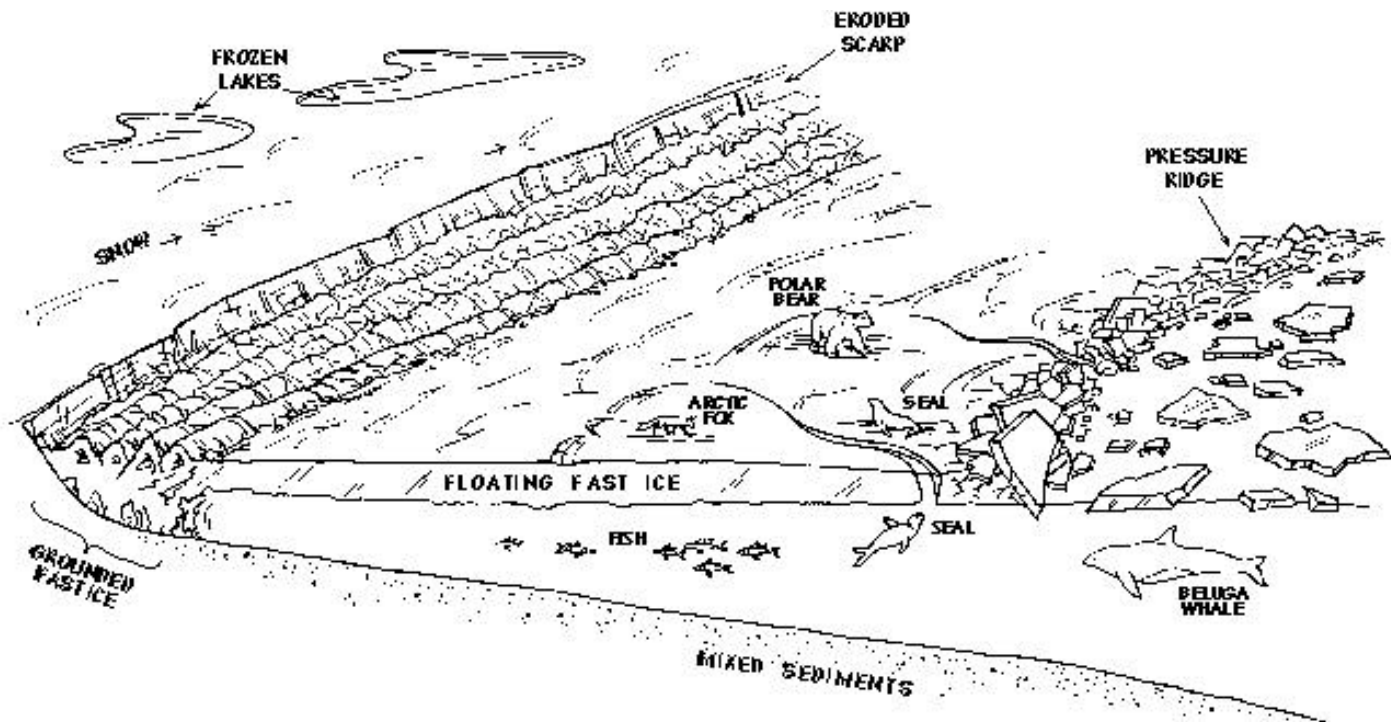


# Accessible and Inaccessible Ice

ICE



### Description

- Ice forms on the sea surface during winter in cold climates and can persist for several months.
- Most sea surface ice is floating but can be frozen to the bottom or stranded in intertidal areas during low tide.
- *Accessible ice* can safely support the personnel and equipment suitable for response to a particular oil spill on, in, under, or adjacent to solid ice.
- *Inaccessible ice* cannot safely support response personnel and response equipment.

### Predicted Oil Behavior

- Ice along the shoreline or in the adjacent nearshore water can act as a natural barrier, reducing the amount of oil that might otherwise make contact with the shoreline substrate.
- During the ice growth phase, oil in or under the ice can become encapsulated within the ice.
- During a thaw, or if the surface of the ice is melting and wet, oil is unlikely to adhere to the ice surface and will tend to remain on the water surface or in leads.
- In the spring, before the ice becomes inaccessible, oil in or below sea ice will often migrate through brine channels to the surface.

### Response Considerations

- The ice habitat presents unique safety issues in terms of cold, ice stability, and wildlife interactions.
- Oil spills on, in, under, or adjacent to brash ice, small or fast moving floes, or other ice types which are “inaccessible” must be treated from the air or from vessels working in, or alongside, the ice.
- Some methods, including flooding, debris removal, sediment reworking, vegetation cutting and removal, high-pressure flushing, sand blasting, solidifiers, and shoreline cleaning agents, are not considered suitable for use in these environments.

# Accessible and Inaccessible Ice

ICE

Relative environmental impacts

## Accessible Ice

### Response Method

### Oil Category

I II III IV V

### Oil Category Descriptions

- I - Gasoline products
- II - Diesel-like products and light crudes
- III - Medium grade crudes and intermediate products
- IV - Heavy crudes and residual products
- V - Non-floating oil products

The following categories are used to compare the relative environmental impact of each response method in the specific environment and habitat for each oil type. The codes in each table mean:

- A = The least adverse habitat impact.
- B = Some adverse habitat impact.
- C = Significant adverse habitat impact.
- D = The most adverse habitat impact.
- I = Insufficient information - impact or effectiveness of the method could not be evaluated.
- = Not applicable.

| Response Method                      | I | II | III | IV | V |
|--------------------------------------|---|----|-----|----|---|
| Natural Recovery                     | A | B  | B   | C  | C |
| Booming                              | - | B  | B   | B  | - |
| Skimming                             | - | A  | A   | A  | - |
| Barriers/Berms                       | B | B  | B   | -  | - |
| Physical Herding                     | B | B  | B   | B  | - |
| Manual Oil Removal/Cleaning          | - | A  | A   | A  | A |
| Mechanical Oil Removal               | - | B  | B   | B  | B |
| Sorbents                             | - | B  | B   | B  | - |
| Vacuum                               | - | A  | A   | A  | A |
| Low-pressure, Ambient Water Flushing | B | B  | B   | B  | C |
| Low-pressure, Hot Water Flushing     | - | B  | B   | B  | C |
| Steam Cleaning                       | - | B  | B   | B  | C |
| Dispersants                          | - | B  | B   | -  | - |
| Emulsion-treating Agents             | - | I  | I   | I  | I |
| Elasticity Modifiers                 | - | A  | -   | -  | - |
| Herding Agents                       | I | I  | I   | -  | - |
| Nutrient Enrichment                  | - | I  | I   | I  | I |
| Natural Microbe Seeding              | - | I  | I   | I  | I |
| In-situ Burning                      | B | B  | B   | B  | - |

Consult the *Environmental Considerations for Marine Oil Spill Response* document referenced on page 5 before using this table.

# ICE

Relative environmental impacts

## Inaccessible Ice

### Oil Category Descriptions

- I - Gasoline products
- II - Diesel-like products and light crudes
- III - Medium grade crudes and intermediate products
- IV - Heavy crudes and residual products
- V - Non-floating oil products

The following categories are used to compare the relative environmental impact of each response method in the specific environment and habitat for each oil type. This method may cause:

- A = The least adverse habitat impact.
- B = Some adverse habitat impact.
- C = Significant adverse habitat impact.
- D = The most adverse habitat impact.
- I = Insufficient information - impact or effectiveness of the method could not be evaluated.
- = Not applicable.

## Accessible and Inaccessible Ice

| Response Method                      | Oil Category |    |     |    |   |
|--------------------------------------|--------------|----|-----|----|---|
|                                      | I            | II | III | IV | V |
| Natural Recovery                     | A            | A  | B   | B  | B |
| Booming                              | -            | B  | B   | B  | - |
| Skimming                             | -            | A  | A   | A  | - |
| Barriers/Berms                       | -            | -  | -   | -  | - |
| Physical Herding                     | B            | B  | B   | B  | - |
| Manual Oil Removal/Cleaning          | -            | -  | -   | -  | - |
| Mechanical Oil Removal               | -            | B  | B   | B  | B |
| Sorbents                             | -            | B  | B   | B  | - |
| Vacuum                               | -            | A  | A   | A  | - |
| Low-pressure, Ambient Water Flushing | -            | B  | B   | B  | - |
| Low-pressure, Hot Water Flushing     | -            | B  | B   | B  | - |
| Steam Cleaning                       | -            | -  | -   | -  | - |
| Dispersants                          | -            | B  | B   | -  | - |
| Emulsion-treating Agents             | -            | I  | I   | I  | I |
| Elasticity Modifiers                 | -            | B  | -   | -  | - |
| Herding Agents                       | I            | I  | I   | -  | - |
| Nutrient Enrichment                  | -            | I  | I   | I  | I |
| Natural Microbe Seeding              | -            | I  | I   | I  | I |
| In-situ Burning                      | B            | B  | B   | -  | - |

Use this table only after consulting the *Environmental Considerations for Marine Oil Spill Response* document referenced on page 5.