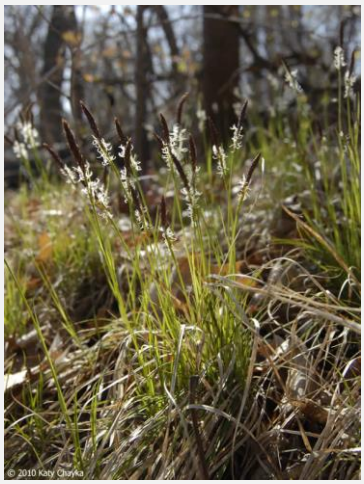
INLAND STRANDED OIL HABITAT FACT SHEET FOR RESPONSE:

Sedge Meadow

Indicator Species

Lake Sedge
Carex spp.

Hummock Sedge
Carex spp.



Pennsylvania Sedge
Carex spp.

I. Habitat Description

The sedge meadows habitat includes lowland areas around lakes, ponds, backwaters, and along seasonally flooded shorelines. Similar to wet meadows, these habitats are close to 100% vegetated with perennial grasses and forbs. The distinction is over 20% of the vegetation consists of sedges (*Cyperaceae*). Most of the species present are from the genus *Carex*, true sedges characterized by three-ranked leaves and triangular stems, with grasses and rushes interspersed. Forbs are also present, but may grow poorly under competition with the sedges. Though the soils remain saturated most of the year, there is little standing water present (except after flooding or precipitation events).

Sedge meadow in Navarino Wildlife Area – Wisconsin Image: WI DNR

Tussock sedge meadow. Image: Steve Eggers, USACE

II. Sensitivity to Oil Spills

The sedge meadows habitat is highly sensitive to oil spills. This biologically diverse habitat provides a home to many types of plants and animals. Restoration of the plant community may require the purchase of plugs, as many of the area's plants have low germination rates. Many animal species such as the sandhill crane and common snipe use the sedge meadows for reproduction and feeding purposes. The abundance of small mammals makes these ideal feeding grounds for raptors, mink, and fox. Significant loss of this habitat would greatly affect the populations of these animals and, consequently, the local ecology. Light refined oils with high amounts of water-soluble fractions can cause acute mortality to animals and plants in this habitat. Heavier oils tend to coat vegetation and animals, though the vegetation may survive if oil coats only the stems or if the roots are not affected. Viscous oils will not penetrate into dense vegetation.

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)
MN DNR (http://www.dnr.state.mn.us/restoreyourshore/pg/meadow.html)
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)
Oil Spills in Marshes: Planning and Response Considerations (http://response.restoration.noaa.gov/sites/default/files/Oil_Spills_in_Marshes.pdf)

Information compiled by UMRBA staff from NOAA, USFWS, and U.S. EPA sources, March 2016.

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III. Sensitivity to Response Methods

The following text 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

Flooding

- Appropriate for locations with gentle gradient where persistent oil has pooled.
- Should only be used if released oil can be reliably directed towards sorbents or recovery devices and prevented from impacting other areas.
- Effectiveness increases with lighter oils because they are less viscous and less residual oil is left in the environment.
- Some oil may still be left stranded after flooding and will need to be collected through other means.

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).

Low-Pressure, Ambient-Water Flushing

- Effective for washing oil stranded on banks into the water for recovery.
- Vegetation cover minimizes the potential for sediment erosion from flushing. However, thick vegetation also reduces area of influence of flushing operations.
- Effectiveness increases with lighter oils because they are less viscous and less residual oil is left in the environment.

In-Situ Burning

- May be one of the least physically damaging means of moderate and heavy oil removal.
- Fires are a naturally occurring part of this habitat's plant lifecycle, so vegetation should be able to recover quickly from a burn as long as the roots are not damaged.
- "Heavy ends" of petroleum product remain unburned and must be recovered. This residue will sink once it is cool.
- Least adverse impact when used in grassy areas versus areas covered with trees and shrubs. Fires are a naturally occurring part of this habitat's plant lifecycle, so vegetation should be able to recover quickly from a burn as long as the roots are not damaged.
- Authorization of in-situ burning is subject to RRT approval, consultation and concurrence from the state and the Department of the Interior.

Some Adverse Habitat Impact

Natural Attenuation/Phytoremediation

- Least 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.

Debris/Vegetation Removal

- Most appropriate for oils that form a thick, sticky coating on the vegetation, such as medium and heavy oils.
- Remove stained or oiled vegetation to protect wildlife users of the habitat. Additionally, grass roots can by damaged by oil and may need to be removed as well.
- 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.

Most Adverse Habitat Impact

Light Equipment Oil Removal

- May be needed where oil has heavily contaminated bottom sediments.
- Avoid forcing oil into the substrate and trampling vegetation by limiting access routes through the area, traversing the area on boards/mats/pontoons, or using a helicopter to bring in equipment.

Nutrient Enrichment

- Applicable where nutrients are a limiting factor for oil degradation.
- More effective after gross oil removal is completed.
- Should be used in environments where preservation is not a priority.
- When used on bare soil, nutrients need to be mixed with oil and soil.

Sediment Removal

- For watered areas: vacuum/dredge sediments and dewater using geotube/settling tank; or, where feasible, dewater the 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.

Hand Tool Oil Removal/Cleaning

- Used where persistent oil occurs in heavy amounts and animals using the wetland are likely to be oiled.
- Avoid forcing oil into substrate and trampling vegetation by limiting access routes through the area and walking on boards or mats.

Sorbents

- Overuse generates excess waste.
- Forcing contact between pads and oiled substrate can drive oil into the soil, making it more difficult to recover.