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ARCOD WORKING PAPER 82-8

A CLASSIFICATION OF AREAS IN THE  
CANADIAN ARCTIC FOR USE IN  
THE RENEGOTIATION OF OIL AND GAS  
EXPLORATION AGREEMENTS

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A CLASSIFICATION OF AREAS IN THE  
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THE RENEGOTIATION OF OIL AND GAS  
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Arctic Offshore Development Committee  
Department of Fisheries and Oceans

August 1982

## FOREWORD

The Canada Oil and Gas Lands Administration (COGLA) is renegotiating all hydrocarbon exploration agreements and leases on Canada lands to ensure that they are in compliance with the recently promulgated Canada Oil and Gas Act and the amended Oil and Gas Production and Conservation Act. As part of this process, COGLA asked the Department of Fisheries and Oceans (DFO) and other federal departments, in April 1982, to review the areas to be renegotiated and to identify environmental concerns.

This document is the result of that review. It covers all marine areas in the Canadian Arctic (north of 60°N), Hudson Bay, James Bay, and certain freshwater areas in the Northwest Territories. The review identified areas where no exploration activities should be permitted and other areas requiring different degrees of protection. The classification system was developed specifically for oil and gas exploration activities.

DFO's review was transmitted to both the Department of Indian Affairs and Northern Development and COGLA by Dr. G. H. Lawler in September 1982. The information will be used in developing environmental positions for COGLA to use in the renegotiation of exploration agreements with industry. DFO will continue to be involved in the process of developing specific environmental positions either through the Interdepartmental Environmental Review Committee's Ad Hoc Exploration Agreement Subcommittee or directly with COGLA for Hudson Bay and James Bay.

TABLE OF CONTENTS

	<u>Page</u>
Foreword . . . . .	i
Introduction . . . . .	1
Department of Fisheries and Oceans Approach . . . . .	2
Red Areas . . . . .	6
Orange Areas . . . . .	16
Yellow Areas . . . . .	21
Green Areas . . . . .	24
Bibliography . . . . .	25

## INTRODUCTION

The Canada Oil and Gas Lands Administration (COGLA) is currently in the process of renegotiating hydrocarbon exploration agreements with industry for all of the federal oil and gas lands. The purpose of this exercise is to ensure that all exploration activity is in compliance with the recently promulgated Canada Oil and Gas Act.

Although the prime thrusts of the renegotiations are to encourage exploration for oil and gas and to ensure that Canadian benefits are adequately identified, COGLA also is utilizing the exercise to identify environmental concerns. Accordingly, COGLA has asked that the Department of Fisheries and Oceans (DFO) review the areas to be renegotiated and to suggest areas which should be closed to exploration activities and areas which would require special consideration. This document is DFO's present position on hydrocarbon exploration in the marine areas of the Canadian Arctic (north of 60°N), Hudson Bay and James Bay and in selected freshwater environments of the mainland Northwest Territories (Mackenzie River basin). The Department of Fisheries and Oceans has reviewed the environmental importance of the areas in question, and has prepared this area classification and supporting rationale.

It should be noted that this exercise was undertaken on very short notice, and is based on a current assessment of the literature and on personal communication with various experts within the Department. As new data or a more extensive review of existing data become available the classification of areas may change such that additional areas may need to be withdrawn, or operating terms and conditions may require review.

The classification scheme derived is applicable to exploratory operations only. Should a proponent wish to produce oil and gas on a commercial basis from any of these areas, the proposal should be subject

to an Environmental Assessment Panel review.

#### DEPARTMENT OF FISHERIES AND OCEANS APPROACH

For areas in the Canadian Arctic (north of 60°N), Hudson Bay and James Bay, DFO has developed a classification scheme based on the environmental importance of the area to the maintenance and survival of fish and marine mammal stocks, on the harvest of these resources, on threats from the environment, and on the adequacy of biological and oceanographic data. Based on these criteria, areas have been classified into the following four categories.

Red Areas. These areas require the ultimate degree of protection as they are essential to the survival of important fish and marine mammal stocks. No exploration activities should be permitted in these areas.

Orange Areas. These areas are important to the survival of fish and marine mammal stocks, are areas where major harvesting activities occur, or are areas that pose serious hazards to exploration activities. Any proposed exploration activities should be reviewed by an Environmental Assessment Panel. DFO may oppose any specific proposal or may require stringent operating conditions.

Yellow Areas. These areas are of general use by fish and marine mammals, are areas where some harvesting activities occur, or are areas with an inadequate data base to determine their proper classification. Any proposed exploration activity should be subject to the requirements of the Environmental Assessment and Review Process (EARP) and of the regulatory processes. Except for areas with inadequate data, DFO expects that exploration activities could be permitted with site-specific operating conditions.

3.

Green Areas. These areas are of limited importance for fish and marine mammals and their harvesting. Any proposed exploration activity still should be subject to the requirements of EARP and the regulatory processes, but DFO expects that exploration activities should be permitted with standard operating conditions.

Table I provides, in more detail, a summary of the criteria and their application to the four areas.

The following sections discuss each category in turn. General information and the criteria for that category are listed. Areas falling into that category are listed by map sheets, as provided by COGLA, and a rationale is provided for the classification of each area. A summary map is located at the end of the report; it shows the classification of each area with identification numbers which refer to the text.

TABLE I

SUMMARY OF AREA CLASSIFICATION CRITERIA AND RATIONALE

	<u>RED</u>	<u>ORANGE</u>	<u>YELLOW</u>	<u>GREEN</u>
CONDITIONS	No exploration permitted.	Exploration may proceed following review by EAR Panel. Stringent operating conditions.	Exploration may proceed following site specific assessment and site specific operating conditions.	Exploration may proceed under standard operating conditions.
RATIONALE	Areas require year-round protection. Essential to the survival of important fish and marine mammal stocks.	Areas are important to the survival of fish and marine mammal stocks or are areas where major harvesting activities occur or are areas that pose serious hazards to exploration activities.	Areas of general use by fish and marine mammals, or are areas where some harvesting activities occur, or where data base is inadequate to determine proper classification.	Areas are of limited use for fish and marine mammals and their harvesting.
ENVIRONMENTAL IMPORTANCE				
<u>Marine Mammals</u>	Areas of year-round or very high seasonal concentrations of marine mammals, e.g. recurrent polynias, certain estuaries and terrestrial haul-out areas for walrus.	Areas of seasonal use by concentrations of marine mammals, e.g. for wintering, feeding, calving, pupping or migration.	Areas of general use by marine mammals.	Areas of limited use by marine mammals.
<u>Fish</u>	Overwintering, spawning or nursery areas for major concentrations of harvested or ecologically important fish species.	Areas of seasonal use by concentrations of harvested or ecologically important fish species.	Areas of general use by harvested or ecologically important fish species.	Areas of limited use by important fish species.
<u>Harvesting</u>		Major areas for the harvesting of fish and marine mammals.	Areas in which some harvesting of fish and marine mammals occurs.	Areas with little or no harvesting of fish and marine mammals.

TABLE I (Continued)

	<u>RED</u>	<u>ORANGE</u>	<u>YELLOW</u>	<u>GREEN</u>
<u>Productivity</u>	Localities of high productivity e.g. recurrent polynias.	Areas of enhanced marine productivity e.g. ice edges, shore leads, areas of upwelling.		
THREATS FROM THE ENVIRONMENT				
<u>Icebergs</u>		High concentrations of icebergs.		
<u>Ice</u>		Intensive concentrations of multi-year ice.		
<u>Currents</u>		Strong or highly variable currents.		
<u>Navigational Hazards</u>		Navigational hazards exist e.g. uncharted waters, reefs, channels unsuitable for navigation.		
DATA ADEQUACY			If data are inadequate to determine classification, areas are given a yellow classification. More information may be required before exploration is permitted.	

## RED AREAS

These areas should be removed from the permitting process and closed to all exploration ventures because they are essential for the survival of important stocks of fish and marine mammals.

## CRITERIA

Environmental Importance

- recurring polynyas with year-round populations of marine mammals.
- recurring polynyas with very high seasonal concentrations of marine mammals.
- seasonal marine mammal habitat supporting a major proportion of a population or stock.
- terrestrial haul-out areas for walrus.
- known overwintering, spawning or nursery habitat for major concentrations of harvested or ecologically important fish species.
- International Biological Program (IBP) sites of significance to the marine and freshwater environment.

## AREAS SELECTED AND RATIONALE

Map Sheet 1

## Southern Baffin Island (1-1)

- extensive shorelead system develops along coast.
- some walrus utilize lead system to overwinter (Mansfield 1958).
- ringed seals breed and pup in the fast ice of bays along south coast and sub-adults congregate in shore lead system (Stirling et al. 1981).
- walrus hunting and walrus haul-outs at King Charles Cape, Andrew Gordon Bay, Chorbak Inlet, Amadjuak Bay, White Strait, North Bay, Observation Cove, Pritzler Harbour, East Bluff. Status of population is unknown (Freeman 1976).
- extensive seal hunting by Inuit from Cape Dorset and Lake Harbour all along south Baffin Coast (Freeman 1976).

## Frobisher Bay (1-2)

- recurring polynya develops annually at mouth of Frobisher Bay

(Smith and Rigby 1981).

- moderate numbers of bearded seal reside year-round (Smith 1980).
- varying numbers of walrus occur throughout the year (Anders et al. 1967; MacLaren Marex 1979; Smith et al. 1979).
- extensive hunting of walrus at Ward Inlet, Hamlen Bay, Lupton Channel and Blunt Peninsula (Freeman 1976).
- large numbers of harp seal occupy the area during summer and fall (MacLaren Marex Inc. 1975).
- many overwintering beluga in polynya (MacLaren Marex Inc. 1975).

#### Cumberland Sound (1-3)

- recurring polynya develops annually at mouth of Sound (Smith and Rigby 1981).
- bowhead whales (unknown numbers) appear to concentrate in the polynya during fall, winter and early spring (Koski and Davis 1979). Twenty bowhead were sighted in the polynya in the winter 1981-82 (Richard pers. comm.).
- polynya provides early access from wintering areas in Davis Strait to feeding areas at head of Sound (Sergeant and Brodie 1975).
- walrus hunting and haul-outs along much of south shore of Sound near Kipisa, Utusivik, Salut Bay and the Leybourne Islands. Along the east coast of the Sound, walrus are hauled out and are hunted from the mouth of Iqualujuak Fiord to Kumlein Fiord and Wareham Island, near the mouth of Aktyantukan Fiord and near Kekeatualuk Island in Hoare Bay (Freeman 1976).
- at the present time the beluga population in Cumberland Sound is extremely stressed.
- there are important commercial, domestic and sport fisheries for arctic charr in Kingnait and Clearwater Fiords (Moshenko pers. comm.).

#### Cape Dyer to Broughton Island (1-4)

- Exeter Sound and Padloping Island have historically supported large populations of walrus and can be considered excellent habitat. Walrus population has been much reduced due to over-hunting during commercial whaling era. Today only Padloping Island supports a large breeding population (Mansfield 1958).
- walrus are common along the coast and narwhal and beluga are common in the coastal fiords (Freeman 1976).
- the Padloping Island area has been designated a proposed IBP ecological site (Nettleship and Smith 1975).

Map Sheet 2

## Roes Welcome Sound (2-1)

- recurring polynya develops annually in Sound (Smith and Rigby 1981).
- important wintering area for beluga, narwhal and harbour seals (Mansfield 1958; Mansfield 1967; Sergeant 1973).
- summering area for narwhal (Ross 1974; Mansfield et al. 1975a). Numbers are unknown at present. DFO to commence aerial census program of the area in 1982.
- probably used by beluga in winter but it is not known how many of 10,000 western Hudson Bay beluga population winter in the polynya.
- walrus (about 3000) congregate in the polynya in winter. Some remain in the area after breakup while others migrate to north-eastern Coats and southeastern Southampton Island for summer (Mansfield 1968).
- bowhead reside in Roes Welcome Sound and in adjacent areas (Repulse Bay, Frozen Strait, Daly Bay) from approximately mid-May to mid-September (Ross 1974). Population numbers low at present but animal is on protected list. Occasionally some bowhead may winter in the polynya (Ross 1974).
- because of the abundance and diversity of marine mammals in the area the Duke of York Bay area has been proposed as an IBP ecological reserve (Nettleship and Smith 1975; Revel 1981).

## Walrus Island (Fisher Strait) (2-2)

- the Island is a favourite haul-out ground for as many as 2,000 walrus (Manning 1943).

## Coats Island - Bencas Island (2-3)

- at least four walrus haul outs around the islands (Mansfield 1958).
- Mansfield (1968) reports an estimated population in the area to be about 3,000 animals.

## Southern Southampton Island - Fisher Strait, Evans Strait (2-4)

- walrus make extensive use of area for hauling out both on land at Seahorse Point and East Bay and on ice in Fisher and Evans straits. Strong currents and high average wind speeds keep ice in constant motion (Mansfield 1958).
- walrus, beluga and seals are extensively hunted by Inuit from Coral Harbour (Freeman 1976).

- concentrations (unknown numbers) of harbour seal at Cape Low and Cape Kendal (Mansfield 1968).

#### Duke of York Bay (2-5)

- excellent summer habitat and summer hunting area for walrus, seals, beluga, narwhal and arctic charr (Freeman 1976).
- walrus haul out on southeast White Island (Mansfield 1958).
- proposed IBP site (Nettleship and Smith 1975; Revel 1981).

#### Map Sheet 3

#### Western Basin Great Slave Lake including Mills Lake, Beaver Lake (3-1)

- area contains overwintering, spawning and nursery habitat for whitefish, walleye, pike, grayling and inconnu populations.
- these populations support extensive commercial, domestic and sport fisheries (Moshenko and Gillman 1980; Moshenko et al. 1981).

#### Map Sheet 4

#### Great Bear Lake (4-1)

- the area contains spawning, nursery and overwintering habitat for lake trout (Moshenko and Gillman 1980).
- Great Bear Lake is one of the most oligotrophic lakes in the world (Johnson 1975 a, b).
- the area supports an important high quality recreational fishery and an extensive domestic fishery in the vicinity of Fort Franklin.

#### Map Sheet 5

#### Shallow Bay (West Mackenzie Bay) (5-1)

- seasonal concentration area for up to 4,000 beluga (Fraker 1979).
- Mackenzie estuary is the only habitat of this type available to the entire Beaufort Sea beluga population.
- Berger (1977) recommended that the area be set aside as a sanctuary.

#### Kugmallit Bay (5-2)

- seasonal concentration area for many of the 4,000 beluga in the Beaufort Sea population (Fraker 1979).
- beluga move from Shallow Bay to Kugmallit Bay when ice opens around Kendall Island.

- beluga arrive in Kugmallit Bay in early to mid-July and remain in area until mid-September.
- it appears that Kugmallit Bay is as important to beluga as is Shallow Bay.

Mason Bay - Mallik Bay (5-3)

- overwintering and nursery areas for several species of anadromous and marine fish including inconnu, arctic cisco, least cisco, lake whitefish, pacific herring, arctic flounder and starry flounder (Percy 1975).
- spawning area for pacific herring, flounders and saffron cod.

Baillie Islands - Cape Bathurst (5-4)

- Hunter (pers. comm.) reports extensive use of area for spawning and nursery for Pacific herring, capelin and arctic cod.

Mackenzie River Delta Channels and Lakes (5-5)

- the lakes and channels of the Mackenzie Delta support a wide variety of fish in very high numbers.
- these areas fulfill all habitat functions, spawning, wintering, nursery and feeding.
- the channels are also major migration corridors for anadromous coregonids.
- these populations of fish are harvested either by Delta, Beaufort Sea or Mackenzie Valley communities.

Map Sheet 6

Brooman Point - Markham Point - Lacey Point 98°W 75°20N (6-1)

- terrestrial walrus haul-outs (Davis et al. 1978).
- variable population of walrus (<200) utilize adjacent waters as summer feeding areas.
- area is within the Bracebridge - Goodsir Inlets IBP site (Nettleship and Smith 1975).

Allen Bay - Interpid Bay (Cornwallis Island) (6-2)

- historical walrus habitat and hunting area (Freeman 1976; Bisset 1968).

Aston Bay (6-3)

- extremely important ringed seal pupping and moulting area (Smith 1981).

## Cunningham Inlet (6-4)

- very important concentration area for beluga (possible calving area) (Heyland 1975; Sergeant and Brodie 1975; Finley 1976).
- proposed IBP site (Nettleship and Smith 1975; Revel 1981).

## Garnier Bay (6-5)

- concentration area for beluga (>1000 animals) during July (Finley 1976).

## Cape Clarence (6-6)

- walrus hunting area (Freeman 1976).

## Cresswell Bay (6-7)

- very important seasonal concentration area for beluga. Finley (1976) reports in excess of 3,000 beluga occupying area during late July and early August.
- partially within proposed Stanwell-Fletcher Lake IBP site (Nettleship and Smith 1975).

## Bellot Strait (6-8)

- recurrent polynya (Smith and Rigby 1981).
- high densities of ringed seals, bearded seals (Stirling et al. 1981).
- bowhead utilize area during summer months (Davis et al. 1980).
- feeding areas for narwhal (Finley and Johnston 1977; Sergeant and Hay 1978).
- Smith (unpublished data) observed approximately 2,000 narwhal in area on July 30, 1980.
- proposed IBP site (Nettleship and Smith 1975).

## Fury and Hecla Strait (6-9)

- recurrent polynya (Smith and Rigby 1981).
- area supports high concentrations and numbers of walrus, bearded and ringed seals on a year-round basis (Manning 1943; Loughrey 1959; Anders 1965; Mansfield 1967).
- important summering area for bowhead whales (Mansfield 1971).
- important migration corridor for beluga and narwhal (Mansfield et al. 1975 a).

- area is extremely important culturally, socially and economically to community of Igloolik (Freeman 1976).

#### South Coast Devon Island (6-10)

- lead develops along coast in early spring.
- narwhal, beluga, walrus and bowhead move along lead from overwintering areas in northern Baffin Bay.
- bays and fiords all along coast contain high numbers of walrus (Davis et al. 1978).
- known terrestrial haul-outs for walrus in Union Bay, Radstock Bay, Dundas Harbour (Davis et al. 1978; Mansfield 1973).
- high numbers of bearded seal and ringed seal in Maxwell Bay and Radstock Bay year-round.
- Croker Bay utilized by harp seal.
- narwhal follow south Devon Coast from overwintering areas to summering areas as do bowhead and beluga.
- importance of area has been demonstrated in course of Lancaster Sound Green Paper exercise.
- proposed IBP sites include Croker Bay to Philpots Island, Cape Liddon and Hobhouse Inlet, all of which have significance to region marine mammal populations (Nettleship and Smith 1975; Revel 1981).

#### Map Sheet 7

##### Pond Inlet Area (7-1)

- ice edge at eastern end of Pond Inlet is scene of extremely important spring narwhal hunt.
- semi-permanent ice edge near Button Point provides excellent habitat for ringed, hooded and bearded seal and narwhal (Nettleship and Smith 1975).
- narwhal utilize Pond Inlet, Eclipse Sound and Navy Board Inlet in large numbers during open water period.
- an estimated 20 - 30,000 narwhal enter Lancaster Sound each year (Davis et al. 1978). A major portion of this population resides in Pond Inlet during part of the summer.
- a large population of arctic charr from the Robertson River feeds in the adjacent marine areas during the summer period.
- there is an extensive sport fishery for arctic charr at the mouth of the Robertson River on Milne Inlet (Moshenko 1981).

- important domestic fishery at Salmon River near Pond Inlet (R. Moshenko pers. comm.).
- area is partially within the proposed Bylot Island IBP site (Nettleship and Smith 1975).

#### Igloodik Area (7-2)

- the Fury and Hecla Strait polynya and the numerous smaller polynyas of northern Foxe Basin support high densities of walrus, bearded seals and ringed seals on a year-round basis (Manning 1943; Loughrey 1959; Anders 1965; Mansfield 1967).
- the whole region is an important summering area for bowhead whale and an ice free corridor for eastward migrating beluga, narwhal and bowhead in the fall (Mansfield 1971).

#### Map Sheet 8

##### Penny Strait and Queens Channel (8-1)

- polynyas in Penny Strait and Queens Channel are located over relatively shallow water (Stirling et al. 1981) and are particularly significant to overwintering walrus. Upwards of 300 walrus may utilize the area in winter (Ian Stirling pers. comm.).
- it is suspected that the area may be the most important overwintering area for walrus in the High Arctic outside the North Water.
- bearded seals and ringed seals are abundant in these polynyas on a year-round basis (Stirling et al. 1981).
- the Queens Channel area supports small numbers of bowhead (Davis et al. 1980).

##### Hell Gate - Cardigan Strait (8-2)

- variable numbers of walrus winter in this small but reliable polynya each year.
- the area is adjacent to Queens Channel and Penny Strait and walrus migrate freely between these polynyas (Stirling et al. 1981).
- as leads form in Jones Sound in late spring, walrus migrate into the Hell Gate area. Throughout the summer they feed both in Fram Sound and in the shallow water north of North Kent Island.
- the area is very important to walrus as an overwintering area, a summer feeding area and as a seasonal migration route to other areas.

- because of the importance of the area to marine mammals, IBP ecological sites have been proposed in the North Kent - Calf Island area and in the Cape Vera and St. Helena Island area (Nettleship and Smith 1975; Revel 1981).

#### Map Sheet 9

##### Lake Hazen (9-1)

- Lake Hazen supports a population of arctic charr, the size and abundance of which are unique and not known to occur elsewhere at such a high latitude (A.H. Kristofferson pers. comm.).
- area is partially within a proposed IBP site (Nettleship and Smith 1975; Revel 1981).

#### Map Sheet 200

##### Roes Welcome Sound (200-1)

See comments re: Map Sheet 2.

##### Seal, Knife, Churchill and Nelson River Estuaries (200-2)

- Sergeant (1973) estimates approximately 10,000 beluga comprise the western Hudson Bay population.
- the animals utilize these river estuaries as concentration feeding and possibly calving areas over the course of the summer.
- Richard (pers. comm.) observed approximately 10,000 beluga in these areas in 1981.

##### Cape Henrietta Maria (200-3)

- walrus occupy a haul-out site at Cape Henrietta Maria on an annual basis. The present size of the herd is estimated in excess of 300 animals (Davis et al. 1980).

##### Nastapoka, Great Whale, Little Whale, Manitousuk River Estuaries and Richmond Gulf (Eastmain) (200-4)

- these estuaries are utilized by the eastern Hudson Bay stock of beluga. However, the size of the population is not well known.
- the population is in a depressed condition (Breton-Provencher 1979; P. Richard pers. comm.).

##### Belcher Islands (200-5)

- beluga utilize the areas adjacent to the islands during the open water period and are hunted by the Inuit of Sanikiluaq.
- walrus utilize the islands and surrounding marine areas on a year round basis.

- bearded and ringed seals make extensive use of the area and are hunted actively (Freeman 1976).
- area is within a proposed IBP site of significance to marine mammals (Nettleship and Smith 1975).

Coats, Mansel, Nottingham, Salsibury Islands (200-6)

- walrus have several summer haul-outs on Coats Island and overwinter in the waters of Hudson Strait (Mansfield 1968).
- Coats Island is a proposed IBP site on basis of abundance of marine mammal community (Nettleship and Smith 1975).

Cape Dorset Area (200-7)

See sheet 1 - Southern Baffin Island.

Ungava Bay, Leaf River, Mucalic River, Whale River, Koksoak River Estuaries (200-8)

- although Sergeant and Brodie (1975) reported approximately 1,000 beluga utilizing the Leaf River estuary during the open water period, Finley et al. (1982) estimated that the population presently numbers, at most, in the very low hundreds.
- the present population is severely reduced from historic levels.

Lake Harbour Area (200-9)

See sheet 1 - Southern Baffin Island.

## ORANGE AREAS

These areas are important to the survival of fish and marine mammal stocks, are areas where major harvesting activities occur or are areas that pose serious hazards to exploration activities. No exploration activities should be permitted unless approved by an Environmental Assessment Panel, in which case stringent conditions may be applied. DFO may oppose exploration at Panel hearings.

## CRITERIA

Environmental Importance

- areas of seasonal use by concentrations of marine mammals (wintering, feeding, calving, pupping, migration corridors).
- areas of seasonal use by concentrations of harvested or ecologically important fish species.
- areas with enhanced marine productivity.
- areas with high social, cultural and resource utilization values.

Threats from the Environment

- high ice berg concentrations.
- intense concentrations of multi-year ice.
- strong or highly variable currents.
- navigational hazards.

## AREAS SELECTED AND RATIONALE

Map Sheet 1

## Hudson Strait (1-A)

- Finley et al. (in press) report that the pack ice of Hudson Strait is an important wintering area for beluga. As many as 9,000 beluga overwintered in this area in 1980-81.
- the fast ice edge provides excellent habitat for seals and walrus.
- many walrus overwinter in leads surrounding Nottingham Salisbury Islands (Mansfield 1958).
- bowhead, beluga, narwhal, killer whales and harp seals migrate through Hudson Strait in spring and fall (Mansfield 1968; Sergeant 1968; Mansfield et al. 1975 a).

## Foxe Basin (1-B)

- the importance of Foxe Basin to marine mammals on both a seasonal

and year-round basis has been well documented (Mansfield 1958).

- a very large commercially exploited population of arctic charr originating from the Nettilling Lake - Koukdjuak River system feeds in Foxe Basin during the summer months (Kristofferson unpublished).

#### East Baffin Island Coastal Zone (1-C)

- fiords along the east coast of Baffin Island support particularly high densities of breeding ringed seals (McLaren 1958; Smith 1973).
- bearded seals breed along the polynya and into the offshore pack ice (Koski and Davis 1979; Smith et al. 1979).
- eastern Baffin shoreleads provide access between winter and summer ranges for harp seals (Koski and Davis 1979) and for narwhal and bowhead migrating from Pond Inlet to Cumberland Sound (Koski and Davis 1979).

#### Map Sheet 2

##### Foxe Basin

as per map sheet 1.

##### Southern Southampton Island (2-A)

- walrus, beluga and bowhead migrate through the waters of Fisher and Evans Strait in spring and fall (Richard pers. comm.).
- walrus are extensively hunted in these waters by the Inuit of Coral Harbour (Freeman 1976).
- ice in Fisher and Evans Strait provides good seal and walrus habitat.

##### West Coast - Hudson Bay (2-B)

- an extensive shorelead system develops along the coast each year (Smith and Rigby 1981) which provides early access to summering areas and provides wintering areas for beluga, ringed and bearded and harbour seal (Sergeant 1968; Mansfield et al. 1975 b; Stirling et al. 1977).
- Inuit of Keewatin communities utilize the area extensively to hunt seals, walrus and beluga (Freeman 1976).
- rivers entering the western coast of Hudson Bay support populations of arctic charr (Peet unpublished data) that feed in the coastal zone during the summer season.

Map Sheet 3

## Mackenzie River (3-A)

- importance of Mackenzie River as a migratory route for large numbers of fish (inconnu, broad whitefish, least cisco, arctic cisco, lake whitefish) has been demonstrated in numerous hearings and reports (Berger 1977; FEARO 1980).

Map Sheet 4

## Mackenzie River (4-A)

See Map Sheet 3.

Map Sheet 5

## Mackenzie Delta - Beaufort Sea Coastal Zone (5-A)

- the importance of the nearshore and inshore areas of the Beaufort Sea as overwintering, nursery, feeding and spawning areas and as migration corridors to marine and anadromous fish (inconnu, broad whitefish, lake whitefish, least cisco, arctic cisco, arctic charr, arctic cod, pacific herring) has been described in many reports (Kendel et al. 1975; Percy 1975; Lawrence et al. in prep.). Anadromous species utilize freshwater areas along the coast.

## Cape Bathurst Polynya (5-B)

- beluga and bowhead utilize an extensive system of offshore leads to travel from wintering areas in the Bering Sea to reach their summer feeding areas in the Cape Bathurst polynya (Sergeant and Hoeck 1974; Fraker 1979).
- approximately 4 - 6,000 beluga and as many as 2,000 bowhead utilize this area (Fraker 1979; Braham et al. 1979).
- main use of leads along Banks Island occurs in mid-May.
- beluga feed in polynya before moving to concentration areas in Mackenzie River estuary in July.
- since beluga arrive in Mackenzie estuary with calves, it is suspected that the Cape Bathurst polynya is the major calving area for these animals (Fraker 1979).
- many beluga and bowhead remain in polynya throughout the open water season.
- sub-adult ringed seals and adult bearded seal make extensive use of the polynya and adjoining lead system (Stirling et al. 1977; Smith unpublished).
- Cape Bathurst polynya and lead system provides all habitat functions and requirements for bearded seal, and may be the only such area in the eastern Beaufort Sea area (Smith and Stirling 1975;

Stirling and Smith 1977).

Admundsen Gulf (5-C)

- Large numbers of ringed seal utilize the fast ice areas in Admundsen Gulf and along the coast of Banks Island as pupping areas (Smith and Stirling 1975; Stirling and Smith 1977).
- beluga and bowhead feed extensively throughout Amundsen Gulf during spring and summer (Fraker 1979).

Map Sheet 6

Lancaster Sound (6-A)

- the importance of the waters of Barrow Strait, Lancaster Sound, Peel Sound, Wellington Channel and Prince Regent Inlet to marine mammals on a seasonal basis has been well documented in both EARP hearings and in the Lancaster Sound Green Paper exercise.
- Approximately one-third (10,000) of the white whale population and 85% (20 - 30,000) of the narwhal population for North America migrate through or use the Sound (FEARO 1979). An unknown number of bowhead utilize the sound as a summer feeding area. As many as 150,000 harp seal have been observed migrating along the north coast of Bylot Island to summer feeding areas (Tuck 1957).

Jones Sound (6-B)

- substantial numbers of walrus, beluga, bowhead utilize Jones Sound during the summer season and are hunted by the Inuit of Grise Fiord (Freeman 1976).
- Jones Sound is an important migration route for walrus moving from wintering areas in the North Water to summer feeding areas in Fram Sound and north of North Kent Island (Stirling et al. 1981).
- Cape Vera - St. Helena Island area at the head of the Sound has been proposed as an IBP ecological site due to its importance to marine mammals (Nettleship and Smith 1975).

Map Sheet 7

Foxe Basin (7-A)

See Map Sheet 1.

Baffin Bay (7-B)

- the importance of Baffin Bay to the eastern Arctic biological system has been documented in the numerous reports prepared for the Eastern Arctic Marine Environmental Study Program.

Map Sheet 8

North Water - Kane Basin (8-A)

Same comments as for Baffin Bay sheet 7.

Jones Sound

See comments for Map Sheet 6.

Wellington Channel - Queens Channel

- walrus, beluga and bowhead make extensive use of these areas as summer feeding areas (Davis et al. 1978; Davis et al. 1980).

Map Sheet 200

Coastal Zone Western Hudson Bay

See comments for Map Sheet 1.

Coastal Zone Eastern Hudson Bay (200-B)

- the coastal zone of eastern Hudson Bay fulfills the same habitat requirements for beluga as does Western Hudson Bay but for a reduced number of animals.
- local concentrations of walrus occur in the shoreleads surrounding the Ottawa, Sleeper and Belcher Islands (Loughrey 1959; Mansfield 1958).
- the waters of eastern Hudson Bay are important summer feeding areas for undetermined numbers of harp seal (Sergeant 1965; Mansfield 1968, 1970).

James Bay (200-C)

- white whales have been reported overwintering in the persistent leads of James Bay (Jonkel 1969).

Coastal Zone- Southampton Island

See Map Sheet 2.

## YELLOW AREAS

These are areas of general use by fish and marine mammals where some harvesting activities may occur. Some of these areas have a limited biological and/or oceanographic data base on which to classify them. Exploration may proceed in these areas following site specific assessments and with site specific terms and conditions.

## CRITERIA

Environmental Importance

- areas of general use by marine mammals as pupping, feeding habitat and travel corridors.
- areas of general use by harvested or ecologically important species.
- areas in which some harvesting of fish and marine mammals occurs.

Limited Data

- oceanographic and biological data bases inadequate to make decisions.

## AREAS SELECTED AND RATIONALE

Map Sheet 1

## South Davis Strait (1-1)

- unconsolidated pack ice is used as general overwintering habitat by large numbers of bowhead, beluga and narwhal (McLaren and Davis 1981).
- large populations (30 - 50,000) of hooded seals breed and whelp in the offshore pack ice of South Davis Strait in March and April (Sergeant 1974).
- relatively low use of the area by marine mammals during the open water season (Collins 1980; Stemp 1981).

Map Sheet 2

No designated yellow areas.

Map Sheet 3

No designated yellow areas.

Map Sheet 4

No designated yellow areas.

Map Sheet 5

## Beaufort Sea (5-1)

- general marine mammal habitat.
- some feeding by bowhead and beluga (Fraker 1979).
- limited amount of data with respect to marine system beyond the limits of the transition zone.

## Prince of Wales Strait (5-2)

- very limited amount of biological data.

## M'Clure Strait (5-3)

- very limited amount of biological or oceanographic data available.

Map Sheet 6

## Viscount Melville Sound (6-1)

- general use of east end of Sound by ringed seals.
- due to high degree of ice coverage, marine mammals do not venture far into the area.
- no Inuit resource utilization in area (Freeman 1976).

## M'Clintock Channel (6-2)

- general seal habitat.
- little information available on marine ecosystems in the area.

## Queen Maud Gulf (6-3)

- general seal habitat (all functions).
- coastal streams all support arctic charr populations which feed in marine waters during summer months.

Map Sheet 7

No yellow areas.

Map Sheet 8

## Sverdrup Basin (8-1)

- due to a limited amount of data concerning the marine environment the entire Sverdrup Basin is coloured yellow.

23.

Ellesmere Island - Axel Heiberg Island Marine Area (8-2)

- limited data available.

Map Sheet 9

- very limited data available for all areas.

Map Sheet 200

See comments as per sheet 2.

GREEN AREAS

Areas having a relatively low degree of biological importance and in which standard exploratory procedures may be undertaken utilizing standard operating conditions.

CRITERIA

Environmental Importance

- areas of limited use by marine mammals.
- areas of limited use by important fish species.
- areas with little or no harvesting of fish and marine mammals.

AREAS SELECTED AND RATIONALE

Map Sheet 1

No designated green areas.

Map Sheets 2 and 200

Central Hudson Bay (2-A)

- very limited use of central Hudson Bay by marine mammals.
- on basis of previous review of potential exploratory permits by DFO in 1980, area is considered "green" for future exploration and subject to current/future operating procedures or conditions.

Map Sheets 3 - 9

No designated green areas.

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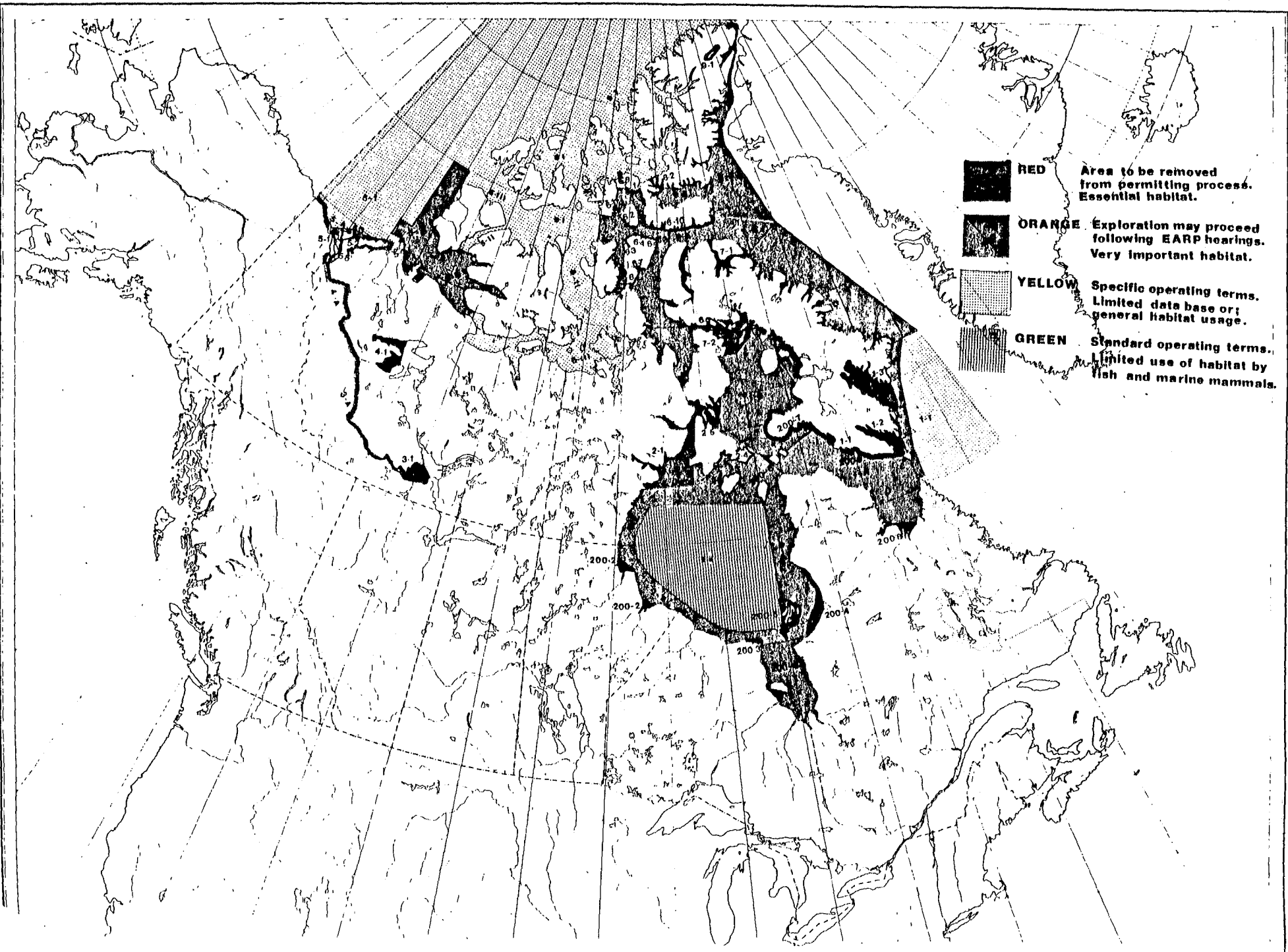
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- RED** Area to be removed from permitting process. Essential habitat.
- ORANGE** Exploration may proceed following EARP hearings. Very important habitat.
- YELLOW** Specific operating terms. Limited data base or; general habitat usage.
- GREEN** Standard operating terms. Limited use of habitat by fish and marine mammals.