ASSESSMENT OF THE NOVA SCOTIA COASTLINE FOR POTENTIAL IMPINGEMENT OF "KURDISTAN" OIL

1. Glace Bay to Point Michaud, March 21, 1979
2. Hartlen Point to Cape Canso, March 28, 1979

by

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PREFACE

The breakup of the KURDISTAN oil tanker off the Cape Breton coast in mid-March, 1979, resulted in a request from Environmental Protection Service for assessments of the shoreline sensitivity of two Atlantic coastal segments of Nova Scotia. EPS wanted to be prepared with a protection strategy in the event of large-scale oiling of the shoreline. Shoreline maps for the region were nonexistent. Consequently, EPS asked if we could quickly provide assessments of the morphological characteristics and environmental sensitivity of the coastline using existing maps, charts, air photographs and any other relevant information at our disposal. This open-file report contains these two assessments exactly as they were submitted to EPS.

The report consists of two assessments with accompanying maps. Assessment 1 (with Map No. 1) covers the area from Glace Bay to Point Michaud on Cape Breton Island. Assessment 2 (with Map No. 2) covers the eastern shore of mainland Nova Scotia, from Hartlen Point to Cape Canso. Each assessment was completed within two days of the initial requests and supplied to EPS on March 21 and March 28. I emphasize that both reports were compiled using only existing published information and maps with no first-hand field observation. Therefore, the shoreline geomorphology (particularly in Map No. 1) should be considered preliminary; the descriptive terms refer to regional trends rather than site-specific trends. For example, the term "sandy beaches" refers to beach shorelines that are likely to contain a significant amount of sand-sized sediment, whereas "pebble-cobble beaches" are those shores that consist predominantly of coarse-grained beach materials. The distribution of marshlands indicates the areas in which marsh wetlands are most prevalent; it does not refer to the precise areal distribution of the marshes.

The reasons for presenting these assessments as an open-file report are threefold: 1) to illustrate that a useful evaluation of sensitivity of coastal zones can be achieved in an emergency situation by a suitably-trained person who has access to relevant air photographs, maps and charts; 2) to make available the information for possible use as baseline data in further detailed studies of the region; and 3) to allow individuals to appraise the value of these rapid assessments, to see the inherent shortcomings in them and thus be able to respond with improved versions when similar emergency situations arise in the future.

1. ASSESSMENT OF COASTLINE FROM GLACE BAY TO POINT MICHAUD FOR POTENTIAL IMPINGEMENT OF "KURDISTAN" OIL MARCH 21, 1979 (To accompany Map No. 1)

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DATA BASE

The north Chedabucto shoreline has been mapped (to Point Michaud) by Owens (1971). Published map information, on the coastal sector from Point Michaud northward to Glace Bay, is virtually non-existent. This assessment was prepared from the following sources of data:

1. Geological map of Nova Scotia,
2. 1:75,000 hydrographic charts,
3. 1:50,000 topographic maps,
4. Dalhousie University, Institute of Environmental Studies; Maintenance of beaches technical report,
5. Owens, 1977, Coastal Environments of Canada: the impact and clean-up of oil spills: EPS Rept. - 3-EC-77-13,
6. a set of black and white oblique aerial photographs obtained by R. Belanger and D. Buckley during a reconnaissance flight on Saturday, March 17, 1979,
7. surficial geology map of Nova Scotia, from Maritime Water Resources Study, Atlantic Development Board, 1969.

The above data base is not adequate enough for a thorough documentation of the characteristics of the coastline. However, it is sufficient to provide a basic framework to use in emergency oil-spill contingency planning.

COASTAL ZONES

This sector of coast is divided into three zones (based on geology, coastal physiography, shoreline types, etc.), as follows:

Zone 1 - Glace Bay to Mira Bay South Shore - Scatari Island,

Zone 2 - Scatari Island to Head of Gabarus Bay,

Zone 3 - Head of Gabarus Bay to Point Michaud.

ZONE 1 - GLACE BAY TO SCATARI ISLAND

a) General Description

Rock-cliffed coasts (5 to 20 m elev.) of low-resistant Permo-Carboniferous sandstones, till cover thin to absent; characterized by three large, northeast trending bays containing bayhead barrier beaches, which enclose large lagoonal estuaries.

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b) Tidal Range and Wave Exposure

∿1 m; bayheads exposed to wave fetches up to 500 metres in northeast directions.

c) Shoreline Characteristics

Length - ∿620 km
Percent beaches - ∿26%
Percent cliffs - ∿74%
No. of tidal inlets - 7
Trends - sand barrier beaches at bayheads, coarse-grained beaches, bay flanks, to rock cliffs seawards.

d) Vulnerable Areas

Barrier beaches at the head of Glace, Schooner, Morien, and Mira Bays. All these beaches face northeast, are composed primarily of sand, and are in the order of a few hundred metres (or less) in width. Every barrier beach is cut by at least one inlet.

e) Accessibility

All major beaches are easily accessible by road. Would allow movement of equipment, vehicles and manpower. Most of this coastal zone has good overland access.

f) Protective Measures

1. Barrier beach and lagoon systems should be concentrated upon; particularly the areas at the heads of the main bays.

2. All tidal inlets should be boomed to prevent oil from entering the lagoons. (Contrary to what the hydrographic chart indicates, there is no barrier beach across False Bay, on the north shore of Mira Bay. The mouth of this bay should be boomed also, because it is connected to the lagoon at the head of Morien Bay.)

3. The barrier-beach systems, which extend only about 2-3 m above mean low water (such as at Dominion Beach), should be dyked at the high-water line using material from the beach face. These low-relief beaches are cut by overwash channels, and oil approaching the shore under high wave energy conditions and/or spring tides could easily be carried through these channels into the back barrier lagoons. Depending on the wave conditions, some of the overwash areas may require additional barricading.

4. The beaches that have a steep backshore consisting of coarse storm ridge deposits (such as what appears to be present, from the oblique photographs, at some of the Mira Bay beaches) should be given a lesser priority in terms of dyke construction than the low-relief sand beaches. However, if oil is approaching the shore under storm-wave conditions, the major beach segments should all be dyked. These segments are:

i) Mira River - Catalogne Lake, Mira Bay,
ii) Barrier beach at head of Morien Bay,
iii) Schooner Cove,
iv) Barrier beach at Dysan's Pond - Glace Bay.

5. Rocky shores are generally vertical cliffs; nothing should be attempted to protect these shores.

ZONE 2 - SCATARI ISLAND TO HEAD GABARUS BAY

a) General Description

Low lying, highly resistant coastline consisting largely of Precambrian metamorphic rocks, with till cover of variable thickness and occasional drumlins; except for those on Scatari Island, the rock and till cliffs are generally less than 10 m in elevation; characterized by low-sloping rock shore platforms (numerous shoals and reefs) often overlain by till bluffs, and by coarse-grained (cobble, pebble), mainland-attached and pocket beaches; small open-ended bays, (i.e.: Louisbourg and Baleine Cove).

b) Tidal Range and Wave Exposure

∿1 m; east to east-southeast facing, exposed to north Atlantic swell, except in lee of Scatari Island; high wave energy expended close to shore because of steep nearshore gradient compared to Zone 1 (6 fathom line situated relatively close to shoreline).

c) Shoreline Characteristics

Length - 810 km
Percent beaches - ∿24%
Percent cliff and sloping rock shores - ∿76%
No. of tidal inlets - 1(?) - east side of Scatari Island
Trends - no significant barrier beach or lagoon development, only three large sandy beach areas (Main-à-Dieu, east side of Scatari Island, and double tombolo south of Cape Breton). Beaches are mostly coarse grained, pebble-cobble beaches commonly occur adjacent to and overlying low-sloping rock shore platforms; coarse-grained perched storm-ridge deposits in some exposed areas.

d) Vulnerable Areas

Main-à-Dieu and east Scatari Island sandy beaches, Louisbourg Bay, and the coarse-grained east- and southeast-facing pocket beaches.

e) Accessibility

Apart from the Louisbourg and Main-à-Dieu regions, the shoreline is not as easily accessible to onshore protection activities, as Zone 1. Most of the small coves and beach tracts will be nearly impossible to reach within a reasonable time frame. A main road runs along the north shore of Gabarus Bay from the head of the bay to Louisbourg.

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f) Protective Measures

1. Louisbourg Bay and the harbour at Fortress of Louisbourg should receive top priority in any onshore protection scheme. Entrance to Louisbourg Bay is fairly wide, but attempts should probably be made to boom it.

2. Main-à-Dieu harbor (between the breakwaters) could be boomed easily. Likewise at Bay Lorraine, Little Lorraine and Baleine Cove.

3. Scatari Island should receive low priority relative to the mainland.

4. The beach at Main-à-Dieu has a fairly steep gradient with a well-developed storm berm. It looks like a high wave-energy beach with an abundant sediment supply from local erosion of till cliffs. This beach could be cleaned up, if oiled, with far less adverse consequences than at some of the other beach areas where sediment supply is scarce.

5. Coarse-grained beaches are highly susceptible to oil penetration. Two areas that should receive some consideration for protection are: 1) the region between Fortress Louisbourg and White Point, and 2) north and south sides of Cape Breton. Spreading of sorbents to reduce permeability would help, i.e.: manure, straw, burlap, spread like a compost at or above the high water line.

ZONE 3 - HEAD OF GABARUS BAY TO POINT MICHAUD

a) General Description

Predominantly lowland unconsolidated coast featuring abundant eroding drumlin till cliffs; subtidal shallow gradient rock platform with numerous reefs and rock shoals, platform rock forms base of till cliff headlands; characterized by narrow, relatively low-relief sandy barrier beaches connecting eroding drumlin cliffs, with numerous enclosed lagoons and extensive wetland and marsh areas.

b) Tidal Range and Wave Exposure

$\sim$1 m; high wave-energy coast, almost entirely exposed to Atlantic waves and swell; fairly straight coast relative to the other two zones.

c) Shoreline Characteristics

Length - 775 km
Percent Beaches - 48%
Percent cliffs (largely till) - 52%
No. of tidal inlets - numerous, >14
Trends - abundant supply of sediment from eroding till cliffs, and intense littoral processes have combined to create a dynamic beach dominated coastline.

d) Vulnerable Areas

This segment of coast, in general, is highly vulnerable to contamination and long-term damage by oil. Barrier beaches are highly vulnerable (although they are usually steep-gradient beaches), because they are very narrow, consist largely of medium to coarse-grained sand with granules and pebbles, and have overwash channels cutting through the dune belt. Tidal inlets are small and numerous. The lagoon and marsh region behind the barrier beaches is the richest area for migrating shore birds in Cape Breton (Dalhousie University, Institute of Environmental Studies Report).

e) Accessibility

Over-land accessibility is poor. There are a few major roads such as at Framboise Cove, Point Michaud and Kempt Point.

f) Protective Measures

1. All the tidal inlets should be boomed. This could be done by helicopter.

2. At this time of year the beach face may consist largely of coarse-grained materials (granules, coarse-grained sand, pebbles) with finer sand offshore in the subtidal zone. This condition will favor oil contamination. Dyking should be carried out on the major beach tracts to prevent oil from contaminating the backshore. In some places the barrier beaches are so narrow that the proper placement and alignment of the dykes will be critical (i.e.: the dyking may induce overtopping of the barrier by waves rather than preventing it).

3. The Fourchu, Framboise, and St. Esprit Lake barrier-beach systems should be given high priority because of the extensive lagoon and marsh areas adjacent to these areas.

4. The use of sorbents, which could be rapidly deployed, should be strongly considered because of the large area that would have to be given protection, within a relatively short time (natural sorbents, such as burlap, manure, peat, ground rubber). Accessibility will be a problem.

5. If it appears that oil is going to impact on the shore during storm wave and/or spring tide conditions, dyking and barricades should be constructed at the front of the dunes and at the mouth of overwash channels, etc. It is vital that no oil gets into the back barrier regions.

6. The mouth of Forchu Harbor could be boomed easily; likewise the harbor at L'Archeveque Cove.

7. The first priority in this zone is to keep the oil from getting into the back barrier regions. The beaches are subjected to high-wave energy and therefore to self-cleansing; the marshes and lagoons are not. Protecting the lagoon-marsh, while allowing the beaches to be oiled, might be a viable strategy given the poor accessibility in this region. It is certainly the lesser of two evils.

TIMING OF OIL IMPINGEMENT

Predicted tide tables indicate that the tides will be approaching maximum range (spring tides) in the week of March 25 to March 30 (1.2 m range, March 29). Minimum tidal ranges (neap tides) are predicted for the week of April 2 to April 7 (0.7 range, April 5). Obviously, the barrier-beach shoreline will be more vulnerable to extensive contamination during spring tides than during neap tides. Protective methods will to some extent be dictated by the tidal phase and the wave-energy conditions at the time of impending oil encroachment on the shore. Neap tidal conditions and low wave energy would facilitate more effective protection, and would also minimize subsequent cleanup operations.

OVERALL ASSESSMENT

1. Zone 3 is liable to extensive contamination and long-term damage by oil impingement. It is also the most difficult, of the three zones, in which to launch an effective onshore protection scheme.

2. Zone 2 is the least vulnerable (of the three zones) to long-term damage by oil spillage. Louisbourg Harbor is an exception and should be given special protective consideration.

3. Zone 1 is the area in which it will be relatively easy, compared to the other two zones, to launch an effective onshore protection scheme.

NOTE: Map No. 1 accompanies this brief.

2. ASSESSMENT OF COASTLINE FROM HARTLEN POINT TO CAPE CANSO FOR POTENTIAL IMPINGEMENT OF "KURDISTAN" OIL MARCH 28, 1979 (To accompany Map No. 2)

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DATA BASE

This assessment was prepared rapidly from the limited data available on this region. Sources of data which were drawn upon include the following:

1. Preliminary information from a shoreline mapping study presently being undertaken (DSS Contract) by H.D. Munro,
2. 1:50,000 topographic maps,
3. hydrographic charts,
4. Owens, E.H. and Bowen, A.J., 1977, Coastal environments of the Maritime Provinces. Maritime Sediments, v. 13, p. 1-31,
5. Owens, E.H., 1977, Coastal Environments of Canada: the impact and clean-up of oil spills. EPS Rept. - 3-EC-77-13,
6. unpublished data of Coastal Geodynamics Group, AGC.

COASTAL ZONES

This entire coastal sector is made up of low resistant metasedimentary and granitic rocks, which are covered by varying thicknesses of glacial till. It is a lowland, highly indented coast with rock and till cliffs to 10 m, and locally, drumlins to 30 m in elevation. There is systematic variation in coastal physiography and submarine topography along this coastal sector. This variation has produced a trend in the distribution of shoreline types, which combined with physiography, enables a division into four coastal zones as follows:

Zone 1 - Hartlen Point to Stoddart Point,

Zone 2 - Stoddart Point to Liscomb Point,

Zone 3 - Liscomb Point to New Harbour,

Zone 4 - New Harbour to Cape Canso.

ZONE 1 - HARTLEN POINT TO STODDART POINT

a) General Description

Characterized by exposed bedrock and till-cliff headlands and deeply indented embayments, which are often partially enclosed by barrier beaches and spits. Lagoons and bays exhibit extensive tidal flat and marsh development.

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b) Tidal Range and Wave Exposure

Mean 1.4 m; headlands and beaches almost completely exposed to high-wave energy; partially enclosed bays and inlets are low-wave energy environments.

c) Distinguishing Coastal Features

1. Sand-fine gravel barrier beaches adjacent to exposed headlands (i.e.: Martinique, Lawrencetown).

2. Bays and lagoons containing abundant intertidal flat and marsh areas (i.e.: Petpeswick Inlet, Clam Harbour).

d) Most Vulnerable Areas

1. Shallow lagoon systems (marsh and tidal flats) of Cow Bay, Cole Harbour, West Marsh; Lawrencetown Lake, Chezzetcook Inlet, Petpeswick Inlet, Musquodoboit Harbour, Jeddore Harbour, Clam Harbour.

2. Barrier beaches at Martinique, Lawrencetown, Clam Bay, Cow Bay. All these beach systems exposed to high-energy waves, are relatively low and narrow; therefore can be overtopped by storm waves; all these beaches protect shallow lagoon-marsh-flat areas.

e) Accessibility

All major beaches are easily accessible by road. Most of this coastal zone has good overland access.

f) Protective Measures

1. Protection of lagoon marsh and tidal flat areas should receive top priority. This could be done in most cases by booming or temporary barricading the tidal inlets and entrances at the following localities (all of relative equal priority):

   i) Cow Bay - south end of barrier beach - maybe could be temporarily dammed (∿100 m width).

   ii) Cole Harbour - two booms across entrance to harbour, connecting island to mainland.

   iii) Lawrencetown Lake - two bridges to Fox Island and Lawrencetown beach could be easily boomed; the entrance to the backwater behind Fox Island should also be barricaded.

   iv) Porters Lake - railway and highway bridges at Rocky Run are excellent spots for a dual boom system.

   v) Inlets at Clam Harbour, Little Harbour, and Sleepy Head are relatively narrow and could be boomed readily.

Areas that should receive top priority but where booming or temporary barricading will be difficult are (protection of these areas will be extremely difficult):

i) Chezzetcook Inlet - entrance too wide (∿800 m) and too exposed to boom. Probably better to protect the upper reaches by booming across to the islands; the backwater at Grand Desert could be easily amenable to booming (at the bridge).

ii) Petpeswick Head - only feasible place for booming would be halfway up the bay at the town of Petpeswick Harbour, where the bay narrows to ∿250 m; backwater behind Petpeswick Head should be protected.

iii) Musquodoboit Harbour Area - the entrance could not be sealed off. There is an extensive marsh and lagoon system (Bird Sanctuary) behind Martinique Beach. Probably only a part of it could be protected with an intricate boom arrangement between the many islands. Accessibility is poor, and would have to be done by helicopter probably. The bridge across Oyster Pond Inlet at Pleasant Point (about 100 m width) should be boomed.

iv) Jeddore Harbour - a long boom network could be attempted between the wharves at East and West Jeddore (width of channel is ∿650 m).

2. Ocean beaches should receive second priority in any protection scheme. Some of them such as at Martinique, could be dyked at high water line. The beaches with major dune blowouts and overwash channels should receive particular attention. The overwash and blowout conduits should be barricaded at the seaward side to prevent high-wave driven oil from entering the back barrier marsh-lagoon regions.

3. The major beaches which should be given first priority for beach protection planning are Martinique, Lawrencetown and Clam Bay - Clam Harbour beaches.

4. The sandy beaches are high-energy beaches. So in any protective scheme should be secondary to preventing oil from penetrating back barrier bay-lagoon and marsh areas. High-energy beaches have ability to be "self-cleansing" over the long term.

5. Rocky shores and till-cliff headlands cannot be protected adequately; should be ignored in any protection scheme.

ZONE 2 - STODDART POINT TO LISCOMB POINT

a) General Description

Highly-indented, irregular coastline with numerous shallow bays, Ship Harbour Bay and Sheet Harbour estuary being the only exceptions. Shorelines predominantly bedrock with veneer of boulders and cobbles occasionally, and boulder-cobble pocket beaches. Characterized by low-gradient offshore platform with numerous bedrock islands, reefs and shoals.

b) Tidal Range and Wave Exposure

Mean 1.4 m; moderate to low-energy wave environment, wave energy expended on complex offshore island and shoal region.

c) Distinguishing Coastal Features

Numerous bedrock islands, reefs and shoals.

d) Most Vulnerable Areas

The small areas in the inner parts, and at the heads of bays, where swamp-marsh wetlands occur.

e) Accessibility

Most of the mainland shoreline is accessible by road, especially the heads of bays. A lot of the seaward headlands are inaccessible. Abundant offshore islands are obviously relatively inaccessible.

f) Protective Measures

1. It will be virtually impossible to launch protective measures on most of this shoreline. The offshore islands compound the problems of protection and cleanup methods.

2. On an areal basis, there are few vulnerable localities (relative to Zone 1) in this zone, and this combined with the difficulty of launching a protective scheme here, makes this a low priority zone for protection schemes, compared to Zones 1 and 3.

3. Priority areas for protection in this zone would be the heads of bays where marsh-tidal flats are present. The areas listed below are localities where booms could be realistically employed (all the areas below are of relatively equal priority):

   i) Sheet Harbour - boom Church Point to Mitchell Point (~300 m width), also Church Point across East River (~200 m width).

   ii) Wharf at Port Dufferin - ~250 m width.

   iii) Extensive marsh and flats at the head of Quoddy Inlet - this area should be protected by booms, if impossible, deployed at Hartling (width of channel ~400 m).

iv) Across neck (∿200 m wide) of Necum Teuch Harbour.

v) Smith Cove could be protected easily by running the booms from mainland to island to mainland (width of 100 to 200 m).

vi) Head of Ecum Secum Inlet where it is ∿150 m wide.

vii) Bridge at Baker Cove - to protect small marsh.

viii) Little Harbour at the wharves.

ix) Ship Harbour would be tough to boom because of exposure and currents - perhaps could be done at Beach Point where the harbour is ∿500 m wide.

x) Small tidal inlet to backwater at Taylor's Head could be barricaded easily (<100 m wide).

There are other small bayheads and backwaters which would be accessible for boom setup, but these should receive on-site consideration.

ZONE 3 - LISCOMB POINT TO NEW HARBOUR

a) General Description

Characterized by large, linear deeply-indented embayments and estuaries; bay mouths are deep and very wide; headlands and bay flanks characterized by bedrock shorelines, occasionally with thin veneer of boulders and cobbles; well-developed beaches are extremely scarce.

b) Tidal Range and Wave Exposure

Mean 1.4 m; moderate to high-wave energy, headlands and bay mouths exposed to deep-water waves because of relatively steep nearshore gradient and lack of abundant bedrock islands, reefs and shoals.

c) Distinguishing Coastal Features

Coastline is deeply incised with large and deep, linear embayments and estuaries.

d) Most Vulnerable Areas

Upper reaches of estuaries and bays.

e) Accessibility

Relatively poor except in the upper reaches, and along flanks, of major embayments.

f) Protective Measures

1. For the most part it would only be feasible to launch effective protective schemes in upper reaches of bays and estuaries. It would be difficult to boom the large estuaries which undergo both large freshwater input and large volume of tidal seawater exchange.

2. Protection schemes should be largely restricted to booming of upper bay and estuary regions where marsh and wetlands are prevalent, or where extensive residential areas occur. Areas which could be boomed are as follows:

   i) Inner Liscomb Harbour.

   ii) Gaspereau Brook - near historic site.

   iii) St. Mary's River Estuary - boom acorss from Sonora, a distance of 250 m. This would protect almost all of St. Mary's estuary from contamination.

   iv) The tidal inlet at Wine Harbour could be boomed (∿150 m wide); as could the backwater at Barachais Cove.

   v) The Indian Harbour Causeway should be checked to see if a barricade is useful at this locality.

   vi) Fisherman's Harbour at the narrow neck (width of ∿200 m).

   vii) Country Harbour could be boomed at Green Point (∿500 m wide), or farther landward at Stormont (∿300 m wide).

   viii) Issacs Harbour at seaward wharves (∿500 m wide).

   ix) New Harbour about 400 m seaward of highway bridge.

ZONE 4 - NEW HARBOUR TO CAPE CANSO

a) General Description

Bedrock-controlled, sediment-starved shoreline; extremely irregular coastline with many inshore islands. Cobbles and boulders common overlying bedrock, few cobble pocket beaches also present. Except for Tor Bay, the nearshore shelf gradient is relatively steep compared to other zones.

b) Tidal Range and Wave Exposure

Mean 1.4; Tor Bay coast partially protected from high-wave energy, because of configuration and shallow gradient offshore; rest of zone exposed to high-wave energy, which reaches well into shore where expended on islands and headlands.

c) Distinguishing Features

Low-sloping exposed bedrock shorelines, with absence of significant amount of unconsolidated material; broad, shallow embayment of Tor Bay.

d) Most Vulnerable Areas

There are few vulnerable areas relative to other zones; small inner harbours and reentrants in Tor Bay and Dover Bay.

f) Protective Measures

1. Small indentations along Tor Bay shoreline could be boomed, i.e.: Gammon Cove, Weber Cove, Cole Harbour, the marsh in Molasses Harbour.

2. Inner Dover Harbour could be boomed at headland (width ∿200 m), so also could the bay near the mouth of Gaspereaux Brook in Dover Bay.

3. Northwest Arm near Doughboy Point, in Whitehaven Harbour, could be boomed (channel width ∿350 m).

4. All other areas are virtually inaccessible to protective strategies. numerous inshore islands make realistic protection and cleanup schemes nearly impossible.

SENSITIVITY RANKING OF ZONES
(Relative to one another)

Zone 1 - Hartlen Point (Halifax Harbour) to Stoddart Point: highest susceptibility to long-term damage by oil impingement.

Zone 3 - Liscomb Point to New Harbour: intermediate.

Zone 2 - Stoddart Point to Liscomb Point: relatively low.

Zone 4 - New Harbour to Canso: lowest.

OVERALL ASSESSMENT

In the event of the likelihood of a major oil spill impinging on the eastern shore of Nova Scotia (Halifax to Canso):

1. Attempts should be made to give Zone 1 maximum protection. Cleanup procedures would be both harmful and difficult in this zone. It's easier to protect this zone than clean it up.

2. Zones 2 and 4 would be the most difficult areas in which to launch a protective measures scheme. These zones are also the least vulnerable to long-term damage by oil impingement.

3. A protection scheme could be undertaken in Zone 3; the areas which are most vulnearble (upper reaches of bays and estuaries) are also easily accessible. Protection should be limited to these upper bay regions.

4. Specific areas within Zones 2, 3, and 4 that should be protected from impending oil impact should be decided upon at time of operation, when it can be predicted with more certainty where major concentrations of oil are going to come ashore.

5. With a major oil slick, and very little lead time, protection schemes should be concentrated in Zone 1, with the other three coastal zones receiving low priority.

6. The damming or filling in of channels is not an environmentally sound, nor a physically feasible strategy in this coastal sector. Booming methods are much more preferable because they are easy to deploy, and perhaps more important, they are temporary features.

NOTE: Map No. 2 accompanies this brief; also, 1:50,000 topographic maps are useful when referring to this brief.