coat vegetation, which may survive if oil coats only the stems or if the roots are unaffected. It is difficult for more viscous oils to penetrate densely vegetated areas.



Fens receive both surface and subsurface water and have both surface and subsurface outflows. As a result, fens tend to reflect the chemistry of the underlying geology and can be quite alkaline when fed from limestone sources.
DJ Welsch

References/Additional Information:

General Classification Handbook for Floodplain Vegetation in Large River Systems (http://pubs.usgs.gov/tm/2005/tm2A1/)

Inland Oil Spills: Options for Minimizing Environmental Impacts for Freshwater Spill Response (http://www.michigan.gov/documents/deq/deq-wb-wws-FreshwaterResponse_NOAA102706_265069_7.pdf)

NatureServe (natureserve.org)

Natural Wetland Inventory (http://www.fws.gov/wetlands/)

The U.S. National Vegetation Classification (http://usnvc.org/)

Wetland Plants and Plant Communities of MN & WI, 3rd Edition (http://www.bwsr.state.mn.us/wetlands/delineation/WPPC_MN_WI/index.html)

Information compiled by UMRBA staff from NOAA, USACE, USFWS, USGS, and U.S. EPA sources, March 2017.

III. Sensitivity to Response Methods

The following describes potential adverse impacts to this habitat resulting from various oil spill response methods and provides recommendations to reduce impact when these methods are implemented. This is not intended to preclude the use of any particular methods, but rather to aid responders in balancing the need to remove oil with the possible adverse effects of removal. More detail about the response methods themselves can be found in the Inland Response Tactics Manual.

Least Adverse Habitat Impacts

Exclusion or Deflection Booming

- Boom can be used to exclude or deflect the spill away from sensitive resources.
- Effectiveness is increased by positioning boom at appropriate angles for the current speed.

Sorbents/Sorbent Boom

- In areas with vegetation at or above water, sorbents are most effective in water surrounding vegetation (as opposed to within/on top of vegetated areas).
- Care is necessary during placement and recovery to minimize disturbance of vegetation.
- Pom-pom type sorbents are best for heavy viscous oils that coat the strands; sorbent boom is best for light, low-viscosity oils that can penetrate into the sorbents.
- Absorbent boom must be changed frequently to prevent it from becoming a source of sheen.

Flooding

- This tactic is only applicable in areas where the water level can be controlled, such as near locks and dams or in a small pond/marsh. Contact the U.S. Army Corps of Engineers water control regarding lock and dam operation.
- Can be used selectively to remove localized heavy oiling This tactic is useful to remove oil trapped in vegetation, which can otherwise be difficult to herd toward recovery devices in open water. However, some oil may remain stranded in vegetation and will need to be removed through other means.

Low-Pressure, Ambient-Water Flushing

- Maintain low output pressures (less than 50 psi) to avoid disrupting the substrate and vegetation.
- Effectiveness increases with lighter oils.
- This tactic can be used with flooding to prevent re-deposition of oil.
- Use for spot removal of oil because of the limited area of effectiveness.

In-Situ Burning

- Presence of a water layer can protect plant roots.
- “Heavy ends” of petroleum product will remain unburned and must be recovered. This residue will sink once it is cool.
- The amount and placement of natural fuel in the surrounding area may present challenges to constraining the fire only to oiled areas.
- Authorization of in-situ burning is subject to RRT approval, consultation and concurrence from the state and the Department of the Interior.
- May be one of the least physically damaging means of oil removal as it leaves plant roots intact.

Collection by Direct Suction

- Adverse impact can be mitigated by limiting vehicles, hoses, and equipment to staging areas with firm substrate and sparse vegetation. If equipment must access other areas, precautions should be taken to avoid driving oil into sediment or softer substrate, and trampling vegetation. For example: limit access routes through the area; walk, drive, and station equipment on mats or boards instead of directly on top of vegetation; use boats in flooded areas; and use a helicopter to bring in equipment to areas that are difficult to access.
- Only useful where oil is thickly pooled (not appropriate for sheens).

Debris/Vegetation Removal

- Most appropriate for oils that form a persistent, thick, sticky coating on the vegetation, such as medium and heavy oils.
- Removal will release trapped oil and speed natural flushing rates.
- Debris may be associated with nests or living areas (e.g., beaver and muskrat lodges), therefore impacts on resident animal habitat need to be considered.
- If oil is trapped in floating vegetation, removal may be the only way to recover the oil in the absence of water currents.
- Removal can prevent re-oiling of wildlife.
- Damage by cleanup crews may be reduced by avoiding excessive cutting/removal.
- Response crews entering the marsh can inadvertently trample vegetation during cleanup/removal. To reduce this impact: control and minimize access routes through the marsh; have personnel stand or kneel on boards while working; and conduct operations from boats when possible.

Some Adverse Habitat Impact

Natural Attenuation/Phytoremediation

- Leaving oil could have a negative impact on rare fen plant communities.
- Lesser impact for small to moderate spills and lighter oils; avoids damage often associated with cleanup activities.
- Cleanup should be used in addition to attenuation in areas where using only attenuation would put sizable wildlife populations as risk for becoming oiled or re-oiled.

Most Adverse Habitat Impact

Light Equipment Oil Removal

- Damage to vegetation and substrate may be reduced by controlling access routes, using pontoons or mats, or using a helicopter to bring in equipment.
- May be needed where oil has heavily contaminated bottom sediments.

Peat/Sediment Removal

- Vacuum/dredge sediments and dewater using geotube/settling tank. Or, where feasible, dewater area and excavate the sediment
- Significant sediment removal may result in a change in the area’s hydrology as well as make it difficult to fully restore the plant community that existed prior to the spill incident.
- Permits will be required for sediment removal and for water discharge.