

ENVIRONMENTAL SENSITIVITY INDEX ST. MARYS RIVER

SHORELINE TYPES

The shoreline of the St. Marys River area was classified during helicopter over-flights undertaken in June 1984. The Canadian Coast Guard graciously provided the helicopter and aerial support services. The types of shoreline found to be common within the Great Lakes region are listed below in order of increasing sensitivity to spilled oil. As noted, two of these shoreline types are not found along the St. Marys River. Wetland environments (ESI=10A and 10B) are the most sensitive and deserve priority protection.

- Sensitivity ↓
- 1. Exposed bedrock bluffs (not present)
 - 2. Exposed unconsolidated sediment bluffs
 - 3. Shelving bedrock shores
 - 4. Sand shores
 - 5. Mixed sand and gravel shores
 - 6. Gravel shores
 - 7. Riprap and harbor structures
 - 8. Sheltered bluffs (not present)
 - 9. Low vegetated banks
 - 10A. Fringing wetlands
 - 10B. Extensive wetlands

BIOLOGICAL RESOURCES

The biological resources found within the St. Marys area are compiled from the literature and from direct contact with scientists knowledgeable about local species occurrence. Areas having these resources should receive consideration when planning all spill-response activities. The symbols used to indicate these resources are indicated below.

BIRDS

- ✈ Diving birds
- ➔ Gulls and terns
- 🦅 Raptors
- 🦢 Shorebirds
- 🦶 Wading birds
- 🦢 Waterfowl

FINFISH

- 🐟 Anadromous fish
- 🐟 Freshwater fish

MAMMALS

- 🐾 Furbearers

KEY TO SPECIES

BIRDS

- | | |
|------------------------------|---------------------------------|
| 1. Piping plover | <i>Charadrius melodus</i> |
| 2. Common snipe | <i>Capella gallinago</i> |
| 3. American woodcock | <i>Philohela minor</i> |
| 4. Great blue heron | <i>Ardea herodias</i> |
| 5. Green heron | <i>Butorides striatus</i> |
| 6. Virginia rail | <i>Rallus limicola</i> |
| 7. Sora rail | <i>Porzana carolina</i> |
| 8. Sandhill crane | <i>Grus canadensis</i> |
| 9. Black-crowned night heron | <i>Nycticorax nycticorax</i> |
| 10. American bittern | <i>Botaurus lentiginosus</i> |
| 11. Belted kingfisher | <i>Megaceryle alcyon</i> |
| 12. Black tern | <i>Chlidonias niger</i> |
| 13. Double-crested cormorant | <i>Phalacrocorax auritus</i> |
| 14. Caspian tern | <i>Sterna caspia</i> |
| 15. Common loon | <i>Gavia immer</i> |
| 16. Mute swan | <i>Cygnus olor</i> |
| 17. Canada goose | <i>Branta canadensis</i> |
| 18. Mallard | <i>Anas platyrhynchos</i> |
| 19. Black duck | <i>Anas rubripes</i> |
| 20. Green-winged teal | <i>Anas crecca</i> |
| 21. Blue-winged teal | <i>Anas discors</i> |
| 22. Wood duck | <i>Aix sponsa</i> |
| 23. Ring-necked duck | <i>Aythya collaris</i> |
| 24. Redhead | <i>Aythya americana</i> |
| 25. Greater scaup | <i>Aythya marila</i> |
| 26. Common goldeneye | <i>Bucephala clangula</i> |
| 27. Bufflehead | <i>Bucephala albeola</i> |
| 28. Common merganser | <i>Mergus merganser</i> |
| 29. Bald eagle | <i>Haliaeetus leucocephalus</i> |
| 30. Marsh hawk | <i>Circus cyaneus</i> |
| 31. Osprey | <i>Pandion haliaetus</i> |
| 32. Peregrine falcon | <i>Falco peregrinus</i> |
| 33. Red-shouldered hawk | <i>Buteo lineatus</i> |
| 34. Sharp-shinned hawk | <i>Accipiter striatus</i> |

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|--------------------------------|-----------------------------------|
| 35. Pigeon hawk | <i>Falco columbarius</i> |
| 36. Coopers hawk | <i>Accipiter cooperii</i> |
| 37. Barred owl | <i>Strix varia</i> |
| 38. Red-breasted merganser | <i>Mergus serrator</i> |
| 39. Pintail | <i>Anas acuta</i> |
| 40. American coot | <i>Fulica americana</i> |
| 41. Pied-billed grebe | <i>Podilymbus podiceps</i> |
| 42. Common gallinule | <i>Gallinula chloropus</i> |
| 43. Whistling swan | <i>Olor columbianus</i> |
| 44. Snow goose | <i>Chen caerulescens</i> |
| 45. Lesser scaup | <i>Aythya affinis</i> |
| 46. Oldsquaw | <i>Clangula hyemalis</i> |
| 47. White-winged scoter | <i>Melanitta deglandi</i> |
| 48. Surf scoter | <i>Melanitta perspicillata</i> |
| 49. American wigeon | <i>Anas americana</i> |
| 50. Great egret | <i>Casmerodius albus</i> |
| 51. Snowy egret | <i>Egretta thula</i> |
| 52. Cattle egret | <i>Bubulcus ibis</i> |
| 53. Yellow-crowned night heron | <i>Nyctanassa violacea</i> |
| 54. Yellow rail | <i>Coturnicops noveboracensis</i> |
| 55. Killdeer | <i>Charadrius vociferus</i> |
| 56. Spotted sandpiper | <i>Actitis macularia</i> |
| 57. Greater yellowlegs | <i>Tringa melanaleuca</i> |
| 58. Lesser yellowlegs | <i>Tringa flavipes</i> |
| 59. Red knot | <i>Calidris canutus</i> |
| 60. Least sandpiper | <i>Calidris minutilla</i> |
| 61. Dunlin | <i>Calidris alpina</i> |
| 62. Western sandpiper | <i>Calidris mauri</i> |
| 63. Sanderling | <i>Calidris alba</i> |
| 64. Ruddy turnstone | <i>Arenaria interpres</i> |
| 65. Semipalmated sandpiper | <i>Calidris pusilla</i> |
| 66. Herring gull | <i>Larus argentatus</i> |
| 67. Ring-billed gull | <i>Larus delawarensis</i> |
| 68. Common tern | <i>Sterna hirundo</i> |
| 69. Glaucous gull | <i>Larus hyperboreus</i> |
| 70. Great black-backed gull | <i>Larus marinus</i> |
| 71. Least bittern | <i>Ixobrychus exilis</i> |

FISH

- | | |
|------------------------|-------------------------------------|
| 1. Alewife | <i>Alosa pseudoharengus</i> |
| 2. Rainbow smelt | <i>Osmerus mordax</i> |
| 3. Spottail shiner | <i>Notropis hudsonius</i> |
| 4. River herring | <i>Moxostoma cirratum</i> |
| 5. Lake trout | <i>Salvelinus namaycush</i> |
| 6. Brown trout | <i>Salmo trutta</i> |
| 7. Rainbow trout | <i>Salmo gairdneri</i> |
| 8. Lake whitefish | <i>Coregonus clupeaformis</i> |
| 9. Chinook salmon | <i>Oncorhynchus tshawytscha</i> |
| 10. Coho salmon | <i>Oncorhynchus kisutch</i> |
| 11. Atlantic salmon | <i>Salmo salar</i> |
| 12. Lake sturgeon | <i>Acipenser fulvescens</i> |
| 13. Northern pike | <i>Esox lucius</i> |
| 14. Bluegill | <i>Lepomis macrochirus</i> |
| 15. White crappie | <i>Pomoxis annularis</i> |
| 16. Black crappie | <i>Pomoxis nigromaculatus</i> |
| 17. Yellow perch | <i>Perca flavescens</i> |
| 18. Largemouth bass | <i>Micropterus salmoides</i> |
| 19. Smallmouth bass | <i>Micropterus dolomieu</i> |
| 20. Rock bass | <i>Ambloplites rupestris</i> |
| 21. Pumpkinseed | <i>Lepomis gibbosus</i> |
| 22. Walleye | <i>Stizostedion vitreum vitreum</i> |
| 23. White bass | <i>Morone chrysops</i> |
| 24. Tiger musky | <i>Esox amentus</i> |
| 25. Muskellunge | <i>Esox masquinongy</i> |
| 26. Channel catfish | <i>Ictalurus punctatus</i> |
| 27. Carp | <i>Cyprinus carpio</i> |
| 28. Gizzard shad | <i>Dorosoma cepedianum</i> |
| 29. Cisco | <i>Coregonus artedii</i> |
| 30. Brook trout | <i>Salvelinus fontinalis</i> |
| 31. Blackchin shiner | <i>Notropis neterodon</i> |
| 32. Blacknose shiner | <i>Notropis heterolepis</i> |
| 33. Fathead minnow | <i>Pimephales promelas</i> |
| 34. Banded killifish | <i>Fundulus diaphanus</i> |
| 35. Shorthead redhorse | <i>Moxostoma macrolepidotum</i> |
| 36. Longnose sucker | <i>Catostomus commersoni</i> |
| 37. White sucker | <i>Catostomus commersoni</i> |
| 38. Yellow bullhead | <i>Ictalurus natalis</i> |
| 39. Brown bullhead | <i>Ictalurus nebulosus</i> |
| 40. Green sunfish | <i>Lepomis cyanellus</i> |
| 41. Grass pickerel | <i>Esox americanus vermiculatus</i> |
| 42. Sauger | <i>Stizostedion canadense</i> |
| 43. Pink salmon | <i>Oncorhynchus gorbuscha</i> |
| 44. Burbot | <i>Lota lota lacustris</i> |
| 45. Round whitefish | <i>Prosopium cylindraceum</i> |

MAMMALS

- | | |
|------------|---------------------------|
| 1. Beaver | <i>Castor canadensis</i> |
| 3. Muskrat | <i>Ondatra zibethicus</i> |

SOCIOECONOMIC FEATURES

The following information is provided to highlight those areas having socioeconomic importance in order to assist or direct the spill-response effort. Boat ramps are included to provide river access points. Two equipment staging locations are indicated; Drummond Dolomite, Inc. is south of De Tour Village Ferry dock on Drummond Island, and De Tour Dock Co. is 2 miles north of De Tour Village.



Parks and preserves



Recreational beaches



Water intakes



Marinas



Boat ramps



Station locations

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Description of Shoreline Types

EXPOSED BEDROCK BLUFFS

ESI = 1

- Not present in study area

EXPOSED SEDIMENTARY BLUFFS

ESI = 2

- Exposed sedimentary bluffs are not common in the study area
- They are composed of soft, unconsolidated sediments
- They are commonly present as low-lying bluffs
- Beaches in front of the bluffs are narrow or absent
- Biological activity is low

Predicted Oil Impact

- Incoming oil will form a band along the high-tide swash line
- Oil persistence is limited to days or weeks, due to wave activity

Recommended Response Activity

- In most areas, cleanup is not necessary due to the short residence time of the oil
- Oil can usually be scraped off the surface of the sediment using manual labor
- Removal of sediment should be avoided
- Mechanical cleanup may be very difficult due to the steep slope of the bluff



SHELVING BEDROCK SHORES

ESI = 3

- Shelving bedrock shores are not common in the area
- They are found along one section of Walton Bay (Map 2)
- They consist of gently sloping bedrock
- Boulders or gravel may be present on or along the top of the ledge

Predicted Oil Impact

- Incoming oil will commonly form a band along the swash line
- Oil persistence is limited (days to weeks) in most areas exposed to wave action

Recommended Response Activity

- In most wave-exposed areas, cleanup is not necessary
- Other areas, including high recreational-use areas, may be cleaned effectively using high-pressure water spraying if oil is still fresh

SAND BEACHES

ESI = 4

- Sand beaches are not common in the study area
- They are present primarily as small pocket beaches except along Detour State Park (Map 14) and along the entrance to St. Marys River (Maps 1 and 2)
- Sediments may vary from fine to coarse grained
- Dunes are present in Detour State Park
- Birds such as plovers, sandpipers, and gulls are common along the beaches

Predicted Oil Impact

- Commonly, oil will be deposited on and become mixed into the sand along the swash zone
- Oil may deeply penetrate into the beach

Recommended Response Activity

- Cleanup may be difficult because of relatively soft sediments
- Cleanup should concentrate on oil removal from the upper swash zone
- Sand removal should be minimal to avoid erosion problems
- Activity through the oiled sand should be limited to prevent grinding oil deeper into the beach
- Use of heavy equipment for oil/sand removal may result in the removal of excessive amounts of sand; manual cleanup may be more efficient



MIXED SAND AND GRAVEL BEACHES

ESI = 5

- Mixed sand and gravel beaches are not common in the study area
- They are generally present along spits and headlands or points
- They are most common along the U.S. side at the upstream entrance of St. Marys River (Maps 1 and 2)

Predicted Oil Impact

- Oil will be deposited primarily along the swash zone
- Oil percolation into the beach may be deep in well-sorted material
- Biota present may be killed by the oil, either by smothering or by lethal concentrations in the water column

Recommended Response Activity

- Remove oil primarily from the upper swash lines
- Removal of sediment should be limited
- Mechanical reworking of the sediment into the wave zone and/or high-pressure water spraying can effectively remove the oil; sorbent boom may be necessary to capture oil outflow



GRAVEL BEACHES

ESI = 6

- Gravel beaches are particularly common throughout the lower portions of St. Marys River and along the Lake Huron section of the study area
- Fish may occupy space between very coarse gravels

Predicted Oil Impact

- The primary problem with oil pollution in this environment is related to the deep penetration of oil into the gravel beach
- If oil is left uncleaned, it may become asphalt-like
- Resident fauna and flora may be killed by the oil

Recommended Response Activity

- Removal of sediment should be restricted
- The use of high-pressure water spraying may be effective at removing oil while it is still fresh
- Sorbent booms or pads should be used to capture oil outflowing during the cleansing process

RIPRAP AND HARBOR STRUCTURES

ESI = 7

- Riprap and harbor structures are common in the Sault St. Marie industrialized area and along several portions of the river used for shipping
- They also may be present in front of beach cottages for shore protection
- Riprap is composed of cobble- to boulder-sized material
- Concrete, steel, or wooden bulkheads are common as port structures and along the locks at Sault St. Marie
- Biota along the upper structures are sparse, although gulls may be common
- Some fish may occupy portions of the riprap structure
- Riprap is an important substrate for fish-food organisms and for the spawning of several species of fish

Predicted Oil Impact

- Oil would percolate easily between the gravel and boulders of riprap structures
- Biota would be damaged or killed under heavy accumulations

Recommended Response Activity

- Along exposed structures, cleanup may not be necessary
- High-pressure spraying or sandblasting is effective, especially for fresh oils
- Cleanup is usually necessary in recreational beach areas; sorbent materials should be used to capture the oil as it leaches out



SHELTERED BLUFFS

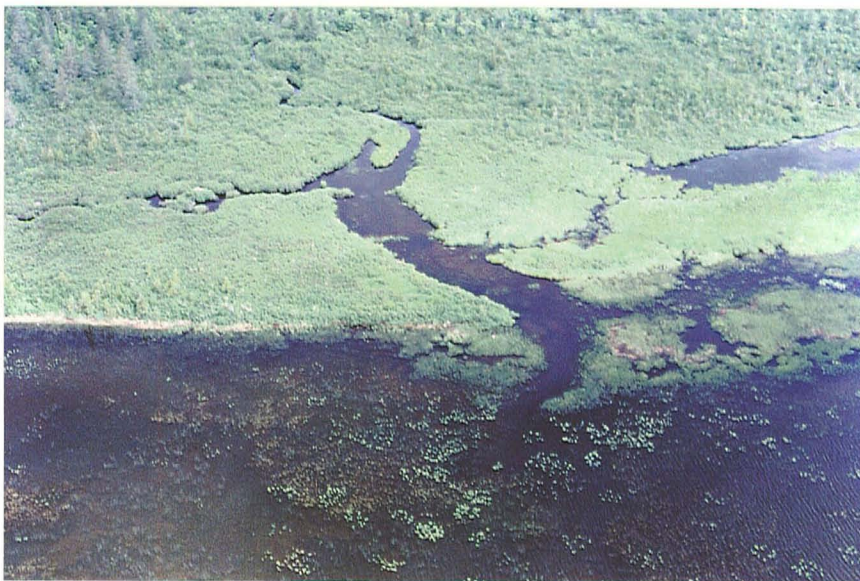
ESI = 8

- Not present in study area

LOW BANKS SUBJECT TO FLOODING

ESI = 9

- Low banks subject to flooding are found only along one section near Sault St. Marie



NARROW WETLANDS

ESI = 10A

BROAD WETLANDS

ESI = 10B

- Narrow or fringing wetlands are found throughout the study area
- Broad wetlands are common in low-lying, sheltered areas, particularly in Munuscong Lake and along the quieter waters of the study area
- They are relatively sheltered from wave activity
- Narrow areas less than 5 m wide are found throughout the study area
- Wetlands are the most important wildlife habitat in the area, providing a nesting area for ducks, geese, herons, rails, kingfishers, some shorebirds, muskrats, and turtles; as well as a major nursery and spawning ground for many species of sport and forage fish

Predicted Oil Impact

- Oil in heavy accumulations may persist for decades
- Small quantities of oil will be deposited primarily along the outer wetland fringe or along the upper wrack (debris) swash line
- Resident biota, including bird life, are likely to be oiled and possibly killed

Recommended Response Activity

- Under light oiling, the best practice is to let the wetland recover naturally
- During winter months, surface ice commonly offers shoreline protection
- Cutting of oiled grasses and low-pressure water spraying are effective, especially during the early part of the spring growing season
- Heavy oil accumulations on the wetland surface should be removed manually; access across the wetland should be greatly restricted
- Cleanup activities should be carefully supervised to avoid excessive damage to the area