

# **Fish Harvesting Activities Within the Proposed Gwaii Haanas National Marine Conservation Area**

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NATIONAL MARINE CONSERVATION AREA

by

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## ABSTRACT

Hillier, C.J., Gueret, D., Butterfield, S., and Pellegrin, N. 2007. Fish harvesting activities within the proposed Gwaii Haanas National Marine Conservation Area. Can. Manuscr. Rep. Fish. Aquat. Sci. 2803: vi + 65 p.

On June 13<sup>th</sup>, 2002, Canada passed the *Canada National Marine Conservation Areas Act* which gives Parks Canada the authority to establish a system of marine conservation area reserves that are representative in the oceans Atlantic, Arctic, Pacific, and the Great Lakes. The *Canada National Marine Conservation Areas Act* provides for opportunities, through the zoning of marine conservation area reserves, for the ecologically sustainable use of marine resources for the lasting benefit of coastal communities. In order to establish a National Marine Conservation Area (NMCA), Parks Canada must consult with local communities, First Nations and other governments. The *Canada National Marine Conservation Areas Act* specifies that Fisheries and Oceans Canada (DFO) will work with Parks Canada in managing fisheries in the NMCA based on the provisions of the *Canada National Marine Conservation Areas Act*. The establishment of the Gwaii Haanas NMCA in Haida Gwaii, Queen Charlotte Islands, will challenge DFO in this regard. To enable effective collaborations, this report identifies the location of fisheries occurring within or in the vicinity of the proposed Gwaii Haanas NMCA. The report also includes a brief description of these fisheries as well as the various industry groups, contacts.

## RÉSUMÉ

Hillier, C.J., Gueret, D., Butterfield, S., and Pellegrin, N. 2007. Fish harvesting activities within the proposed Gwaii Haanas National Marine Conservation Area. Can. Manuscr. Rep. Fish. Aquat. Sci. 2803: vi + 65 p.

Le 13 juin 2002, le Canada a adopté la *Loi sur les aires marines nationales de conservation du Canada* qui charge Parcs Canada d'établir un système d'aires marines de conservation représentatives des océans Atlantique, Arctique et Pacifique et des Grands Lacs. La Loi prescrit, grâce au zonage des aires marines de conservation, l'utilisation durable sur le plan écologique des ressources marines dans l'intérêt à long terme des localités côtières. Lors de l'établissement d'une aire marine nationale de conservation (ANMC), Parcs Canada doit consulter les collectivités locales, les Premières Nations et les autres paliers de gouvernement. La Loi stipule que Pêches et Océans Canada devra collaborer avec Parcs Canada sur le plan de la gestion des pêches dans les ANMC en vertu des dispositions de la *Loi sur les aires marines nationales de conservation du Canada*. L'établissement de l'ANMC Gwaii Haanas à Haida Gwaii, îles de la Reine-Charlotte, constituera un défi pour Pêches et Océans Canada. Afin d'assurer l'efficacité des initiatives de collaboration, ce rapport détermine l'emplacement des activités de pêche ayant lieu soit à l'intérieur soit à proximité de la zone proposée pour l'ANMC Gwaii Haanas. Le rapport comprend également une brève description de ces pêches, les coordonnées des représentants et des divers groupes industriels concernés.



## INTRODUCTION

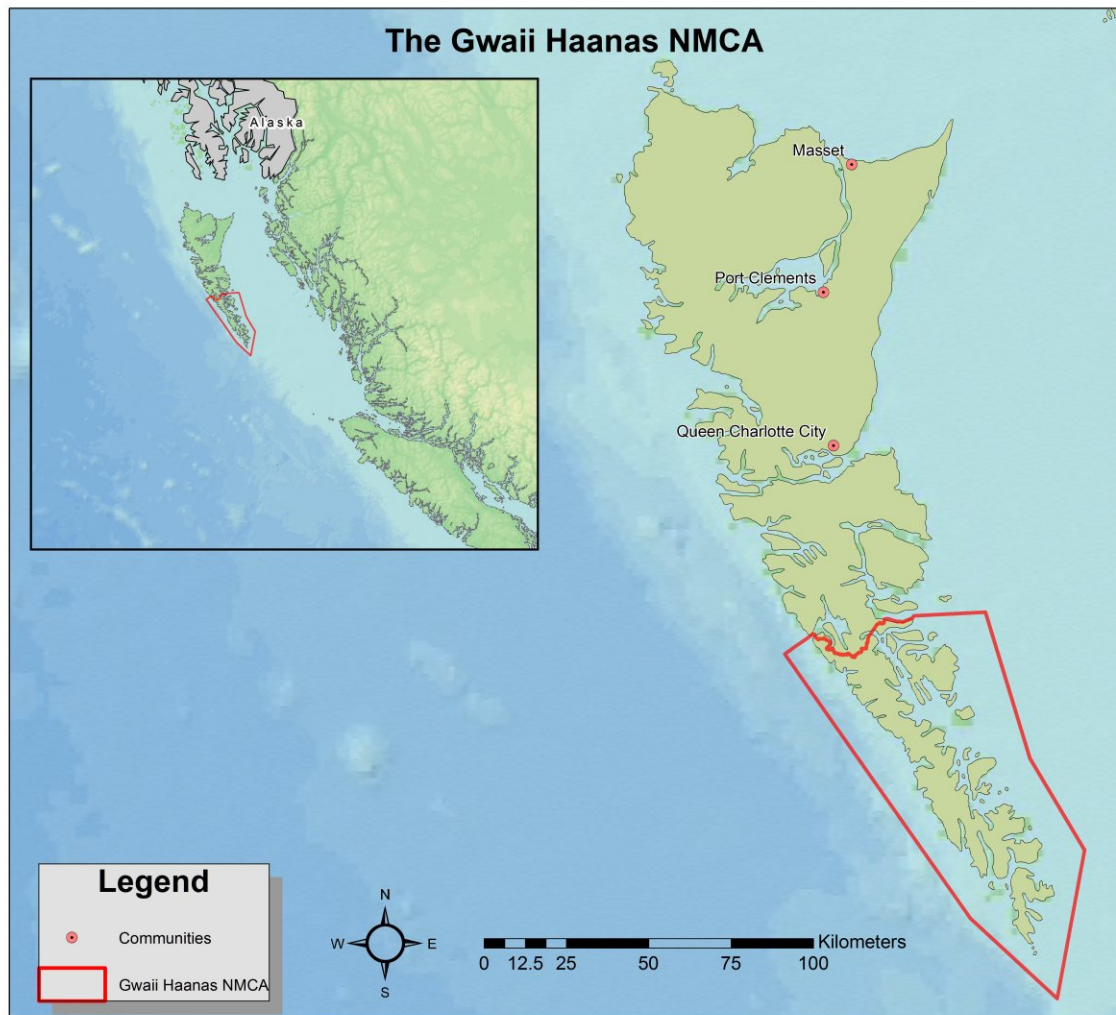
The *Canada National Marine Conservation Areas Act* (Act) charges Parks Canada with the task of establishing a system of NMCA within Canada's coastal waters. This Act stresses integrated and collaborative approaches that "consider the implications for ecosystems in the planning and management of marine conservation areas". It "involves federal and provincial ministers and agencies, affected coastal communities, aboriginal organizations, aboriginal governments, bodies established under land claims agreements, and other appropriate persons and bodies in the effort to establish and maintain a representative system of marine conservation areas"; while providing for the continued management of marine resources within the NMCA by DFO.

Gwaii Haanas (Figure 1), located in the southern portion of Haida Gwaii (with the gazetted name of the Queen Charlotte Islands), is one of the proposed NMCA's in the Pacific region. At present, Parks Canada is identifying ecosystems within the Gwaii Haanas NMCA. Within, or directly adjacent to the proposed Gwaii Haanas NMCA, numerous marine harvesting activities occur. It is anticipated that a "zoning plan" to protect representative and sensitive ecosystems within the NMCA will be developed. While DFO will continue managing marine resources within the NMCA, depending on the conservation objectives established, Parks Canada's planning and zoning may affect current harvesting regimes, spatially, temporally or by gear type.

Working collaboratively with Parks Canada and managing marine resources in the manner established by the Act, while not affecting the status quo management regime may prove difficult for DFO. As a result, the development, and implementation of the Gwaii Haanas NMCA may prove challenging.

This report aims to inform a broad readership of the fish harvesting activities within the vicinity of the Gwaii Haanas NMCA. This is to ensure informed participation in upcoming consultations necessary for declaration of the proposed Gwaii Haanas NMCA. To do this, the report examines marine harvesting activities within Gwaii Haanas and coast-wide, with the intention of identifying interests that may be impacted by management changes resulting from the establishment of the NMCA. This will assist managers and decision makers to consider some key socio-economic effects of any proposed zoning plans. Additionally, existing conservation areas within the proposed NMCA are also presented where they related to the management or restriction of fishing activities.

Anticipating the development of the Gwaii Haanas NMCA, Parks Canada is producing the *Living Marine Legacy of Gwaii Haanas* report series<sup>1</sup>. These reports provide baseline marine biological inventories for Haida Gwaii (Queen Charlotte Islands), including the proposed Gwaii Haanas NMCA. At present, five reports have been completed. Among those completed, is a baseline report inventorying marine invertebrates. It is likely that a marine fin fish report will be produced in the near future.



**Figure 1: Location of the Gwaii Haanas National Marine Conservation Area**

<sup>1</sup> The following reports have been completed:

1. Living Marine Legacy of Gwaii Haanas I: Marine Plant Baseline to 1999 and Plant-related Management Issues, March 2000
2. Living Marine Legacy of Gwaii Haanas II: Marine Invertebrate Baseline to 2000 and Invertebrate-related Management Issues, December 2001
3. Living Marine Legacy of Gwaii Haanas III: Marine Bird Baseline to 2000 and Marine Bird-related Management Issues throughout the Haida Gwaii Region, December 2002
4. Living Marine Legacy of Gwaii Haanas IV: Marine Mammal Baseline to 2003 and Marine Mammal-related Management Issues throughout the Haida Gwaii Region
5. Living Marine Legacy of Gwaii Haanas V: Coastal Zone Values and Management around Haida Gwaii

## DATA SOURCES AND ANALYTICAL METHODS

While harvest data is obtained through individual or multiple sources and programs for each fishery in British Columbia (BC), there are certain restrictions regarding the disclosure of this information. Section 20(1)(b) of the *Access to Information Act*, prevents DFO from disclosing to a third party, records containing confidential financial, commercial, scientific or technical information; and section 20(1)(c) of the Act prevents the disclosure of data which may reasonably be expected to result in material financial loss or reasonably be expected to prejudice the competitive position of the fisher, information can be released if:

1. Data is used for personal and public non-commercial use;
2. Users exercise due diligence in ensuring accuracy of materials reproduced; and
3. DFO is identified as the source department.

However, DFO does disclose commercial harvest information in a manner that ensures compliance with the *Access to Information Act*. Third party records are aggregated in such a manner that information pertaining to individual fish harvesters is protected. The standard for aggregation is that a minimum of three harvesters have landings in a particular area, which, as noted below can constrain the geographic or temporal scale of data presentation.

### DATA SOURCES

The sales slip data base contains data on landed values and total catch at the scale of the Pacific Fishery Management Areas (PFMA). For the purposes of this report, all data on landed value were obtained from this database. Landings are recorded by PFMA. As a result, separate landed values of harvest from Gwaii Haanas are not possible.

In addition to the sales slip data base, detailed harvest and effort data is collected through logbook, observer or Dockside Monitoring Program (DMP) specific to each fishery, and maintained in individual databases. Databases are updated on an annual or, in some cases, more frequent basis. In most cases, catch, effort and landed value information within these databases does not precede 1995. Where available, these data sources were used to determine catch and effort within Gwaii Haanas, and map the locations and extent of fisheries in the Queen Charlotte Islands.

Hook and Line fisheries, outside ZN and the Schedule II fisheries, were extracted from the Pacific Harvest Hook and Line (PacHarvHL) database, managed by the Groundfish Section, Marine Ecosystem and Aquaculture Division. Data is recorded geospatially using latitude and longitude. Data from these Subareas were mapped to determine the extent of fishing activity within the proposed NMCA and out to a 2.2 kilometre buffer zone. The buffer zone was calculated to take into account that the average length of a single skate (section of a long line), approximately 550 metres and often two to six skates are connected to create one long line for a fishing set. Since the average number of skates used during a fishing set is four and their average length is 550 metres, a 2.2 km buffer was calculated.

Groundfish trawl data is collected from the PacHarvTrawl database (Groundfish Division). It is noted that there is greater confidence in the recorded latitude and longitude than in the recorded PFMA from the year 2000 onwards. Thus, data is mapped by latitude and longitude and sorted based on the following priorities:

1. Data was considered to be representative of a Subarea if the PFMA matched the location of the point mapped by latitude and longitude;
2. Data points mapped by latitude and longitude and found within the NMCA boundary but not matching the recorded PFMA, was summed and grouped into NMCA categories “West Undefined” and “East Undefined”; and
3. The data queried for ZN Hook and Line and Schedule II represents fish harvester logbook estimates “fisherlogs” between 1993 and 2004. Data from 1993 and 1994 is considered “incomplete”, 1995 to 2004 “complete” and all data from 1993 to 2004 is included in the results. Fisherlog data was recorded by both Management Area and Subarea in addition to a latitude and longitude (mean of set line).

Data points not having corresponding mapped data points by latitude and longitude outside the NMCA were summed and grouped into the category “Outside NMCA-Undefined”. This database stores catch and effort data from commercial hook and line fisheries in BC, excluding salmon troll.

The International Pacific Halibut Commission (IPHC) maintains comprehensive logbook data on fisheries occurring in BC waters. DFO submitted a request to the IPHC to provide spatial data on halibut fishing effort in BC. At the time of the writing of this report, spatial data had not been supplied to DFO; however, spatial data on catch distribution was supplied to Parks Canada and is available for viewing in the report *Living Marine Legacy of Gwaii Haanas. V: Coastal Zone Values and Management around Haida Gwaii*.

Pacific salmon fishery catch information is collected through landing records (fishslips/landing records, sales slips) which are compiled in the PACHARV3 database and through limited DMP. For the purposes of this analysis, data was obtained from the PACHARV3 database, maintained by the Catch Statistics Unit in Vancouver, BC. Coast-wide, commercial salmon data is collated by PFMA for each salmon fishery gear type and includes catch weight, number of salmon (piece count), and the summed dollar value for each. As landings are recorded by PFMA, separating catch, effort and landed values of harvest for Gwaii Haanas are not possible.

Invertebrate datasets were assembled directly from the Shellfish Data Units harvest log database located at the Pacific Biological Station (PBS).

## **DATA ANALYSIS**

A fisheries catch summary grid was established by DFO’s Groundfish Trawl, Shellfish and Oceans and Habitat Enhancement Branches for the production of this report. By presenting the data by grid cell, the area for which the data was collected, the actual fishing location and value is obscured within the grid cell. Thus the catches of the three

or more vessels are reflected in the entire cell. Commonalities of the data sets presented include spatial representation in Arc GIS format and tabular format, recording both effort and catch in pounds or kilograms. All information gathered used the common PFMA rather than the ground fish management areas. Resource maps generated throughout this report are created by extracting information from the appropriate DFO Fisheries Management database. In some cases buffers are used to account for gear type since the location mapped represents the mid-point of a set and an average (sablefish set) trap and long line length is three km. Data from these Subareas were mapped to determine the extent of fishing activity within the proposed NMCA and out to 1.5 km.

Thus, results from different fisheries spatially coincide with a given cell size, facilitating spatial analysis of catch data for multiple fisheries. The following are the established specifications:

1. Origin of 139°0'0"W, 45°0'0"N (BC Albers: Easting -27940m, Northing 94650m) at the lower left corner;
2. Prepared using the BC Albers Equal Area Conic projection, Datum NAD83; and
3. Cell size will depend on the data set, preferably rounded to the nearest kilometer (e.g. 2, 4, 5, 8, 10, 20 km).

Conforming to DFO policy on the release of commercial fishing data, data is presented in as fine as scale possible, but conforms to the data disclosure requirement where at least three vessels have reported fishing activity. Cells containing less than three vessels are excluded from the results and are not noted on the maps generated.

Invertebrate fisheries logbook data is provided in ten kilometer grid cells. For finfish fisheries four kilometer grid cells are presented. This technique effectively divides the spatial extent of the data set into a contiguous grid of square cells of a specified diameter. The results are reported in BC Albers "northings" and "eastings".

## EXISTING CONSERVATION AREAS WITHIN THE PROPOSED GWAI HAANAS NATIONAL MARINE CONSERVATION AREA

### ROCKFISH CONSERVATION AREAS

In response to conservation concerns, a Rockfish Conservation Strategy was established in 2002, identifying 28 Interim Areas of Restricted Fishing (IARF). In 2004, 89 Rockfish Conservation Areas (RCAs) were implemented on the BC coast. In spring, 2005, 16 new RCAs, effective June 1<sup>st</sup>, 2005 were announced. Established to prevent further impact to inshore rockfish and their associated habitat, RCAs provide a buffer against scientific uncertainty, and are considered an essential element in the protection and rebuilding of rockfish stocks. Two of the three RCAs within the Queen Charlotte Islands, Lyell Island and South Moresby are found in Gwaii Haanas (Figure 2). Limited fishing activity is permitted within RCAs but activities causing rockfish mortality are prohibited. For more information on RCAs see the Groundfish section on page 35.

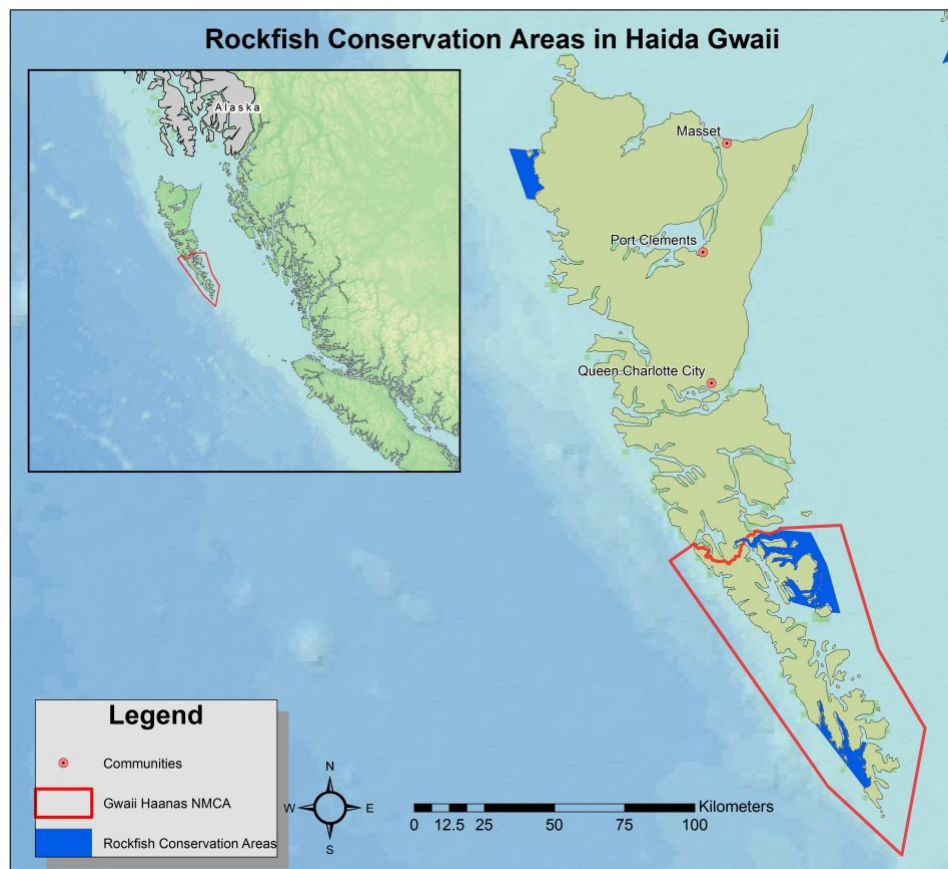


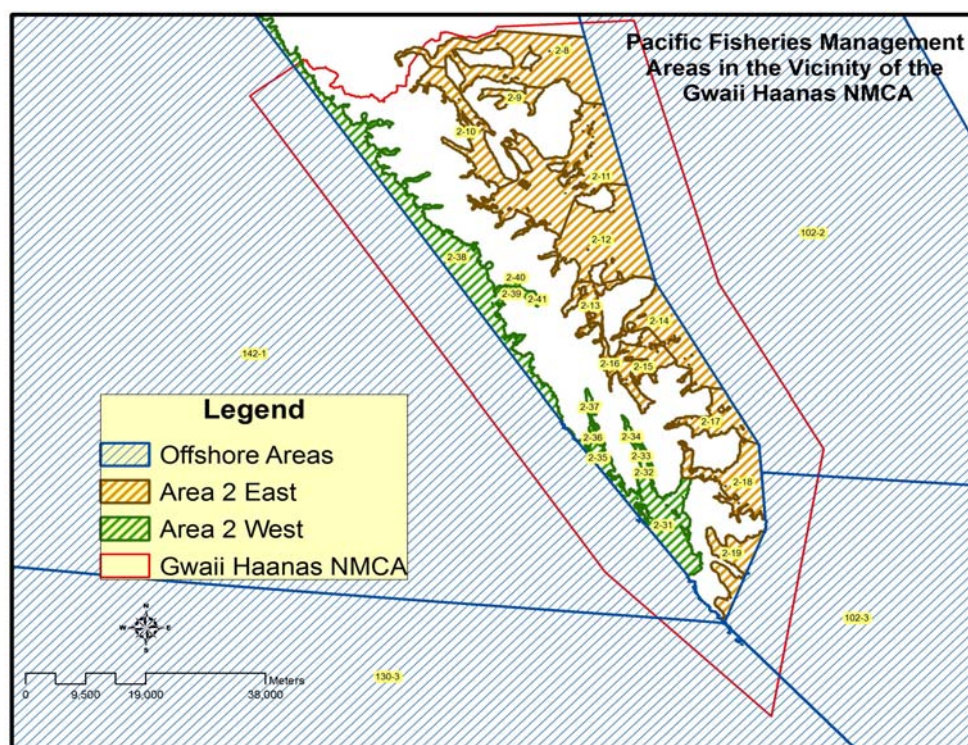
Figure 2: Rockfish Conservation Areas in Haida Gwaii



## FISHERIES WITHIN THE PROPOSED GWAII HAANAS NATIONAL MARINE CONSERVATION AREA

Fisheries in the Pacific Northwest are managed spatially. Regulations prescribe openings, closures, the gear allowed, as well as harvest limits by location within PFMA's. PFMA's are divided into Subareas. Currently, active details regarding fisheries management activities are prescribed through variation orders issued by DFO. The management of fisheries within the PFMA's is more extensively described through Integrated Fisheries Management Plans (IFMP). IFMP's are published documents for the general public, by species, that present the overall fishing requirements for the year(s) given. Information includes, but limited to, historical data, gear requirements, openings, closures and specific reporting requirements. To view IFMP's for the Pacific region, see the website at [www.pac.dfo-mpo.gc.ca/ops/fm/fishmgmt\\_e.htm](http://www.pac.dfo-mpo.gc.ca/ops/fm/fishmgmt_e.htm) and select Fisheries Management Plans.

The proposed Gwaii Haanas NMCA is located in PFMA's 2 East and 2 West; incorporating Subareas 2-7 to 2-19 within Area 2 East, 2-31 to 2-41 within Area 2 West, and offshore Subareas 102-2, 102-3, 130-3 and 142-1. The boundary, between Area 2 and the offshore Subareas of 102-2, 102-3, 130-3 and 142-1, is generally referred to as the surf line (Figure 3). A copy of these regulations is available from the DFO Department of Justice website at <http://laws.justice.gc.ca/en/f-14/sor-82-215/121150.html>.



**Figure 3: Pacific Fisheries Management Area Subareas in Vicinity of the Gwaii Haanas**

Marine harvesting has been carried out in Haida Gwaii for millennia. Table 1 provides a complete list of the commercial fisheries that have occurred, or are occurring, within the boundaries of the Gwaii Haanas NMCA.

**Table 1: Marine Species and Method of Harvest of Species That Have Been/Are Harvested Commercially Within the Gwaii Haanas NMCA**

| Common Name   | Scientific Name   | Harvest Method                    |
|---|---|-----------------------------------|
| Northern Abalone  | <i>Haliotis kamtschatkana</i>   | Dive and Handpick                 |
| Horse Clam*   | <i>Tresus nuttallii</i> and <i>Tresus capax</i>   | Dive                              |
| Native Littleneck Clam  | <i>Protothaca staminea</i>  | Handpick                          |
| Butter Clam   | <i>Saxidomus gigantea</i>   | Handpick                          |
| Octopus   | <i>Octopus dofleini</i>   | Dive and Trap                     |
| Neon Flying Squid   | <i>Ommastrephes bartrami</i>  | Jig (Exploratory)                 |
| Opal Squid  | <i>Loligo opalescens</i>  | Trawl or Seine                    |
| Shrimp (including Prawn)*   | Family <i>Pandalidae</i>  | Trawl or Trap                     |
| King Crab   | <i>Paralithodes camtschatica</i>  | Trap (Exploratory)                |
| Goose Barnacle  | <i>Pollicipes polymerus</i>   | Handpick                          |
| Green and Red Sea Urchin*   | <i>Strongylocentrotus droebachiensis</i> and <i>Strongylocentrotus franciscanus</i>                                       | Dive                              |
| Geoduck Clam*   | <i>Panopea abrupta</i>  | Dive                              |
| Dungeness Crab*   | <i>Cancer magister</i>  | Trap                              |
| Herring*  | <i>Clupea pallasii</i>  | Gill Net, Seine and Spawn on Kelp |
| Salmon*   | <i>Oncorhynchus sp</i>  | Troll, Seine and Gill Net         |
| Rockfish and Thornyhead*  | <i>Sebastes sp</i> and <i>sebastolobus sp</i>   | Hook and Line and Trawl           |
| Halibut*  | <i>Hippoglossus stenolepis</i>  | Hook and Line                     |
| Sablefish*  | <i>Anoplopoma fimbria</i>   | Hook and Line, Trap and Trawl     |
| Cod including Pacific Cod, Pacific Hake, Pacific Tomcod, Walleye Pollock*       | <i>Gadus macrocephalus</i> , <i>merluccius productus</i> , <i>Microgadus proximus</i> and <i>Theragra chalcogramma</i> .  | Hook and Line and Trawl           |
| Flatfish including Butter Sole, Dover Sole, English Sole and Greenland Halibut* | <i>Isopetta isolepis</i> , <i>Microstomus pacificus</i> , <i>Parophrys vetulus</i> and <i>reinhardtii hippoglossoides</i> | Hook and Line and Trawl           |
| Lingcod*  | <i>Ophiodon elongatus</i>   | Hook and Line and Trawl           |
| Spiny Dogfish*  | <i>Squalis acanthias</i>  | Hook and Line and Trawl           |
| Skate*  | <i>Torpedinidae</i>   | Hook and Line and Trawl           |

\*Denotes fisheries that are still occurring.

At present, 15 commercial fisheries occur within or adjacent to the boundaries of the proposed Gwaii Haanas NMCA. These include: the geoduck dive fishery; Dungeness crab by trap and red sea urchin dive fisheries; prawn trap fisheries; the herring seine; gill net and spawn on kelp (SOK) fisheries; the salmon gill net; seine and troll fisheries; the groundfish hook and line and trawl fisheries; the halibut hook and line fishery; the sablefish by trap or hook and line fishery; shrimp by trawl and the miscellaneous species hook and line fishery. As well, there is a by-catch of horse clams from the geoduck fishery that is sold commercially.

Recreational fisheries and First Nation's harvesting activities also occur within the Queen Charlotte Islands. While much of Gwaii Haanas is open for recreational fishing for all of the above species, except northern abalone, most of the effort is directed toward salmon



and currently occurs in the northern portion. The First Nation's food, social and ceremonial harvesting occurs throughout Haida Gwaii.

Stock assessment approaches used to manage BC salmon, groundfish, pelagic, and invertebrate fisheries range from simple to highly sophisticated stock assessment techniques. These measures include indices of recruitment, abundance, harvest rate, catch, and catch per unit effort (CPUE). Even the best stock assessment techniques, however, cannot completely remove uncertainty in managing stocks. In BC, increasingly conservative harvest levels are established as uncertainty in stock status and harvest impacts increases.

This report does not attempt to provide an exhaustive overview of the marine harvesting occurring either within or in close proximity to the proposed Gwaii Haanas NMCA. The various Marine Legacy reports describe, in detail, the marine resources within this region. This report merely shows these disparate marine harvesting activities as they relate to each other. Thus, the following sections provide very brief information on each of these fisheries, where the fishery occurs and to what extent, and then information on the economic importance of the fishery coast-wide and to the Haida Gwaii region where data permits. Where applicable, the report also provides information regarding issues of importance to the Haida or residents of Haida Gwaii.

## INVERTEBRATE FISHERIES

Parks Canada's Marine Invertebrate Baseline Inventory Report provides comprehensive information on the status and management of invertebrate stocks in Haida Gwaii. This report identifies the general location of invertebrate fisheries occurring either within or near to the proposed Gwaii Haanas NMCA.

**Table 2: Status of Commercial Invertebrate Fisheries with the Gwaii Haanas NMCA**

| Species                 | Status  |
|-------------------------|---|
| Abalone, Northern       | Closed coast wide since 1990.   |
| Clam, Butter            | Closed due to lack of Paralytic Shellfish Poisoning (PSP) monitoring.                                       |
| Clam, Geoduck           | Active fishery throughout Haida Gwaii.  |
| Clam, Horse             | Taken incidentally in the geoduck fishery.  |
| Clam, Littleneck Native | Closed due to lack of PSP monitoring.   |
| Crab, Dungeness         | Active fishery centered in the eastern and northern coasts of Graham Island and northwestern Hecate Strait. |
| Crab, King              | No landings since 1996.   |
| Goose Barnacle          | No landings since 1994.   |
| Octopus                 | Taken by trap and dive. Trap licences were discontinued in 1999.  |
| Sea Urchin, Green       | No landings since 1990.   |
| Sea Cucumber            | No landings since 1995.   |
| Sea Urchin, Red         | Active fishery throughout Haida Gwaii.  |
| Shrimp Trawl            | Minor fishery; limited landings.  |
| Squid, Neon Flying      | Experimental or developing fishery.   |
| Squid, Opal             | No landings since 1988.   |

| Species    | Status   |
|------------|--|
| Squid, Red | Taken incidentally in Hecate Strait and Dixon Entrance bottom trawl fisheries. |

## **Geoduck Clam**

**Table 3: General Overview of the Geoduck Fisheries**

| Area and Fishery         | Season                    | # Licences          | Gear               | TAC 2006                  | Landing 2006 | Value 2006 |
|--------------------------|---------------------------|---------------------|--------------------|---------------------------|--------------|------------|
| North Coast Commercial   | Year-Round<br>Bed by Bed  | 55<br>Category G    | Stinger<br>By Dive | 2,376,068 lb              | 2,375,000 lb | \$8.98 lb  |
| North Coast Recreational | April 1 to<br>December 31 | Individual<br>Sport | Hand<br>Picking    | 3 Per Day<br>6 Possession | N/A          | N/A        |

## **History**

The commercial dive fishery for geoducks in BC began in 1976. The fishery expanded rapidly until 1979 when limited entry came into effect and harvest quotas were set for conservation. In 1989, with the support of industry, a management program with equal individual quotas (IQs) was initiated. IQs were set at 1/55 of the annual coast-wide quota and fish harvesters were required to select one of three licence areas in which to fish. As part of this initiative, area licensing and a three-year area rotation period for the fishery was established.

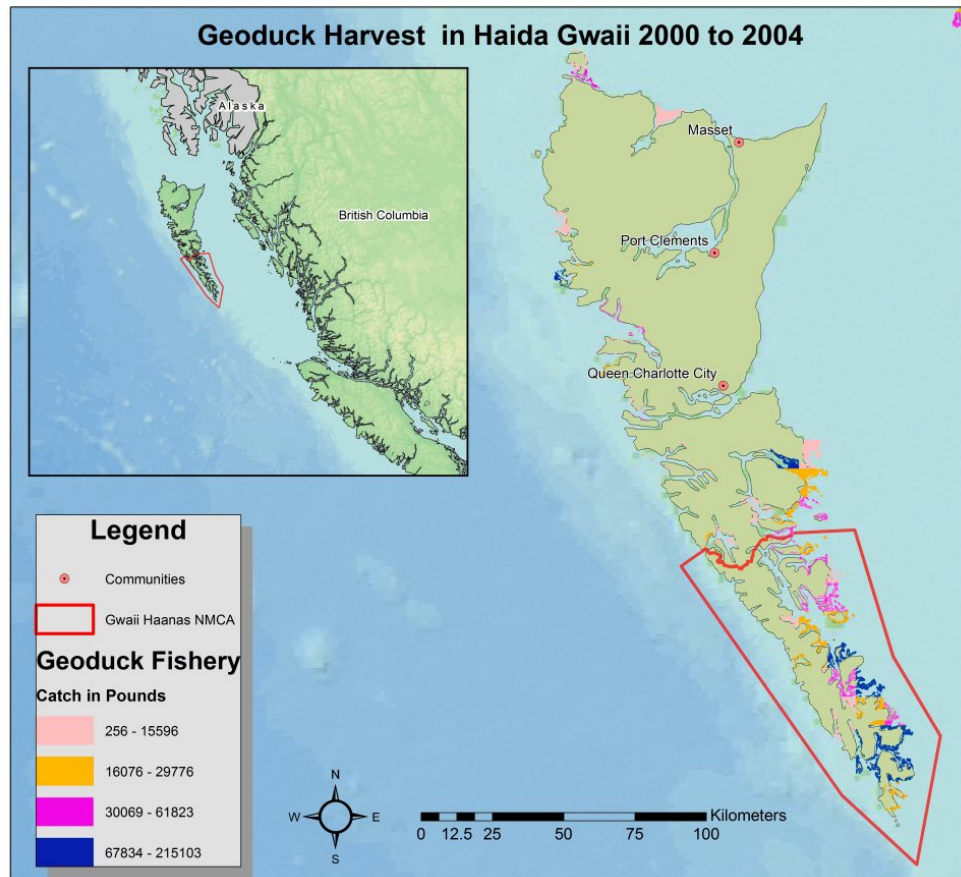
## **Overview**

The commercial geoduck dive fishery is managed by establishing harvest quotas for each geoduck aggregation or bed. Quotas are based on a fixed exploitation rate strategy based on estimates of virgin biomass. “Virgin stock biomass”, for each geoduck bed is calculated as a product of the estimate of the bed area, mean virgin geoduck density, and mean individual geoduck weight. Geoduck density is based on surveys in which the bed is first outlined on a nautical chart and then digitized into polygons. Geoduck openings rotate through each management zone every three years, with the last fishery occurring in the Gwaii Haanas in 2006. Geoduck may not be harvested from biotoxin closed areas, or for direct marketing from closed contaminated areas except by special permit licence under the *Management of Contaminated Fisheries Regulations*. Currently there is not an approved depuration process for geoduck.

## **Location**

Within the boundaries of the proposed NMCA, effort is focused in Area 2 East in Juan Perez Sound, Skincuttle Inlet and Houston Stewart Channel (Figure 4). The fishing areas identified in Figure 4 indicate the broad scale areas where geoduck fishing may occur and are based on logbook information from 2002 to 2004. The map in Figure 4 was generated from the logbook data, plotted in 10 kilometer grid cells where three or more fish harvesters per cell are known to fish. These grid cells are merged with the 0-20 meter bathymetric contours. Areas outside the spatial overlap are discarded. Thus, an illustration showing where fishing may occur, based on dive depth and logbook information, is the result. This map does not reveal the actual beds, and may cover more than the true spatial extent of the bed. Rather, this map illustrates the likely areas of

geoduck fishing activity, not the extent of the geoduck resource in *Haida Gwaii*. It is apparent from this map that geoduck harvesting does occur extensively within the bounds of *Gwaii Haanas*.



**Figure 4: Relative Location of Geoduck Fishing in Haida Gwaii 2000 to 2004**

### Stock Assessment

Stock assessment advice for the years 1997 to 2000 resulted in unchanged annual quotas over that time period. For 2001 and 2002 quota options were reviewed by PSARC (Hand and Bureau, 2000) and the total allowable catch (TAC) rose by 55,000 lb to 3,965,400 lb in 2003; however the TAC subsequently dropped to 3,795,000 lb due to stock concerns for the West Coast of Vancouver Island (WCVI) in the same year. Re-evaluation of bed status information on WCVI alleviated some of this concern and the TAC returned to 3,965,400 lb in 2004. In 2005, the TAC dropped to 3,443,800 lb due to a thorough bed by bed review conducted in 2004. The TAC remained at 3,443,800 lb in 2006.

### Sustainability

The biological objective is to harvest the available biomass on a sustainable basis and to manage this, where possible, on a bed-quota basis. The management objectives to accomplish these objectives are: harvest at a sustainable annual harvest rate of 1.2 to 1.8 percent of estimated current biomass; set individual vessel quotas (IVQ) for the

commercial fishery; validate all landings from the commercial fishery; conduct ongoing surveys and research; and close beds that are close to, or have exceeded, the biological reference point of an aggregate harvest of 60 percent of the original biomass. Sea otters are efficient predators on geoducks and other bottom fauna (urchins, crabs and other clams), and there is some concern over what effect otters may have on the geoduck fishery in areas where otters are present. As for aquaculture with geoduck, brood stock has been collected since 1993 and juvenile seed have been successfully produced at licensed hatcheries.

### **Monitoring**

Monitoring of the fishery is processed through a third party validation program at the first point of landing by DFO certified observers.

### **User Role**

The primary consultative body for geoducks is the Geoduck Sectoral Committee. This committee includes representatives from DFO, commercial vessel owners, processors, First Nations, BC Ministry of Agriculture and Lands, and recreational fish harvesters. Members of the Underwater Harvesters' Association (UHA) represent commercial fish harvesters on this committee. The UHA invests \$1.3 million annually on science and management coast-wide and employs their own biologist for co-management with DFO.

### **Recreational**

For more information on recreational fishing for geoducks, see the general section on page 53.

### **First Nations**

The geoduck fishery has significant economic value to the Haida Gwaii area because, "landings from the Gwaii Haanas area have averaged approximately 53 to 93 percent of total Haida Gwaii landings since onset of the triennial rotation regime." (Sloan, N.A., P.M. Bartier, and W.C. Austin. 2001). For more information on First Nations fisheries, see the general section on page 53.

### **Horse Clam**

**Table 4: General Overview of the Horse Clam Fisheries**

| <b>Area and Fishery</b>  | <b>Season</b>          | <b># Licences</b>   | <b>Gear</b>     | <b>TAC 2006</b>            | <b>Landing 2006</b> | <b>Value 2006</b> |
|--------------------------|------------------------|---------------------|-----------------|----------------------------|---------------------|-------------------|
| PFMA 2E Commercial       | Year-Round             | By-catch to Geoduck | Stinger By Dive | N/A                        | 3468 kg             | \$7,838           |
| North Coast Recreational | April 1 to December 31 | Individual Sport    | Hand Picking    | 6 Per Day<br>12 Possession | N/A                 | N/A               |

## **History**

Due to a lack of stock assessment information, the commercial fishery for horse clams has been limited since 1992 to an incidental fishery open only when the geoduck fishery is open.

## **Overview**

The horse clam fishery is predominantly an incidental fishery within the geoduck fishery and follows a similar commercial management regime. Currently, there is only one experimental horse clam fishery in BC located on Vancouver Island. This fishery will test the market for horse clams, and provide harvest and biological information needed to do further assessments of this fishery.

## **Location**

The incidental horse clam dive fishery occurs within the boundaries of the proposed Gwaii Haanas NMCA, and effort is focused in Area 2 East in Juan Perez Sound, Skincuttle Inlet and Houston Stewart Channel (Figure 4).

## **Stock Assessment**

The Comox Bar area is scheduled for re-survey in 2007, after which the fishery may take place with an assigned quota of 20,500 lb. (10,000 kg). Market feedback to date indicates the fishery is not profitable with the current intensive monitoring and survey requirements funded by the UHA. Catch and other harvest data will be recorded. The survey and fishery data will provide some insight into stock response to harvest and the market receptiveness to the product.

## **Sustainability**

Studies on the productivity of horse clam stocks and preliminary abundance surveys lead to two pilot fisheries for horse clams, one at Comox Bar in the Strait of Georgia and another in Lemmens Inlet on the WCVI. These closely monitored fisheries began in 2003, and continued through 2006, except that the Lemmens Inlet experimental fishery was not viable due to the number of horse clams available. The prospect for this fishery is sustainable under the current TAC and management framework. Harvestable stocks of horse clams appear to be limited at this time.

## **Monitoring**

Monitoring of the fishery is processed through a third party validation program at the first point of landing by DFO certified observers.

## **User Role**

The primary consultative body for geoducks is the Geoduck Sectoral Committee. This committee includes representatives from DFO, commercial vessel owners, processors, First Nations, BC Ministry of Agriculture and Lands, and recreational fish harvesters. Members of the Underwater Harvesters' Association (UHA) represent commercial fish

harvesters on this committee. The UHA invests \$1.3 million annually on science and management coast-wide and employs their own biologist for co-management with DFO.

## **Recreational**

For more information on recreational fishing for horse clams, see the general section on page 53.

## **First Nations**

Horse clams are of continuing importance to most coastal First Nations, who harvest them for food, social and ceremonial purposes. For more information on First Nations fishing for horse clams, see the general section on page 53.

## **Dungeness Crab**

**Table 5: General Overview of the Dungeness Crab Fisheries**

| <b>Area and Fishery</b>  | <b>Season</b>            | <b># Licences</b> | <b>Gear</b>        | <b>TAC 2006</b>            | <b>Landing 2005</b> | <b>Value 2005</b> |
|--------------------------|--------------------------|-------------------|--------------------|----------------------------|---------------------|-------------------|
| Coast-wide Commercial    | January 1 to December 31 | 222 Category R    | Traps or Ring Nets | Based on Size Limit        | 5,149 t             | \$5.18 kg         |
| North Coast Recreational | January 1 to December 31 | Individual Sport  | Net, Trap and Hand | 6 Per Day<br>12 Possession | N/A                 | N/A               |
| Coast-wide First Nations | January 1 to December 31 | 17 Category FR    | Traps or Ring Nets | Based on Size Limit        | N/A                 | N/A               |

## **History**

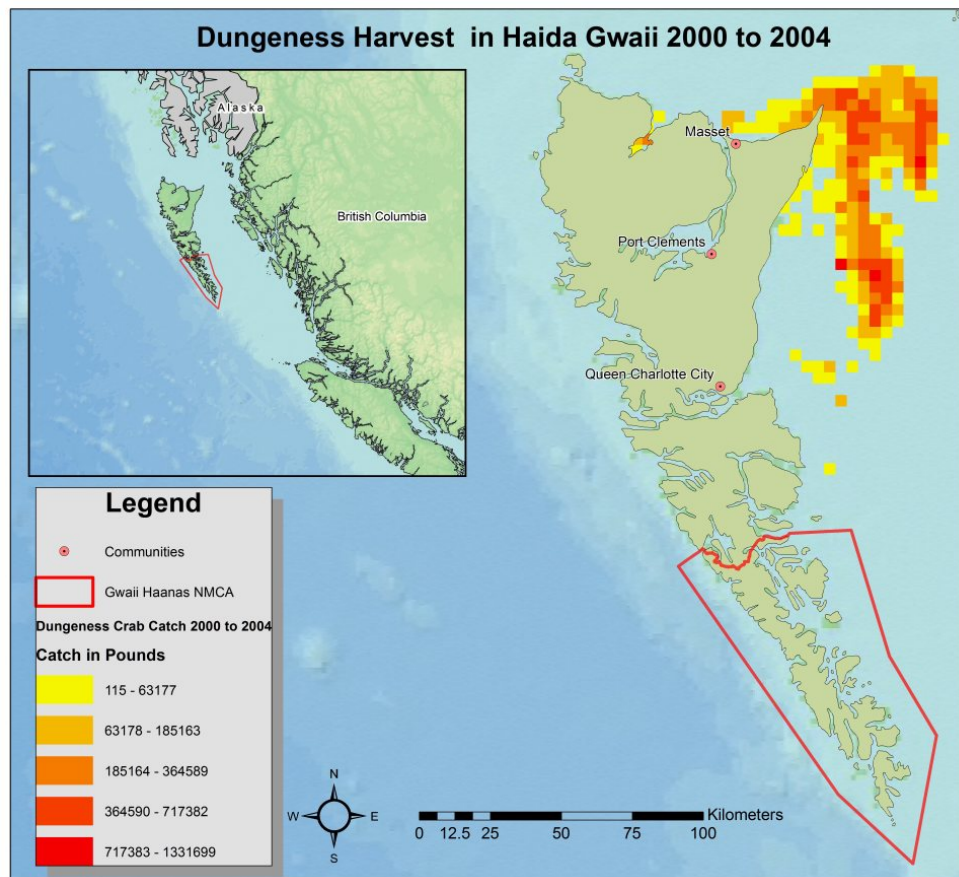
A commercial crab fishery existed prior to 1900s with the first recorded landings in 1885 (Butler 1984). There are now 222 commercial licence eligibilities for this fishery. The fishery is currently managed under a precautionary regime that includes a minimum harvestable size limit, limited commercial licensing, area licensing, trap limits, soak limits, sex restrictions, soft-shell restrictions and gear restrictions.

## **Overview**

Dungeness crabs are the most important species of crab harvested in BC and are exploited by commercial, aboriginal and recreational fish harvesters coast-wide. Baited traps or ring-nets are employed in the commercial Dungeness crab fishery. In Hecate Strait most fish harvesters use circular traps constructed of a heavy steel frame between 80 and 110 cm in diameter and 20 to 35 cm deep covered with a stainless steel mesh. The traps usually have two or more entrance tunnels and all regulations, commercial and recreational, require a biodegradable device preventing fishing if a trap is lost. There is a legal size limit of 165 mm carapace width (including spines); retention of females is prohibited in the commercial fishery. The size limit permits males one or two years of breeding before being fished and appears sufficient to ensure recruitment. (Sloan, N.A., P.M. Bartier, and W.C. Austin. 2001) Sloan et al reports that “The bumper fishing years in Haida Gwaii initiated heavy investment in new gear with attendant concerns over too much fishing effort, and gear or catch theft. In 2000, the number of traps was limited according to vessel size coast-wide.” (Sloan, N.A., P.M. Bartier, and W.C. Austin. 2001)

## Location

In the north coast the majority of harvesting occurs in the Hecate Strait and in the Skeena River estuary. Figure 5 illustrates the commercial Dungeness crab fishery in the vicinity of Haida Gwaii based on logbook information from 2002 to 2004. The fishing areas identified in Figure 5 indicate the broad areas where Dungeness crab fishing occurs. The maps were generated based on a four kilometer grid cell. Commercial Dungeness crab fishing occurs almost entirely on the north and eastern portions of Haida Gwaii. There is commercial crab fishing occurring within Gwaii Haanas, but the information provided only denotes where three or more vessels are known to fish.



**Figure 5: Location of Commercial Dungeness Crab Fisheries in Haida Gwaii**

## Stock Assessment

There is no indication of concern at this time for the conservation of crab stocks; the minimum size limit appears to be protecting the resource. A precautionary approach to management ensures DFO is meeting its conservation goals; however, abundance of harvestable sized male crabs is of concern in some areas. The long-term goal of DFO is to develop a biologically based management regime through a better understanding of the resource.

## **Sustainability**

Natural fluctuations in crab populations do not allow for a steady state or equilibrium harvest, consequently fisheries are not managed to a TAC. Conservation objectives are met through maintenance of the reproductive potential of crab stocks. Fundamental management goals are to protect female crab and leave sufficient male crab to breed. The size limit is designed to protect sexually mature male crab for at least one year prior to harvest. The protection of females and a significant portion of the mature males in crab populations ensure conservation and sustainable harvests.

## **Monitoring**

Full fishery monitoring, either through an at-sea observer or an electronic monitoring (EM) system is required; including biological sampling during on-grounds inspections. Vessel owners/licence holders participating in an at-sea fishery monitoring program must ensure the program includes a method to accurately monitor each individual trap haul, accurately record trap identification, and to accurately record fishing activity, fishing location, date, and time. If overall compliance with non-video EM systems is poor, DFO may consider implementing a requirement for all vessels to be equipped with a video camera commencing in future years.

## **User Role**

The primary consultative body for crab is the Crab Sectoral Committee. This committee includes representatives from DFO, commercial licence holders, processors, First Nations, recreational fish harvesters, the Province of BC and others with an interest in the resource. The Sectoral Committee meets annually to review and provide advice to DFO regarding management issues pertaining to the fishery and on the proposed management. The Gwaii Haanas area is specifically represented by the Area A Crab Association that works closely with DFO.

## **Recreational Fishing**

For more information on recreational fishing for Dungeness crab, see the general section on page 53.

## **First Nations Food, Social and Ceremonial**

First Nations fisheries are subject to the same size limit as the recreational and commercial fisheries. Size is determined as the maximum breadth of the carapace, including the spines, which must be a minimum of 165 mm for Dungeness crab, and 115 mm for red rock crab. First Nations harvesters may retain female crabs larger than the size limits. For more information on First Nations fisheries, see the general section on page 53.



## **Prawn by Trap**

**Table 6: General Overview of the Prawn by Trap Fisheries**

| <b>Area and Fishery</b>  | <b>Season</b>            | <b># Licences</b> | <b>Gear</b>           | <b>TAC 2006</b>            | <b>Landing 2006</b> | <b>Value 2006</b>     |
|--------------------------|--------------------------|-------------------|-----------------------|----------------------------|---------------------|-----------------------|
| Coast-wide Commercial    | May 1 to June 30         | 252 Category W    | Trap                  | Based on Spawner Index     | 22,235 mt           | \$13.20 to \$17.60/kg |
| Coast-wide Recreational  | January 1 to December 31 | Individual Sport  | Ring Net, Trap, Spear | 200 Per Day 400 Possession | N/A                 | N/A                   |
| Coast-wide First Nations | January 1 to December 31 | 7 Category FW     | Trap                  | Based on Spawner Index     | N/A                 | N/A                   |

## **History**

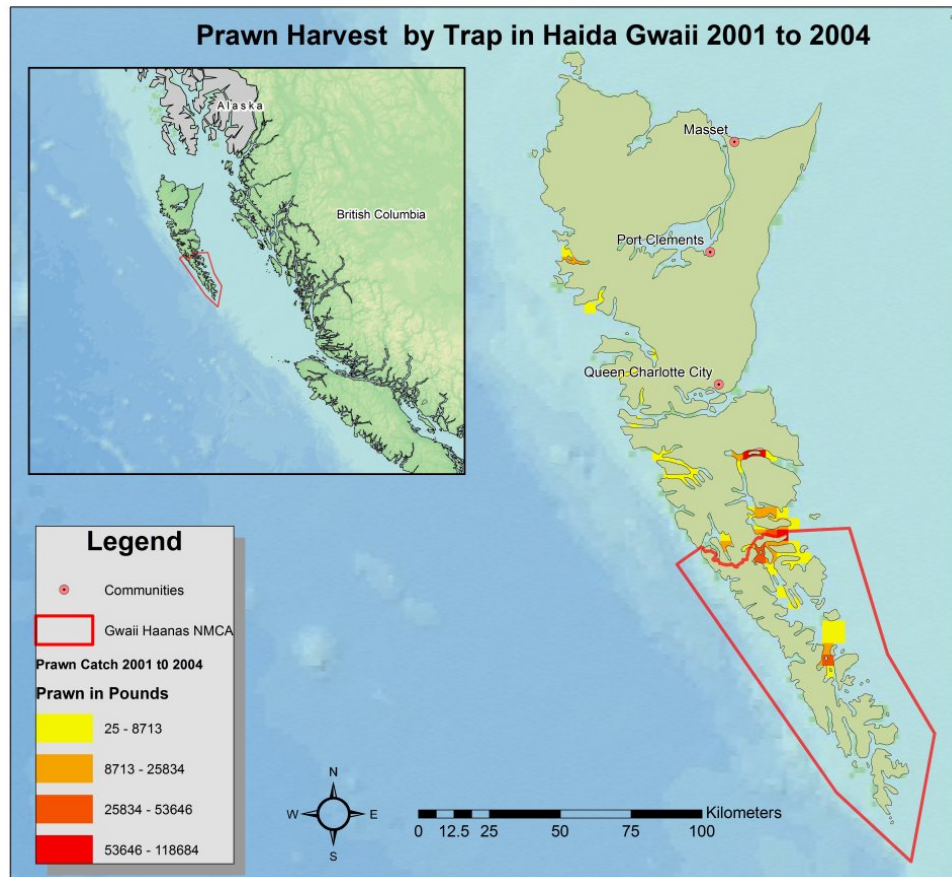
The prawn fishery has significant value to commercial fish harvesters. For instance, it is reported that, the total landed value of the prawn fishery exceeded \$26 million in 1996 and 1997. In 1998, the landed value fell to 20 million due to the weakened Japanese market. This fishery is also very important to the Gwaii Haanas area. “Within the north coast, Haida Gwaii accounted for less than 10 percent of annual landings until 1998. Since 1996, the majority of landings have come from the Gwaii Haanas area, from which landings increased strongly; 19.8 tonnes in 1997 to 48.8 tonnes in 1999.” (Sloan, N.A., P.M. Bartier, and W.C. Austin, 2001). The increase in catches from Gwaii Haanas is because the area is a relative new area for the prawn fishery. Since this fishery is considered fully exploited it is unlikely that the fishery is expanding. (Sloan, N.A., P.M. Bartier, and W.C. Austin, 2001). The shortest fishery on record was 79 days in 1999.

## **Overview**

This harvest is usually conducted by way of traps set at depths from 55 to 90 m on rocky bottoms. This inshore fishery is considered by DFO to be “fully exploited”, that is, all stock areas are known and likely to be fished annually. There is no TAC limit; instead, a suite of regulations manage the prawn fishery. These regulations include, but are not limited to: a fixed escapement target or spawner index threshold; a limit of 253 licence holders coast-wide; a limit of 300 traps per licence; two licences “stackable” to 500 traps per vessel; a legal size of 33 mm carapace length or 22 mm telson (tail) length (for product with head removed at sea); and a minimum trap mesh size allows escapement of undersized prawns.

## **Location**

Commercial prawn harvesting identified in Figure 6 indicates the broad areas where prawn by trap fishing occurs based on logbook information from 2002 to 2004. The majority of prawn fishing in Haida Gwaii is located in the inlets on the eastern side of the island, in the Cumsheewa, Selwyn, Darwin and Juan Perez Sound area. The reason no fishing is noted in Area 2W is that it is likely that there were less than three vessels per established grid cell, and thus, spatial information has not been released.



**Figure 6: Location of Commercial Prawn Fisheries in Haida Gwaii**

### Stock Assessment

The fishery usually opens in April to May, and is closed in-season when the “spawner index” declines to a pre-determined level. Early life stage mortality is a major factor affecting the future harvest-able surplus of prawn stocks. Stock strength cannot be forecasted from the abundance of preceding adult stocks. There are no pre-season fishery independent surveys and no estimate of total biomass.

### Sustainability

The primary conservation and sustainability tool in this fishery is the biological sampling of the prawn spawner index. The index is a measure of the number of female and transitional prawns which will bear eggs the following winter. The “baseline index” is the set of target values initially adopted in 1979, considered necessary and sufficient to ensure conservation of breeding stocks and long term sustainability of the fisheries on those stocks.

### Monitoring

The prawn by trap industry selects a private company to deliver significant at-sea monitoring components of the fishery. On-ground monitors collect spawner index samples, vessel gear inspections and information about rockfish by-catch. Each on-

ground monitor has at least four years of experience, and many of them have 12 years experience.

### **User Role**

The primary consultative body for prawn and shrimp by trap is the Prawn Sectoral Committee (PSC). This committee includes representatives from DFO, commercial licence holders, processors, First Nations, the Province of BC, and others with an interest in the resource. The PSC meets three times annually to provide advice to DFO regarding issues pertaining to the fishery.

### **Recreational Fishing**

There is no accurate information about catch and effort in the recreational prawn and shrimp trap fishery. Specific closure areas have varied considerably from year to year. Closures allow the remaining berried female prawns to complete egg incubation and release larvae with reduced fishing disturbance and handling mortality. For more information on recreational fishing for prawns, see the general section on page 53.

### **First Nations Food, Social and Ceremonial**

Areas identified as important to First Nations continued to be monitored with special attention (in the 2006 commercial fishing season) in Cumsheewa Inlet in the Queen Charlotte Islands (QCI). Some First Nation members are trained in spawner index collection, and catch information may be collected by their fisheries program personnel, or by Band administration offices, but DFO has not established a comprehensive program to receive, store and manage this information. For more information on First Nations fishing for prawns, see the general section on page 53.

### **Red Sea Urchin**

**Table 7: General Overview of the Red Sea Urchin Fisheries**

| <b>Area and Fishery</b>  | <b>Season</b>            | <b># Licences</b>  | <b>Gear</b>           | <b>TAC 2006</b> | <b>Landing 2006</b> | <b>Value 2006</b> |
|--------------------------|--------------------------|--------------------|-----------------------|-----------------|---------------------|-------------------|
| Coast-wide Commercial    | September 15 to July 31  | 99<br>Category ZC  | Dive by Hand<br>Rakes | 4393 t          | 2790 t              | \$1.10 lb         |
| Coast-wide Recreational  | January 1 to December 31 | N/A                | By Hand               | N/A             | N/A                 | N/A               |
| Coast-wide First Nations | January 1 to December 31 | 11<br>Category FZC | Dive by Hand<br>Rakes | N/A             | N/A                 | N/A               |

### **History**

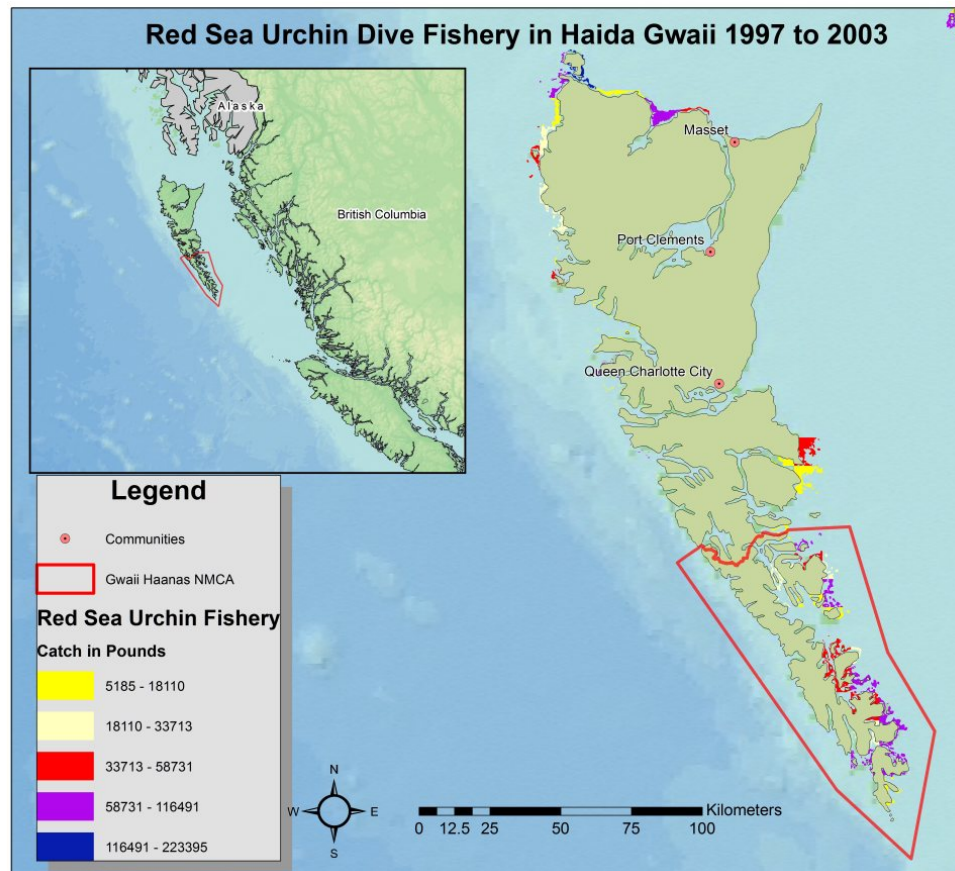
The commercial red sea urchin dive fishery began in the 1970s and grew rapidly after 1982. Historically red sea urchin IQs were set at 1/110 of the annual coast-wide commercial TAC, and fish harvesters were required to select one of two licence areas in which to fish. In 1992, the North Coast red sea urchin landings accounted for almost 90 percent of total coast-wide landings. In that year, Haida Gwaii accounted for over 10 percent of the north coast landings. Of that amount, Gwaii Haanas accounted for 57 percent. Since 1992, the Gwaii Haanas area has accounted for more than 50 percent of annual Haida Gwaii landings.

## Overview

Red sea urchins are harvested for their roe (gonad) which is extracted for commercial purposes at processing plants for shipment to fresh markets. There is a minimum size limit of 90 mm test diameter, between the spines, measured through the greatest diameter of the red sea urchin shell. The management tools of the red sea urchin fishery include: a minimum size limit to allow several spawning years prior to harvest; calculation of a TAC using a precautionary fixed exploitation rate of two to three percent of estimated biomass; limited entry licensing; an IQ program in which total quota by licence area is divided equally amongst licences; area licensing; and area quotas.

## Location

The fishery occurs in numerous locations within Gwaii Haanas, notably around Kunga, Lyell, Burnaby and Kunghit Islands, as well as Carpenter Bay and Houston Stewart Channel (Figure 7). Generated from the logbook data, Figure 7 is plotted on 10-kilometer grid cells where three or more vessels are known to fish. These grid cells are merged with the 0-20 meter bathymetric contours. Areas outside the spatial overlap are discarded, thus, an illustration showing where fishing likely occurs, results. This information reveals the possible extent of the current red sea urchin fishery, not the extent of the red sea urchin stocks.



**Figure 7: Location of Commercial Red Sea Urchin Fisheries in Haida Gwaii**

## **Stock Assessment**

There is no indication of concern for red sea urchin stocks regionally at this time. A precautionary approach to management, which ensures that DFO is meeting its conservation goals, will continue for the near future. This, in turn, will ensure sustainable harvests by all sectors. The long-term goal of DFO is to develop a biologically based management regime through a better understanding of the resource.

## **Sustainability**

Urchin management is considered “conservative” by DFO because only two to three percent of the estimated biomass is fished. Not all areas have been surveyed for biomass.

## **Monitoring**

A Joint Project Agreement between DFO and Pacific Urchin Harvesters Association (PUHA) to provide for in-season catch validation is consistent with DFO’s approach to co-management in the Region. This agreement provides for catch validation at designated landing ports, in-season collection and compilation of harvest log data, collection of biological samples, at-sea monitoring in portions of the coast, and a year-end summary report of the fishery.

## **User Role**

The primary consultative body for red sea urchins in BC is the Red Sea Urchin Sectoral Committee. The PUHA represents the commercial fishing group. The PUHA works closely with the Haida Fisheries Program (HFP) and DFO in stock assessment and research. The HFP receives funding from this partnership to support stock assessment and research. Culturally, red sea urchin is an important fishery for the Haida and there are small areas closed to commercial fishing throughout the archipelago to enable undisturbed Haida food fishing (Sloan, N.A., P.M. Bartier, and W.C. Austin. 2001).

## **Recreational Fishing**

Recreational fisheries are open year-round in all areas and closures may be implemented in order to conserve vulnerable stocks, to protect the public from consumption of contaminated shellfish, or to meet First Nations food, social and ceremonial needs. For more information on recreational fishing for red sea urchins, see the general section on page 53.

## **First Nations**

First Nations communal licences specify the locations permitted for use by First Nations for food, social and ceremonial harvests. Harvesting generally takes place in areas fronting or adjacent to reserves. For more information on First Nations fishing for red sea urchins, see the general section on page 53.

## **Northern Abalone**

Although northern abalone has been closed to commercial, recreational and First Nations food, social and ceremonial harvest since 1990, northern abalone is an important marine

resource and therefore deserves mention. Historically, the majority of northern abalone harvesting occurred in the southern portion of *Haida Gwaii*. The scarcity of northern abalone and its high price make it a target of illegal harvesting operations. Unfortunately, northern abalone stocks continue to show considerable weakness. Thus, northern abalone harvesting remains closed and has been identified as threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and are listed in the *Species at Risk Act* (SARA).

The continued closure of northern abalone to all harvesting, including the collection of food, social and ceremonial purposes for Haida, may be an issue during consultations. DFO's response is the closure will continue and a recovery plan, as required by SARA, will be developed. For instance, in 2003, DFO continued four outreach and community-driven programs funded through the Habitat Stewardship Program. For more information on northern abalone recovery plans, refer to the website [www.speciesatrisk.gc.ca](http://www.speciesatrisk.gc.ca). These programs have been developed to promote and encourage conservation of northern abalone in local communities and marine-related industries, and established two major stewardship areas within Haida Gwaii. In addition, stewardship groups established permanently marked sites for the northern abalone and aggregated mature individuals within these sites to improve reproductive success. A local "Coast Watch" Program for reporting illegal harvesting of the northern abalone was developed. Ongoing plans call for establishing pilot hatcheries in coastal communities to produce northern abalone juveniles for out-planting. It is also anticipated that DFO will work collaboratively with Parks Canada and the Haida Fisheries Program in developing a northern abalone stewardship area. Parks Canada has proposed that DFO, Environment Canada and Parks Canada collaborate in establishing a northern abalone stewardship area within the Gwaii Haanas NMCA. This area would become a northern abalone benchmark site for cooperative, long term, science based management. As suggested, this type of collaboration would be science based, and would fit in with SARA objectives.

### **Shrimp by Trawl**

**Table 8: General Overview of the Shrimp by Trawl Fisheries**

| <b>Area and Fishery</b>  | <b>Season</b>            | <b># Licences</b> | <b>Gear</b>           | <b>TAC 2006</b>          | <b>Landing 2006</b> | <b>Value 2006</b> |
|--------------------------|--------------------------|-------------------|-----------------------|--------------------------|---------------------|-------------------|
| Coast-wide Commercial    | June 1 to March 31       | 85<br>Category S  | Trawl Net             | 2198 t                   | 950 t               | \$1.24 lb         |
| Coast-wide Recreational  | January 1 to December 31 | Individual Sport  | Ring Net, Trap, Spear | 200 per day<br>400 poss. | N/A                 | N/A               |
| Coast-wide First Nations | January 1 to December 31 | 11<br>Category FP | Trawl Net             | N/A                      | N/A                 | N/A               |

### **History**

An earliest record of trawling for shrimp in BC was shown to have taken place in 1895. In 1957, Seattle was the first site of a mechanical peeler on the Pacific coast leading to rapid demand and increases in landings from California to Alaska. By 1976, landings reached a high of 11,100,000 pounds (5035 t) coast-wide. Historic north coast shrimp production was fairly stable averaging 60 t from 1982 to 1994. Mandatory harvest logs were set as a condition of the shrimp licence in 1987. In 1990 limited shrimp by trap

licence was created resulting in split by gear type; prawns by trap and shrimp by trawl. In 1995 the Fraser River Sockeye Public Review Board reinforced the need for “risk adverse management” and called for greater attention to more precautionary management approaches for all west coast fisheries. With this, the first elected Shrimp Trawl Sectoral Committee was established.

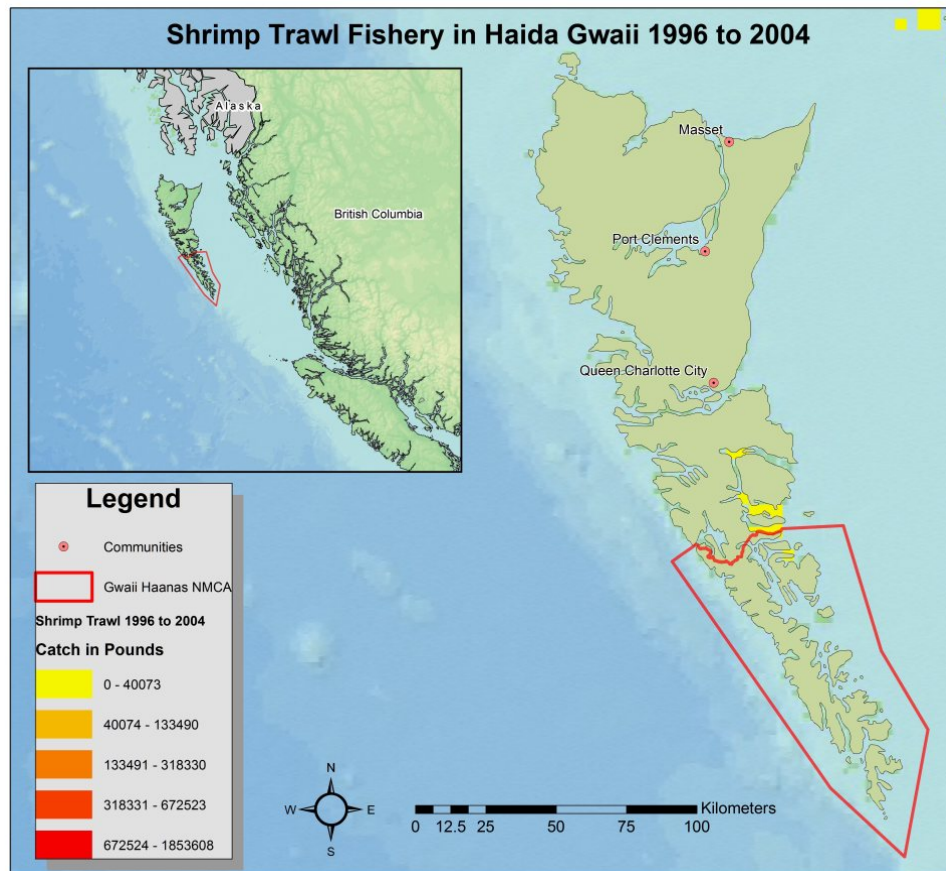
### **Overview**

The assessment and management framework is based on annual biomass surveys, harvest rates of 17 to 33 percent, and catch hauled from sea for 36 shrimp management areas (SMA). The TAC changes every year (there is a forecast biomass, conservative estimates 25 percent or 50 percent risk levels), which are updated (usually increased) after surveys (12 areas) and arbitrary, precautionary 10 t and 20 t catch ceilings for 20 SMA. Shrimp trawl usually takes place in inside waters and is conducted by dragging a small trawl net on or near the bottom of the ocean. Current regulations require that the shrimp trawlers have an “extruder” installed in their net to minimize incidental catches. The majority of landings are a mix of “pink shrimp” and sidestripe shrimp.

### **Location**

The Pacific Region shrimp trawl fishery takes place all along the BC coastline in a number of protected inshore areas and large offshore grounds on soft bottoms of mud or sand. Gwaii Haanas has not had an active shrimp by trawl fishery in recent years. Historically, shrimp trawling occurred in Area 2 East in Cumshewa and Selwyn Inlet. Catch per unit effort (CPUE) on the few trips to the Cumshewa area indicate there are shrimp stocks. Within the boundaries of Gwaii Haanas, limited shrimp trawling effort was concentrated in waters to the north of Lyell Island (Figure 8).





**Figure 8 Historical Shrimp Trawl Fisheries in Haida Gwaii**

### Stock Assessment

In keeping with DFO's mandate on conservation and risk adverse management, catch ceilings have been implemented for most shrimp management areas. In-season adjustments to the catch ceilings may occur based on stock assessment information. Industry-supported, fishery independent biomass surveys are conducted to collect biomass information. Biomass estimates may be made in those areas or in non-surveyed areas that have been identified as a priority for analysis. In many places including Haida Gwaii, biomass for the shrimp trawl fishery has not been established. In these areas, a precautionary quota of 25 tons is in effect.

### Sustainability

To achieve the conservation and sustainable fishery objectives of DFO and the shrimp industry, harvest is limited to a catch ceiling by area. The setting of catch ceilings follows a biological or precautionary approach.

### Monitoring

A by-catch sampling program in the shrimp trawl fishery has been in place since 1997. Each year a service company is selected by the industry, and approved by DFO, for observation coverage. At-sea observers estimate catch composition at sea, identify gear



composition, and collect biological samples. The program changed in 2003 to a target of 50 days of at-sea observer coverage.

### **User Role**

The primary consultative body for shrimp by trawl is the Shrimp Trawl Sectoral Committee. This committee includes representatives from DFO, commercial licence holders, processors, First Nations, the Province of BC, and others with an interest in the resource. The Pacific Coast Shrimpers' Cooperative Association represents the commercial user group.

### **Recreational Fishing**

For more information on recreational fishing for shrimp, see the general section on page 53.

### **First Nations Food, Social and Ceremonial**

For more information on First Nations fishing for shrimp, see the general section on page 53.

### **Sea Cucumber**

Currently, there is no sea cucumber fishery in Haida Gwaii. While commercial fish harvesters have expressed an interest in expanding their fishery to this area, the Haida have indicated that they are opposed to this.

## **HERRING FISHERIES**

### **Herring**

**Table 9: General Overview of the Coast-wide Herring Fisheries**

| <b>Fishery</b>           | <b>Season</b>              | <b># Licences</b>       | <b>Gear</b>   | <b>TAC<br/>2006</b>           | <b>Landing<br/>2006</b> | <b>Value<br/>2006</b> |
|--------------------------|----------------------------|-------------------------|---|-------------------------------|-------------------------|-----------------------|
| Commercial Roe           | Early March to Early April | 1520 Category HS and HG | Seine and Gill Net  | 23,260 t                      | 260.6 mt                | 2780.0 \$(000)        |
| Commercial Spawn on Kelp | February 1 to June 31      | 21 Category J and FJ    | Seine and Trap  | 2125 t                        | 254.4 mt                | 2700.0 \$(000)        |
| Commercial Food and Bait | November                   | Category ZM             | Seine   | 1050 t                        | 399.03 mt               | \$0.15 Per lb         |
| Commercial Special Use   | January 1 to December 31   | Categories ZX and ZY    | Gill Net, Seine, Dip Net/Hoop Net, Hook and Line, Jigging | 1210 t                        | 1210 t                  | \$0.62 Per lb         |
| Recreational             | January 1 to December 31   | Individual Sport        | Dip Net, Herring Jig, Herring Rake, and Cast Net          | 20 kg day<br>40 kg possession | N/A                     | N/A                   |

## **History**

Catch records, dating back to 1877, affirm herring as one of the most commercially important fish species on Canada's Pacific coast. In the early 1900s, the fishery expanded, targeting herring for bait. In the late 1930s, it further expanded by processing herring as a dry salted product. In the 1940s herring catches were processed in the reduction fishery to make an end product of fishmeal or oil. This fishery continued to increase through the 1960s; however, catches were not sustainable. Over fishing, combined with unfavourable ocean conditions, caused a massive coast wide stock collapse in the 1960s and led to the closure of the fishery between 1968 and 1971.

In Haida Gwaii, catches were first reported in 1937. Due to its remote location, herring were fished intermittently until the early 1950s. In the early 1960s, the Queen Charlotte Island stock declined as part of a coast-wide collapse from over fishing, and the commercial reduction fishery was closed in 1967.

## **Overview**

Since 1998, the roe herring fishery has been managed using a variant of the IVQ system. The quota for an area is divided equally among the vessels licensed to fish, while the vessels operate in groups or pools to control fishing effort. The fishery takes place according to specified dates and times announced from the fishing grounds.

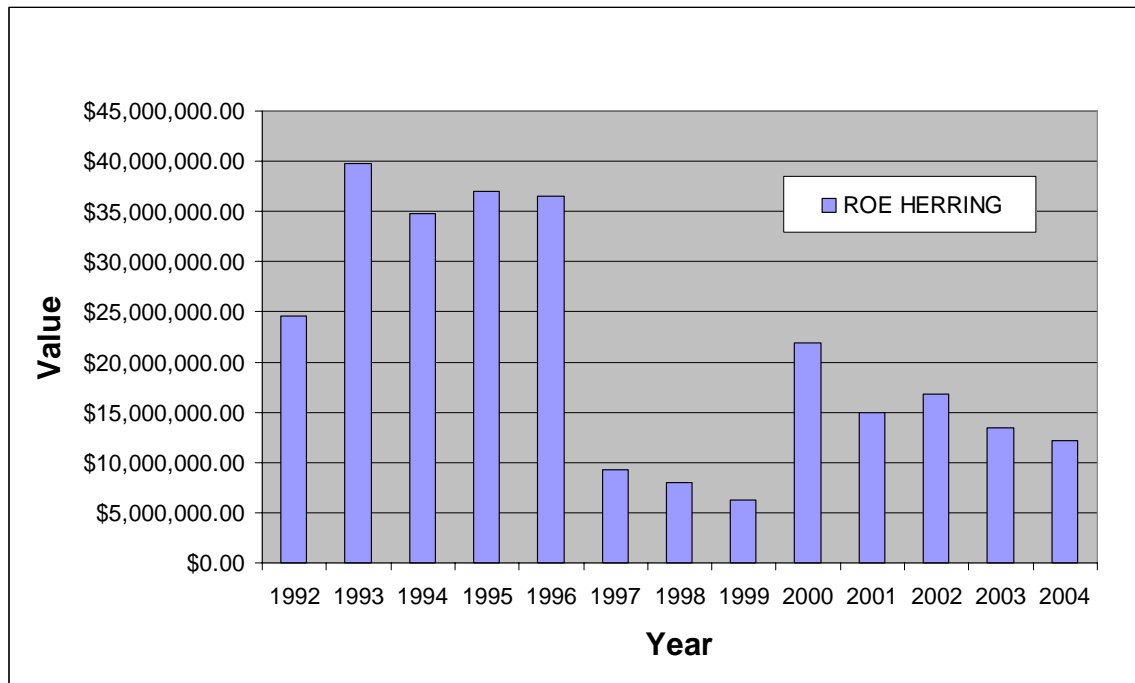
Today, four types of fisheries target pacific herring: roe, spawn-on-kelp (SOK), special use, and food and bait fisheries. These occur in various management regions at different times of the year. All herring fisheries operate within the same overall quota or TAC for a given year. Conservation limits are established to ensure that harvesting proceeds in a precautionary manner and that sufficient biomass is available to replenish the stocks on an ongoing basis.

Herring stocks are managed with a fixed 20 percent harvest rate, in conjunction with a fishing threshold or cut-off level. A decision rule has been adopted by management to close off all commercial herring fisheries when the stock is forecast to be below the cut-off level. The cut-off levels are established at 25 percent of the estimated (not fished) average mature biomass. Any harvest below the cut-off is expected to reduce the rate of stock rebuilding (Schweigert, J.F., 2006).

Each of the herring fisheries has unique licence types, some dependant upon the gear used. All herring licences are party based and for the most part, limited entry. Since 1998, the roe herring fishery has operated under pool fisheries established for each of the fishery management areas. Seine fish harvesters, operating under a HS or FS licence, are required to set up in pools of at least eight licences before fishing. Gill nets, having a HG and FHG licence, are required to pool with a minimum of four licences.

When herring are harvested in the roe herring fishery, the roe is stripped from the fish, salted and shipped to Asian markets. Between 1993 and 2002, annual landings in the commercial roe herring fishery averaged close to 32,000 tons with a landed value close to \$50 million. In recent years poor economic conditions in Japan have resulted in a

reduction in the price paid for herring roe. Figure 9 illustrates the coast-wide value of the commercial roe herring seine fishery from 1992 to 2004.

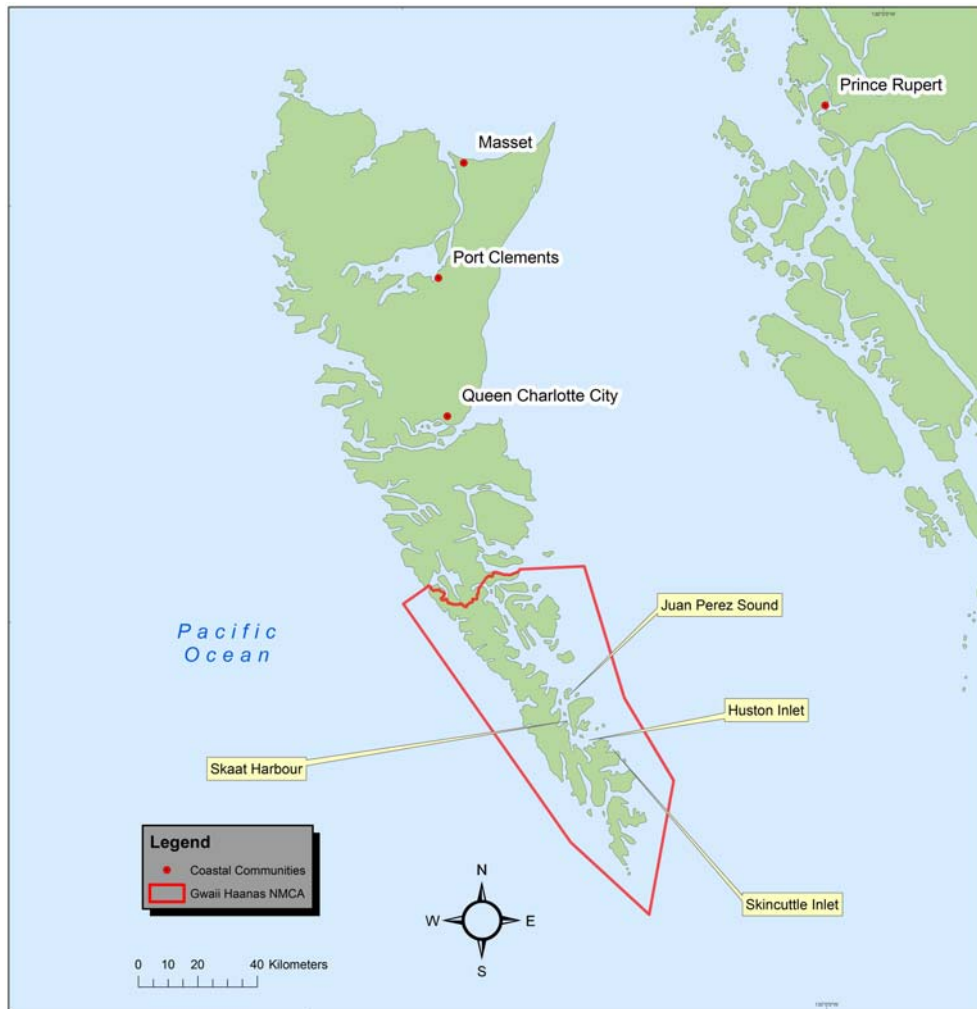


**Figure 9: Coast-wide Value of the Commercial Roe Herring Seine Fishery from 1992 to 2004**

Between 1999 and 2003 product from the SOK fishery in the Queen Charlotte Islands represented from 16 percent to just over 21 percent of the total product tonnage. The values ranged from 17 percent to just over 21 percent of the coast wide value of the fishery. This compares favourably with the product weight. In recent years, however, the SOK fishery has been less profitable. Increased competition from Russia and Alaska combined with changing consumer preferences in the Japanese market and poor market conditions have caused a dramatic reduction in the market price paid for herring SOK. Over the last decade, the average price has plummeted from \$40 per lb in 1995, to less than \$6 per lb in 2004.

### **Location**

Almost 5,260 km (18 percent) of BC's extensive 29,500 km coastline has been classified and ranked as herring spawn habitat. In a typical year, 450 to 600 kilometers (1.8 percent) of BC's shoreline is utilized by spawners. DFO scientists and fishery managers have derived a spawn habitat index which rates the shoreline on its importance in terms of long term production (Hay and Kronlund, 1989; Hay and McCarter, 2005). The index is a function of the number of layers, the extent, and the frequency of the spawn. All BC coastal areas where herring spawn have been surveyed and are ranked by importance. The Haida Gwaii area where herring stocks are assessed includes Gwaii Haanas as a "major stock area occurring in the vicinity of Huston Inlet, Juan Perez Sound, Skincuttle Inlet and Skaat Harbour" (West Side Burnaby Channel).



**Figure 10: Location of Recent Commercial Herring Net Fisheries in Haida Gwaii**

### **Stock Assessment**

The primary data sources for stock assessment are spawn survey data, commercial catch landings data, age composition data from biological samples of commercial fishery, pre-fishery charter, and research catches. On a coast-wide basis, herring abundance decreased in 2006. For SOK fisheries in the QCI Area (Area 2 East), the forecasted biomass is well below the cut off in the major stock assessment area. Seven of the past ten year classes have been poor resulting in the current low abundance level. Since 2003, a precautionary fisheries management plan has been implemented to minimize potential impact on herring resources but the stock has shown no signs of recovery. In 2005, no commercial fishery took place in Area 2 East (major stock assessment area), but fishing in Area 2 West (minor stock area) proceeded with four of the ten operators.

## **Sustainability**

Conservation limits are established to ensure that harvest proceeds in a precautionary manner and that sufficient biomass is available to replenish the stocks on an ongoing basis. The 20 percent harvest rate for Pacific herring was introduced in 1983 and cut off levels were added in 1986. The 20 percent harvest rate is based on an analysis of stock dynamics, which indicates this level will stabilize both catch and spawning biomass while foregoing minimum yield over the long term (Hall et al. 1988, Zheng et al. 1993). Cut off levels have been revised from time to time but have generally remained fixed since 1996.

## **Monitoring**

Pacific herring fishery catch information is validated and obtained through the Dockside Monitoring Program (DMP) and sales slips (fish slips). All roe herring licence holders contribute the funding required for a DMP that provides complete dockside coverage of all roe herring landings. This program is administered by the Herring Conservation Research Society (HCRS). An independent company is hired to carry out monitoring activities. In 2006, dockside monitors, a project co-ordinator, and a pool facilitator were employed to cover landings in six locations.

## **User Role**

The Integrated Herring Harvest Planning Committee (IHHPC) was established by DFO to promote a more stream-lined, representative, cross sectoral advisory process related to herring harvest planning, management, and post-season review. Membership in the IHHPC is comprised of representatives from the Spawn on Kelp Harvest Committee (SOKHC), the Herring Industry Advisory Board (HIAB), First Nations, the Marine Conservation Caucus (MCC), Sport Fishing Advisory Board (SFAB), Province of BC, and DFO. HIAB is the sector organization which represents the commercial roe herring industry and provides advice on issues affecting commercial roe herring fish harvesters. This role includes submitting recommendations for roe herring harvesting plans for all areas with a roe herring TAC. HIAB selects 10 participants to attend IHHPC meetings. The SOKHC is the sector organization which represents the commercial spawn on kelp industry and provides advice on issues affecting commercial spawn on kelp fish harvesters. The SOKHC selects five participants to attend IHHPC meetings.

## **Recreational**

For more information on recreational fishing for herring, see the general section on page 53.

## **First Nations**

Herring SOK is a traditional food of BC coastal First Nations. First Nations communities harvest SOK under the authority of communal licenses. First Nations coastal communities have traditionally harvested herring spawn by the open pond method, or naturally, on several different types of kelp, eel grass and tree branches. For more information on First Nations fishing for herring, see the general section on page 53.

## SALMON FISHERIES

**Table 10: General Overview of the Salmon Fisheries**

| Fishery                  | Season                               | # Licences   | Gear                      | TAC 2006  | Landing 2005  | Value 2006                 |
|--------------------------|--------------------------------------|--|---------------------------|---|---------------|----------------------------|
| North Coast Commercial   | Opening Dependent on Available Stock | 418 Category AG<br>253 Category AT<br>98 Category AS | Troll, Seine and Gill Net | Dependent on Available Stock                                    | 2,840,522 pcs | \$1,165,233 PFMA 2E and 2W |
| North Coast Recreational | January 1 to December 31             | Individual Sport                                     | Hook and Line             | Coho, Chum, Sockeye and Pink 4 Per Day<br><br>Chinook 2 Per Day | 127,544 pcs   | N/A                        |
| Coast-wide First Nations | Opening Dependent on Available Stock | 47 Category FAG<br>8 Category FAT<br>10 Category FAS | Troll, Seine and Gill Net | Dependent on Available Stock                                    | N/A           | N/A                        |

### History

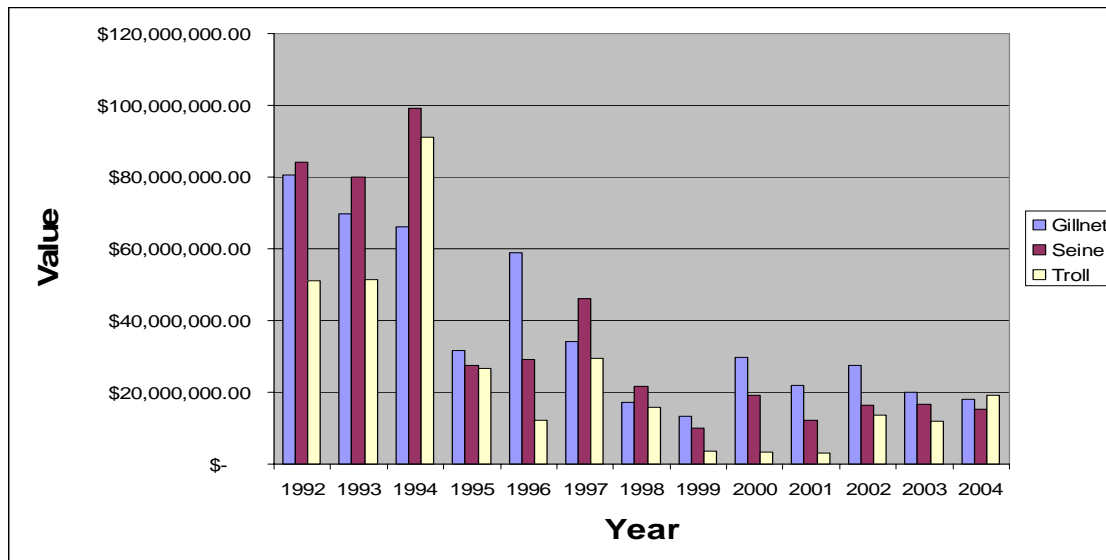
Throughout BC, Pacific salmon have ecological, economic, cultural and social importance. Historically, salmon were the staple of many First Nations people inhabiting the Pacific region. Salmon continue to be an important resource in many communities. Commercial fishing for salmon on the Pacific coast began shortly after the arrival of Europeans and has continued into the present. In the Queen Charlotte Islands area, the commercial salmon fishery began early in the 20<sup>th</sup> century. DFO did not conduct annual salmon abundance estimates in this area prior to the 1930s. By 1947, DFO was monitoring 165 streams obtaining annual salmon estimates. In Gwaii Haanas, DFO has a history of assessing 56 streams.

### Overview

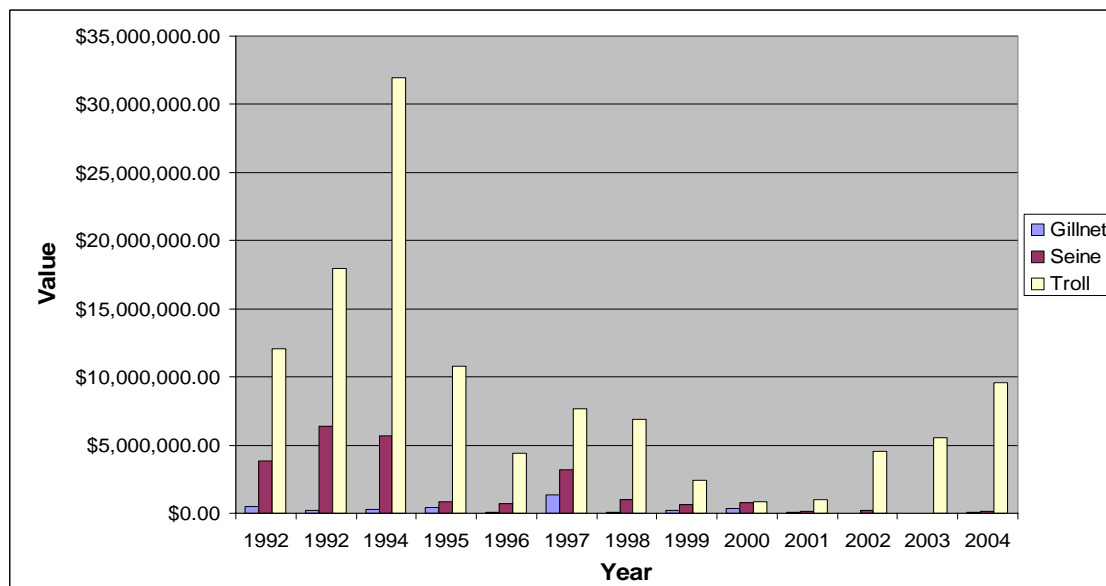
Salmon fishery management is coordinated regionally with the majority of management actions occurring in the area and field offices. Key to salmon management is the development and implementation of IFMPs that meet specified objectives. These objectives focus on salmon conservation, allocation between fisheries and obligations to First Nations and international treaties. Commercial openings are not defined in these annual plans. Openings are announced a few days prior to the actual opening. The reason for in-season fishery opening notices is the uncertainty of both the timing and size of returning salmon runs. Fishing areas, Subareas or portions thereof (provisions for extensions, opening patterns, as well as the duration of the fishing season), are adjusted by DFO staff during the fishing season. These adjustments protect weak stocks, target

abundant stock, and account for fishing effort, gear selectivity, domestic allocations and other factors. Conditions of Licence and commercial fishing plans prescribe allowable gear characteristics such as hook styles, mesh size, net dimensions and the methods by which gear may be used.

Insight into the value of the commercial salmon fisheries coast-wide and Haida Gwaii, respectively, is provided in Figures 11 and 12. These graphs illustrate the reduction in the value of commercial salmon fishing from 1992 until 2004. One notable exception is the troll fishery in Haida Gwaii which shows signs of strengthening.



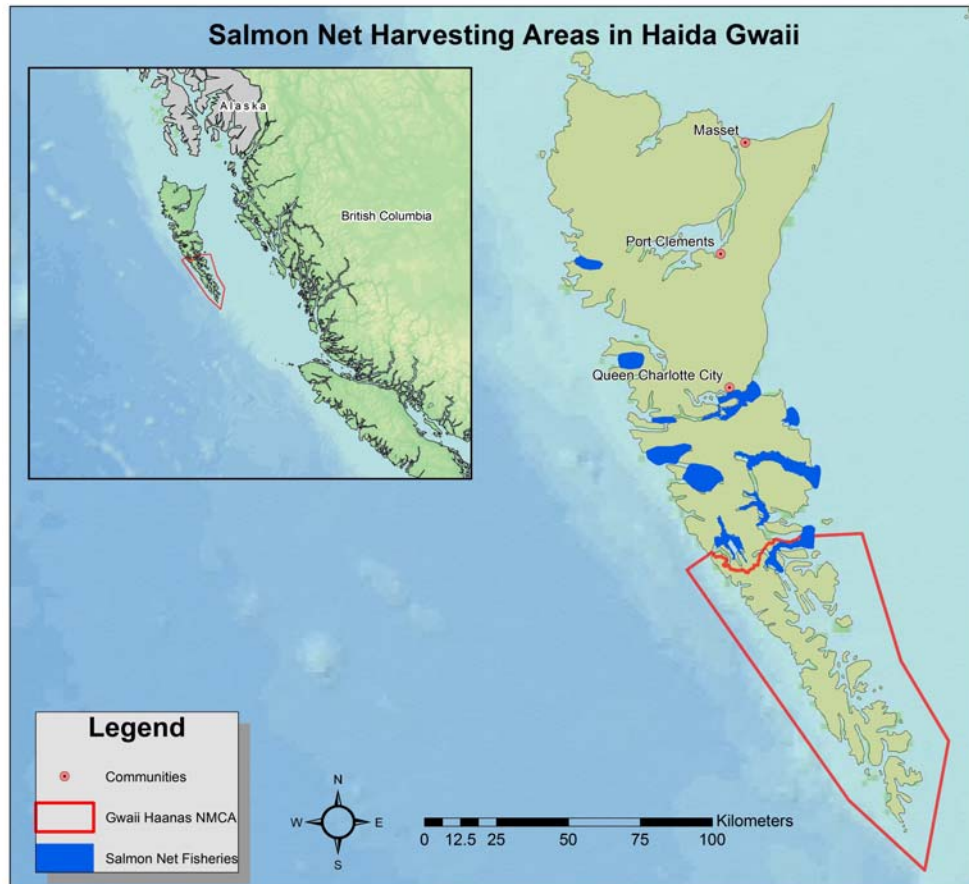
**Figure 11: Coast-wide Value of All Salmon Species by Commercial Gear Type from 1992 to 2004**



**Figure 12: Value of Commercial Salmon Fisheries in Haida Gwaii by Gear Type from 1996 to 2004**

## Location

Net fisheries in Area 2 West have occurred in the vicinity of Port Chanal, Kano Inlet, Skidegate Channel, Englefield Bay and Tasu Sound. Although net fisheries have occurred in Area 2 East in Skidegate Inlet, Copper Bay, Cumsheewa Inlet, Sewell Inlet, Logan Inlet and Darwin Sound, commercial net fishing has not occurred in the vicinity of Gwaii Haanas in over five years.



**Figure 13: Location of Commercial Net Fisheries in Haida Gwaii**

## Stock Assessment

Salmon trolling opportunities have decreased substantially in the north coast in recent years. Fleet reductions have shrunk the northern troll fleet from 450 licences to 153. Northern troll fisheries are generally limited to the waters around Haida Gwaii with additional opportunities in PFMA 3, 6 and 7. These restrictions to fishing areas are due to the presence of weak WCVI Chinook stocks. Other Chinook stocks of concern in this fishery include Skeena and Wannock River. Coho retention is only allowed after August 1<sup>st</sup>, outside of the surf line in Areas 1 and 2 to protect weak Haida Gwaii coho.

Chum stocks harvested within Cumsheewa Inlet are enhanced stocks from Pallant Creek. The overall escapement goals for chum are 30,000 to Pallant Creek and 25,000 for hatchery brood stock; and 20,000 to Mathers Creek plus 5,000 for hatchery brood stock.



Due to a low abundance forecast for enhanced chum into Cumshewa Inlet in 2007, harvest opportunities are considered only on identified surpluses. The Ain and Awun River systems in Masset Inlet are the primary chum salmon producers in Area 1. In Areas 2 East and 2 West wild chum harvest opportunities for both gill nets and seines are considered only when surpluses have been identified. Cumshewa Inlet will be managed similarly to wild chum systems, with openings only on identified surpluses, due to the poor returns observed in Cumshewa in recent years.

Pink surpluses normally do not occur during odd years. Terminal harvest opportunities are based on identified surpluses determined through a variety of measures such as fence counts, charter vessel patrols, over flights and gill net test fisheries.

### **Sustainability**

Management of a natural resource like salmon has a number of inherent risks. Uncertain forecasting, environmental and biological variability, as well as changes in harvester behaviour all add risks that can threaten conservation. Accordingly, management actions will be precautionary and risks will be specifically evaluated. DFO manages fisheries with the objective of ensuring that stocks are returning at sustainable levels. When returns decline below sustainable levels, management actions are taken which may include reducing the impact of fisheries on specific stocks, strategic enhancement and habitat restoration.

The Salmonid Enhancement Program (SEP) in BC, Canada is comprised of nearly 300 projects across BC and the Yukon and includes hatcheries, fish ways, spawning and rearing channels, and small classroom incubators. Projects range in size from spawning channels producing nearly 100 million juvenile salmon annually to school classroom incubators releasing fewer than one hundred juveniles (per aquarium). The Pallant Creek Hatchery facility has been under the management and operation of the Haida Fisheries Program (HFP) with program objectives established through the Haida Tribal Society.

### **Monitoring**

DFO works with all fleets to implement components of traceability including consultation regarding mandatory log-book, phone-in program and a pilot DMP. The coded wire tag (CWT) sampling activity examines 100 percent of the landed fish, and collects all heads that are suspected to contain a CWT. Therefore, trollers removing heads at sea have increasingly been requested by fishery notice, and/or required by Condition of Licence (Chinook in Area F and H), to retain all heads from Chinook and coho, and deliver them to processing plants when landing their catch. A computer based pilot Electronic Logbook Program has started and has been designed following the current, paper versions of logbooks for the gill net, seine and troll fleets. The ultimate goal of this system is to improve the efficiency and compliance of reporting catch to DFO.

### **User Role**

The Integrated Harvest Planning Committee (IHPC) for salmon is comprised of First Nations, recreational and commercial interests (as represented by the SFAB and the

Commercial Salmon Advisory Board) and the Marine Conservation Caucus (representing a coalition of “environmental” organizations). This committee is recognized to be the primary source of stakeholder input into IFMPs.

In 2002, DFO released Pacific Region Fishery Monitoring and Reporting Framework. This framework is used as the main reference tool during coast-wide consultations to identify necessary improvements in fishery monitoring and catch reporting systems. This framework outlines DFO’s goals, objectives and requirements in catch monitoring.

### **Recreational**

Under DFO’s Allocation Policy for Pacific Salmon, after food, social and ceremonial purposes fisheries, the recreational sector has priority to directed fisheries for Chinook and coho salmon. For sockeye, pink and chum salmon, the policy states that recreational harvesters be provided predictable and stable fishing opportunities. The recreational harvest of sockeye, pink and chum will be limited to a maximum average of five percent of the combined recreational and commercial harvest of each species on a coast-wide basis over an allotted period. If stock abundance information suggests that conservation objectives cannot be attained, closures or non-retention regulation will generally be applied. In some cases, recreational fisheries with a non-retention restriction in place will remain open. For more information on recreational fishing for salmon, see the general section on page 53.

### **First Nations**

The Allocation Policy for Pacific Salmon provides that after requirements for conservation, the first priority in salmon allocation is to First Nations for harvest opportunities under communal licences issued, and to treaty rights for harvest opportunities for domestic purposes (consistent with Treaty Final Agreements). While these opportunities will be provided on a priority basis, it does not necessarily mean that fishery targets for First Nations will be fully achieved before other fisheries can proceed. For example, many First Nations conduct their food, social and ceremonial fisheries in terminal areas, while other fisheries are undertaken in marine areas or approach areas. The general guideline is that the fishing plan must adequately provide for the First Nations’ food, social and ceremonial harvests that will occur further along the migration route over a reasonable range of potential run sizes. For more information on First Nations fishing for salmon, see the general section on page 53.

## **GROUNDFISH FISHERIES**

It is important to point out that the various groundfish fisheries have undergone significant change in the last few years. For instance, thirty years ago, a commercial fishing vessel could harvest all species of groundfish (Table 11) with a single C licence. This was, in many respects, a licence for integrated commercial groundfish fishing; allowing for the use of different gear types and the harvesting and retention of all groundfish encountered. As conservation concerns grew, DFO began to limit the licences that could harvest a specific species or use a specific gear type. From the mid 1970s through to the early 1990s, several limited entry programs were implemented in the groundfish fisheries. Many of the groundfish fisheries use management areas that differ

from PFMA's. Table 12 provides a list of stock management areas used in the groundfish hook and line and trawl fisheries and their relation to the PFMA's.

**Table 11: Groundfish Species and their Common Names**

| Species       | Latin Name                     | Species           | Latin Name                   |
|---------------|--------------------------------|-------------------|------------------------------|
| Rockfish      | <i>Sebastes sp.</i>            | Sablefish         | <i>Anoplopoma fimbria</i>    |
| Thornyheads   | <i>Sebastolobus sp.</i>        | Pacific Cod       | <i>Gadus macrocephalus</i>   |
| Spiny Dogfish | <i>Squalus accnathias</i>      | Pacific Hake      | <i>Merluccius productus</i>  |
| Lingcod       | <i>Ophiodon elongatus</i>      | Pacific Tomcod    | <i>Microgadus proximus</i>   |
| Halibut       | <i>Hippoglossus stenolepis</i> | Walleye Pollock   | <i>Theragra chalcogramma</i> |
| Butter Sole   | <i>Isopetta isolepis</i>       | Dover Sole        | <i>Microstomus pacificus</i> |
| English Sole  | <i>Parophrys vetulus</i>       | Greenland Halibut | <i>Reinhardtius</i>          |
|               |                                |                   | <i>hippolglossoides</i>      |

**Table 12: Groundfish Stock Management Areas**

| Name | PFMA Area/Subarea  |
|------|--|
| 3C   | Areas 21, 23, 24, 121, 123, 124 and Subarea 125-6.                                   |
| 3D   | Areas 25, 26, 126 and Subareas 27-2 to 27-11, 125-1 to 125-5, 127-1 and 127-2.       |
| 4B   | Areas 13 to 20, 28 and 29 and Subareas 12-1 to 12-13, 12-15 to 12-48.                |
| 5A   | Areas 11, 111 and Subareas 12-14, 27-1, 127-3, 127-4 and 130-1.                      |
| 5B   | Areas 7 to 10, 108 to 110 and Subareas 102-3, 107-2, 107-3, 130-2 and 130-3.         |
| 5C   | Areas 6, 106 and Subareas 2-1 to 2-19, 102-2 and 105-2 and 107-1.                    |
| 5D   | Areas 3 to 5, 103, 104 and Subareas 1-2 to 1-5 and 101-4 to 101-10, 102-1 and 105-1. |
| 5E   | Area 142 and Subareas 1-1 and 2-31 to 2-100 and 101-1 to 101-3.                      |

**Table 13: Percentage Landings within the Proposed NMCA (N.A. Sloan)**

| Groundfish Fishery | Years of Data Analyzed | Percentage of Catch |
|--------------------|------------------------|---------------------|
| Rockfish (Outside) | 1995 to 2004           | 10.6                |
| Pacific Halibut    | 1991 to 2004           | 06.3                |
| Sablefish          | 1990 to 2004           | 20.0                |
| Schedule II        | 1996 to 2004           | 09.0                |
| Trawl              | 1996 to 2004           | <2.0                |

## **Sustainability**

Since 2003, DFO has focused on working with the commercial groundfish harvesters and others to address management and sustainability issues in the commercial groundfish fisheries. DFO has identified five guiding principles for the commercial groundfish sector:

- All rockfish catch must be accounted for;
- Rockfish catches will be managed according to established rockfish management areas;
- Fish harvesters will be individually accountable for their catch;
- New monitoring standards will be established and implemented to meet the above three objectives; and
- Species and stocks of concern will be closely examined and actions such as reduction of TACs, and other catch limits will be considered and implemented to be consistent with the precautionary approach for management.

Following significant work through the Commercial Groundfish Industry Advisory Committee (CGIAC) and the Commercial Industry Caucus (CIC), a three year pilot is being introduced in the commercial groundfish fisheries. The reforms focus on 100 percent at-sea monitoring and 100 percent dockside monitoring, individual vessel accountability for all catch, both retained and released, IVQ and reallocation of these quotas between vessels and fisheries to cover by-catch of non-directed species.

In 2002, an inshore rockfish conservation strategy was established with initial measures introduced for recreational and commercial fisheries. The strategy addresses four areas under the fisheries management and stock assessment regime:

1. Protect a part of inshore rockfish populations from harvest through the use of RCAs;
2. Collect information on total fishery mortalities through improved catch monitoring programs;
3. Reduce harvests to levels that are less than the estimates of natural mortality (i.e. less than two percent); and
4. Improve the ability to assess the status of inshore rockfish populations and monitor changes in abundance.

Further changes and improvements to the measures currently in effect are anticipated as the conservation strategy develops. For a detailed map of the RCAs in the Gwaii Haanas area, see page 6.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) have designated the bocaccio rockfish species as Threatened. As a proactive measure, the industry has taken steps to reduce the harvest of the potentially SARA listed bocaccio rockfish. These measures were implemented in 2004, and will continue in future years. So far a reduction of the bocaccio catch by over 50 percent has occurred.

### **Monitoring**

Mandatory 100 percent monitoring on all commercial groundfish fishing trips is required to monitor and provide a full and reliable account of all catch in both retained and released, and record fishing activity, location, date and time. This requirement is met either through at-sea observer coverage on each trip, or through the use of an EM system during all fishing activity. In addition, all landings must be validated through a DMP. A private company is hired to provide designated at-sea observers.

## **ZN Fisheries**

**Table 14: General Overview of the Rockfish ZN Fisheries**

| <b>Area and Fishery</b>          | <b>Season</b>            | <b># Licences</b>  | <b>Gear</b>          | <b>TAC 2006/2007</b>       | <b>Landing 2006/2007</b> | <b>Value 2006</b> |
|----------------------------------|--------------------------|--------------------|----------------------|----------------------------|--------------------------|-------------------|
| ZN Inside Coast-wide Commercial  | April 1 to March 31      | 68<br>Category ZN  | Hook and Line        | 19,128 mt                  | 10,851 mt                | \$483,529         |
| ZN Outside Coast-wide Commercial | April 1 to March 31      | 174<br>Category ZN | Hook and Line        |                            |                          |                   |
| North Coast Recreational         | January 1 to December 31 | Individual Sport   | Hook and Line, Spear | 5 Per Day<br>10 Possession | 7,731 pcs in 2005        | N/A               |
| Coast-wide First Nations         | April 1 to March 31      | 20<br>Category FZN | Hook and Line        | N/A                        | N/A                      | N/A               |

### **History**

In 1991, a limited entry program for hook and line rockfish (Category “ZN”) was implemented for the Strait of Georgia, resulting in 74 eligible licence holders. In 1992, the limited entry program was expanded to include the remainder of the coast and resulted in an additional 183 eligible licence holders. In 1997, the Minister of Fisheries and Oceans made several policy decisions regarding the management of the Groundfish Hook and Line fishery. These decisions were a result of consultations with industry regarding the need for change in the long-term management of Pacific Coast groundfish fisheries, and recommendations on the allocation of commercial groundfish between the trawl and hook and line gear sectors. These decisions included commercial rockfish TACs be allocated 92 percent to the trawl gear sector and eight percent to the hook and line sector, including an allocation of 100 percent of the commercial rockfish TACs in the Strait of Georgia.

### **Overview of the Fishery**

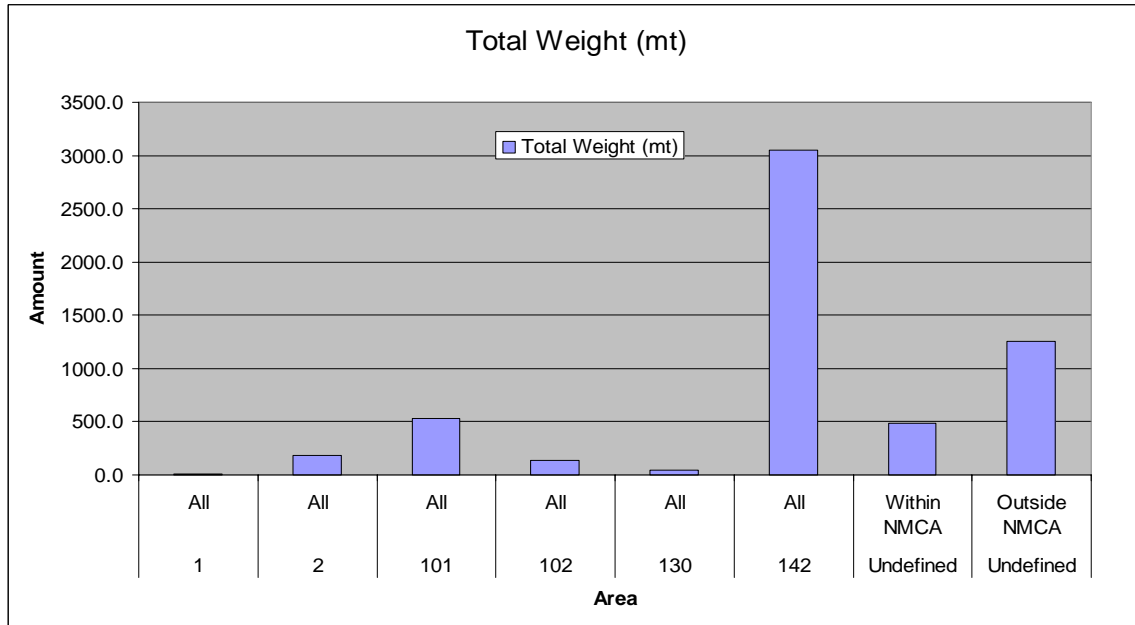
As part of a three year pilot program, the Outside ZN fishery will be managed through an IQ regime and will be permitted to make unlimited annual reallocations between licences. In addition, any vessels participating in this fishery are required to acquire quota to account for all non-directed catch of halibut and dogfish. Subject to species and area closures, vessels will be permitted to retain and land non-directed catch.

There are more than 30 different species of groundfish harvested commercially in coastal waters by trawl and hook and line vessels. Currently, 27 different species are assessed and assigned an annual TAC. There are also different stocks for each species. The groundfish hook and line fishery is managed separately from the trawl fishery. However, both fisheries harvest similar species under the same TACs. Of the different species of rockfish and thornyheads in BC, 26 species are caught in this fishery; this includes species of greenlings and lingcod.

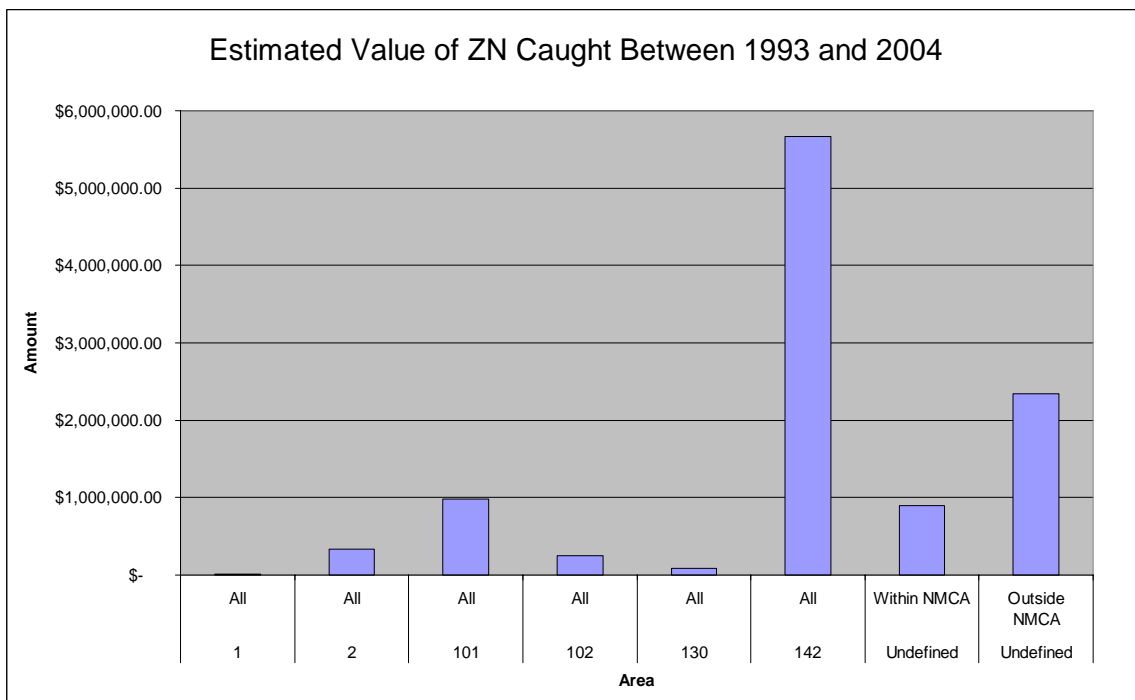
**Table 15: Rockfish Fishery Species and their Common Names**

| Species             | Latin Name                         | Species     | Latin Name                    |
|---------------------|------------------------------------|-------------|-------------------------------|
| Rougheye            | <i>Sebastes aleutianus</i>         | Blackgill   | <i>Sebastes melanostomus</i>  |
| Pacific Ocean Perch | <i>Sebastes alutus</i>             | Vermilion   | <i>Sebastes miniatus</i>      |
| Brown               | <i>Sebastes auriculatus</i>        | Blue        | <i>Sebastes mystinus</i>      |
| Aurora              | <i>Sebastes aurora</i>             | China       | <i>Sebastes nebulosus</i>     |
| Redbanded           | <i>Sebastes babcocki</i>           | Tiger       | <i>Sebastes nigrocinctus</i>  |
| Shortraker          | <i>Sebastes borealis</i>           | Bocaccio    | <i>Sebastes paucispinis</i>   |
| Silvergray          | <i>Sebastes brevispinis</i>        | Canary      | <i>Sebastes pinniger</i>      |
| Copper              | <i>Sebastes caurinus</i>           | Northern    | <i>Sebastes polyspinis</i>    |
| Dusky               | <i>Sebastes ciliatus</i>           | Redstripe   | <i>Sebastes proriger</i>      |
| Darkblotched        | <i>Sebastes crameri</i>            | Yellowmouth | <i>Sebastes reedi</i>         |
| Splitnose           | <i>Sebastes diploproa</i>          | Yelloweye   | <i>Sebastes ruberrimus</i>    |
| Greenstriped        | <i>Sebastes elongatus</i>          | Bank        | <i>Sebastes rufus</i>         |
| Puget Sound         | <i>Sebastes emphaeus</i>           | Stripetail  | <i>Sebastes saxicola</i>      |
| Widow               | <i>Sebastes entomelas</i>          | Harlequin   | <i>Sebastes variegatus</i>    |
| Yellowtail          | <i>Sebastes flavidus</i>           | Pygmy       | <i>Sebastes wilsoni</i>       |
| Chilipepper         | <i>Sebastes goodei</i>             | Sharpchin   | <i>Sebastes zacentrus</i>     |
| Rosethorn           | <i>Sebastes<br/>helvamaculatus</i> | Shortspine  | <i>Sebastolobus alascanus</i> |
| Shortbelly          | <i>Sebastes jordani</i>            | Thornyheads | <i>Sebastolobus</i>           |
| Quillback           | <i>Sebastes maliger</i>            | Longspine   | <i>Sebastolobus altivelis</i> |
| Black               | <i>Sebastes melanops</i>           | Lingcod     | <i>Ophiodon elongatus</i>     |

The economic value of the ZN rockfish fishery is difficult to ascertain as prices fluctuate based on market conditions, the species and the harvest method employed. For instance, prices paid for hand line harvested yelloweye (red snapper) in 2003 was \$.60 more than the price paid for long line harvested yelloweye. However, average prices for ZN caught rockfish during this period were around \$.85 per pound or \$1,874 per tonne. Thus, the value of rockfish during the period 1993 to 2004 was around \$10,578,066.



**Figure 14: ZN Rockfish Commercial Fishery Catches in and around Haida Gwaii (mt) 1993 to 2004**

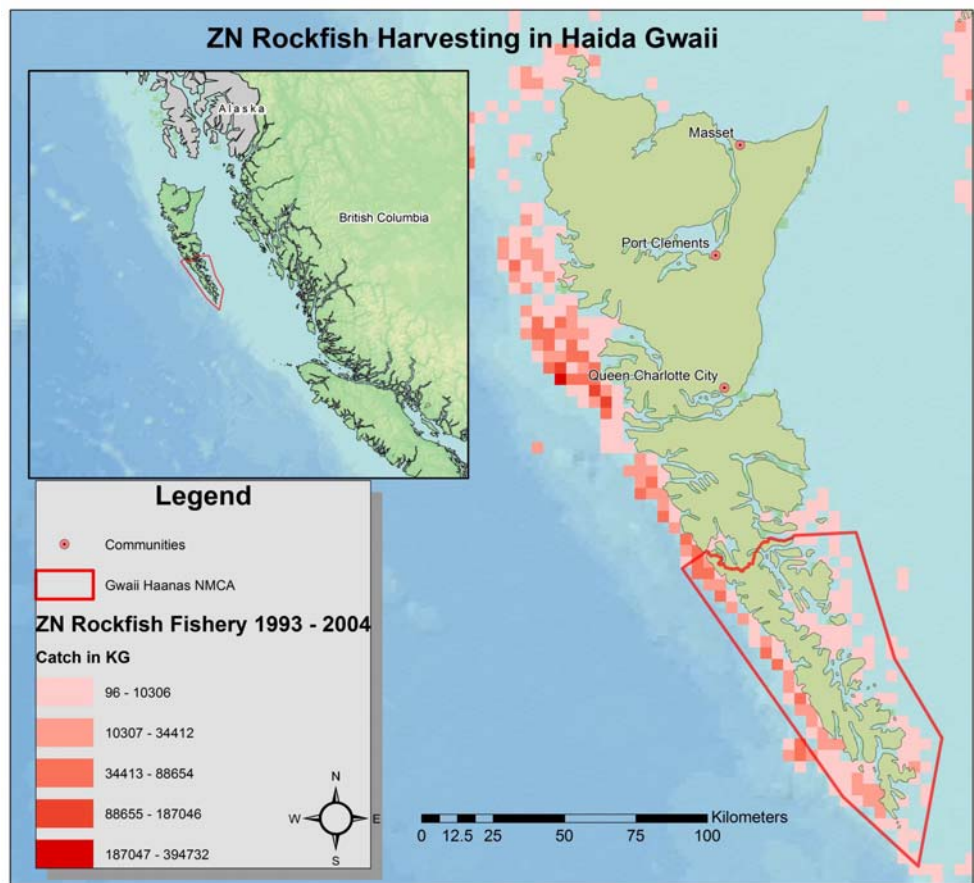


**Figure 15: Estimated Dollar Value of ZN Caught Fish in and Around Haida Gwaii between 1993 and 2004**

### Location

Figure 16 illustrates that the majority of the ZN rockfish fishery occurs off the west coast of Haida Gwaii near the continental shelf rise throughout Area 2 West. The rockfish

fishery in Area 2 East is not as active and occurs from Cumshewa Inlet southward along the east coast of Moresby Island. Clearly though, Figure 16 indicates that the ZN rockfish fishery is active within the NMCA.



**Figure 16: Location of the Outside ZN Rockfish Fishery in Haida Gwaii 1996 to 2004**

### Stock Assessment

Interpreting CPUE data is difficult due to the unknown influence of fishery management actions on the CPUE indices. Changes in fishing behavior in response to limited entry licensing, a change to aggregated species TACs and declining annual quotas has resulted in low confidence that fishery dependent CPUE indices reflect fish abundance (Yamanaka and Lacko 2001).

### User Role

The Groundfish Hook and Line Advisory Committee (GHLAC) is the ZN consultative body, (includes industry, recreational sector, NGOs, First Nations, provincial government, coastal communities and DFO), who advise DFO on strategic approaches on changes to fisheries management in and off season. Industry is a key presence with DFO and makes significant contributions in stock assessment, research, monitoring and management.



## Recreational

Catch monitoring and research programs have indicated inshore rockfish stocks, particularly in the Strait of Georgia, are at low levels of abundance. Due to low survival rates after being caught, DFO encourages different ways of avoiding rockfish if non-targeted during fishing activities. For more information on recreational fishing for rockfish see the general section on page 53.

## First Nations

For information on First Nations fishing for rockfish, see the general section on page 53.

## Halibut by Hook and Line

**Table 16: General Overview of the Halibut Fisheries**

| Area and Fishery         | Season                    | # Licences       | Gear                 | TAC 2006                  | Landing 2006       | Value 2006   |
|--------------------------|---------------------------|------------------|----------------------|---------------------------|--------------------|--------------|
| Coast-wide Commercial    | March 10 to November 15   | 396 Category L   | Hook and Line        | 19,960 mt                 | 11,956 mt          | \$45,875,243 |
| North Coast Recreational | February 1 to December 31 | Individual Sport | Hook and Line, Spear | 2 Per Day<br>3 Possession | 25,965 pcs in 2005 | N/A          |
| Coast-wide First Nations | March 10 to November 15   | 40 Category FL   | Hook and Line        | N/A                       | N/A                | N/A          |

## History

North American Pacific halibut have been fished for centuries by various indigenous people inhabiting the north-western coastline of North America. Commercial halibut fishing began in 1880s as a result of the movement of the Atlantic halibut fleet to the Pacific. From a small fishery along the coasts of Washington and Vancouver Island, the fishery expanded northwards. By 1910, the fishery extended to the south-eastern waters of Alaska. As the fishery grew in intensity, the industry eventually petitioned both Canadian and US governments to manage the fishery. Consequently, on March 2, 1923, the *Convention for the Preservation of the Halibut Fishery of the Northern Pacific Ocean* was signed by both parties and the IPHC, as it is known today, was founded.

## Overview

Between groundfish commercial sectors (trawl, hook and line and halibut), allocation of TACs is based on the percentage of quota and non-quota species. Quota Management Areas for the Queen Charlotte Islands include: Areas 1, 2, 101, 102, 130 and 142. In 1991, the Canadian government adopted IVQ to manage the fishery, and in 1995, the US followed with their individual fishing quota (IFQ) system (IPHC, website). The commercial halibut fishery is managed to a nine-month opening with an annual TAC. This management regime has resulted in an increased value of the fishery, less wastage, and greater safety for the coast-wide fleet (IPHC, website). The number of halibut licences within the Queen Charlotte Islands in relation to licences coast-wide has remained relatively low. Approximately one percent of commercial halibut fish harvesters indicate that their residence is in Haida Gwaii.

## **Location**

DFO was unable to obtain spatial files from the IPHC during the writing of this report. However, *The Marine Legacy of Gwaii Haanas V: Coastal Zone Values and Management around Haida Gwaii* report includes a comprehensive section on halibut including coarse spatial data based on 25 X 25 km grid which Parks Canada was able to obtain from the IPHC. Based on this information, Parks Canada concluded that “it is clear that the fishery is concentrated in the Dixon Entrance-northern Hecate Strait area (mostly offshore PFMAs 101 and 104) and to the south and east of Haida Gwaii in Queen Charlotte Sound (offshore PFMAs 102, 108 to 110, 130).” (Sloan, 2006)

## **Stock Assessment**

Growing concerns about net migration from the western to the eastern Gulf of Alaska have led the IPHC staff to doubt the accuracy of the closed-area assessments that have been done for many years. A coast-wide assessment with survey apportionment was therefore done in addition to the closed-area assessments this year, and was used to calculate the available yield in each area. The two kinds of assessments produced very similar estimates of total abundance (total exploitable biomass about 400 M lb, total available yield about 80 M lb), but the distribution among areas was quite different, with the coast-wide assessment showing more biomass and available yield in Areas 3B and 4, than the closed-area assessments and less in Area 2. Area 3A is about the same in both assessments. Overall, the biomass of halibut remains healthy. However, the IPHC chose to retain the older closed-area assessment methodology for determining the 2007 catch limits. Lower catch limits were recommended for Areas 2C and 2B in response to lowered abundance in these areas. The mid-term prospects for the halibut stock continue to be positive; several strong incoming year classes will begin making major contributions to the exploitable stock in the next several years.

## **User Role**

The Halibut Advisory Board (HAB) is the consultative body, (includes industry, recreational sector, NGOs, First Nations, provincial government, coastal communities and DFO), who advise DFO on strategic approaches on changes to fisheries management in and off season. Industry is a key presence with DFO and makes significant contributions in stock assessment, research, monitoring and management.

The IPHC, originally called the International Fisheries Commission, was established in 1923 by a Convention between the governments of Canada and the United States of America. Its mandate is research on and management of the stocks of Pacific halibut within the Convention waters of both nations. The IPHC consists of three government-appointed commissioners for each country who serve their terms through the United States and Canadian government respectively.

## Recreational

On October 27, 2003, the Minister of DFO announced an allocation framework for the commercial and recreational sectors for the Pacific halibut fishery. The framework outlines that a 12 percent recreational catch “ceiling” will be allocated to the recreational sector until both parties can develop an acceptable market-based mechanism that will allow for adjustment of the recreational share through acquisition of additional quota from the commercial sector. For more information on recreational fishing for halibut see the general section on page 53.

## First Nations

DFO provides opportunities to harvest halibut to First Nations for food, social and ceremonial purposes and to the commercial and recreational fisheries. Opportunities are guided by recommendations on allowable yields submitted by the IPHC to the Canadian and American governments for approval. For more information on First Nations fishing for halibut see the general section on page 53.

## Sablefish

**Table 17: General Overview of the Sablefish Fisheries**

| Area and Fishery         | Season                   | # Licences       | Gear               | TAC 2006/2007             | Landing 2006/2007 | Value 2006   |
|--------------------------|--------------------------|------------------|--------------------|---------------------------|-------------------|--------------|
| Coast-wide Commercial    | August 1 to July 31      | 46 Category K    | Long Line and Trap | 21,480 mt                 | 9,660 mt          | \$52,014,724 |
| North Coast Recreational | January 1 to December 31 | Individual Sport | Hook and Line      | 4 Per Day<br>8 Possession | N/A               | N/A          |
| Coast-wide First Nations | August 1 to July 31      | 2 Category FK    | Long Line and Trap | N/A                       | N/A               | N/A          |

## History

One of the most valuable commercial fish species in the north Pacific, Sablefish (*Anoplopoma fimbria*), have recorded landings dating back to 1913. Initially, sablefish were considered by-catch of the domestic groundfish fishery and considered a nuisance fish due to their low landed value. Foreign vessels targeted Pacific sablefish from the mid-1960s until 1977, at which time Canada adopted the 200-mile Exclusive Economic Zone. In the late 1970s, Canadian fish harvesters established a viable sablefish fishery by pursuing markets in Japan and experimenting with trap gear as a means of effective and productive harvesting. In 1981, increased market demand and escalating trap and long line fishing effort, led to a limited entry management regime. Today, the sablefish fishery continues to be one of BC’s most important.

## Overview

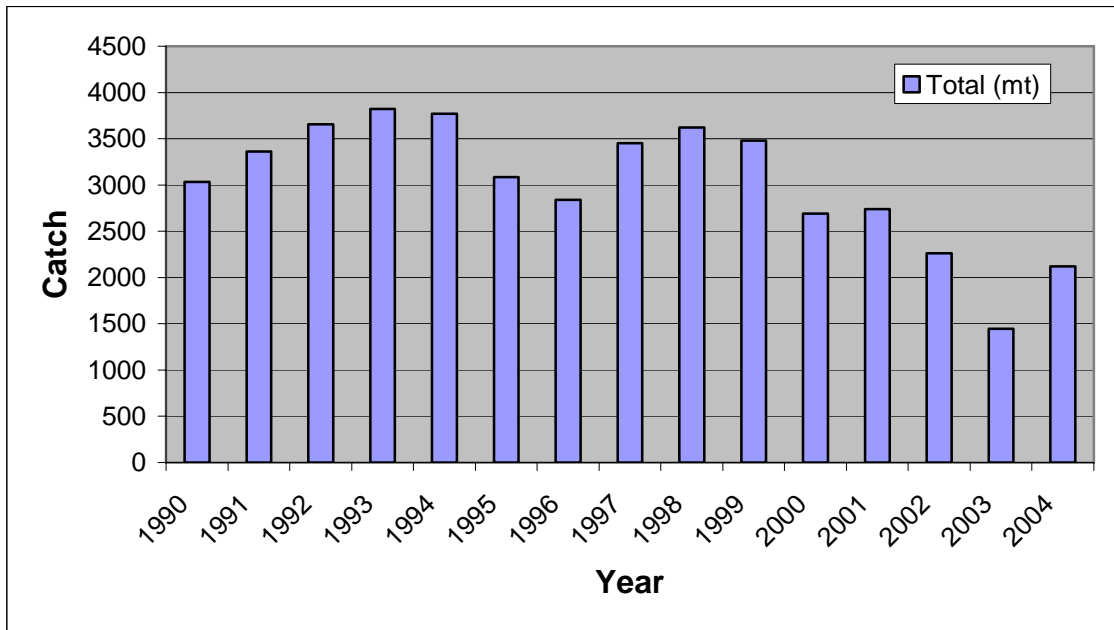
Similar to the groundfish trawl fishery, sablefish fishery management has established eight large management zones along the BC coast, of which three (5B, 5C and 5E) overlap with the proposed Gwaii Haanas NMCA. In consideration of the scale of the NMCA, the smaller PFMA’s are used in the collection of data in place of the management zones. It is important to note four management areas (102-2, 102-3, 130-3 and 142-1) have a portion of their areas overlapping the proposed NMCA. Data gathered for these

four areas was mapped to determine fishing activity within and out to a 1.5 km buffer of the NMCA. The results include commercial catch weight (metric tonnes) excluding seamount and research recorded catch. It has been noted (Wyeth, pers. comm) that any sablefish catch data in Hecate Strait in addition to the PFMA 102 may be the result of a reporting error since this is not “a typical sablefish fishing location”. Sablefish recruitment is variable with strong year-classes that occur periodically. The production of strong year-classes is believed to be linked to higher copepod abundance arising from favourable environmental conditions. Recent studies have shown that there are decadal trends in year-class strength (DFO Sablefish website). The long-lived nature of this species is likely a strategy to ensure survival over extended periods of low recruitment resulting from environmentally unfavourable conditions. The commercial fishery is managed under a TAC regime.

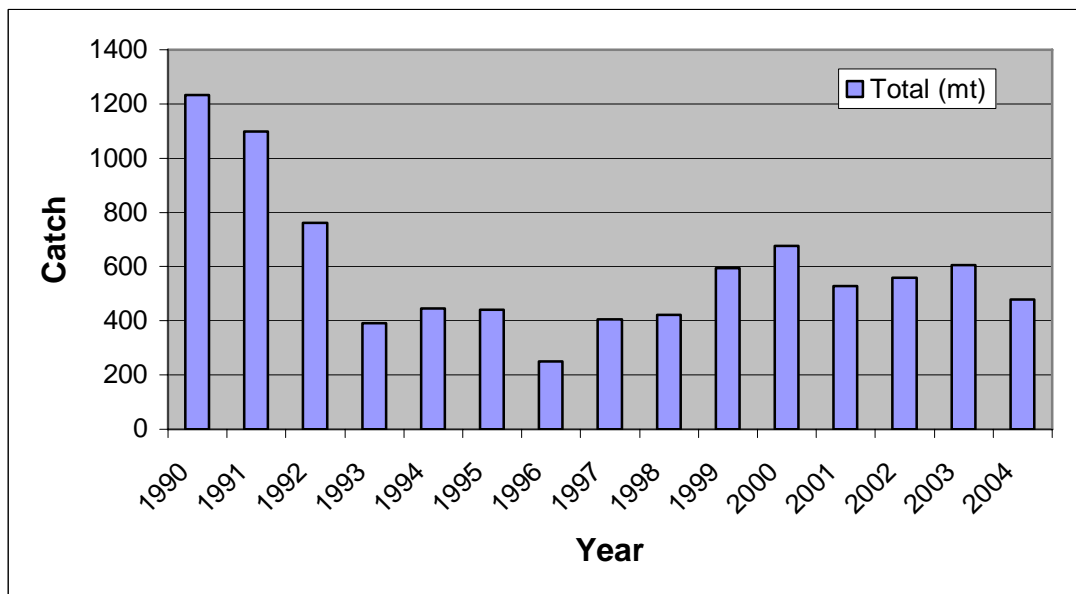
Between 1981 and 1989 the fishery experienced reduced annual openings from 245 days to a mere 14 days, despite a 42 percent increase in the TAC. In 1990, after concern was raised by the Canadian Sablefish Association (CSA), DFO, with the support of the CSA, implemented IVQ. IVQ management involves allocating shares of the TAC to each licensed vessel and results in the fish harvester having more control over factors that affect the value of the fish such as seasonal supply and quality.

Directed commercial fishing for sablefish is conducted under a sablefish fishing licence that permits sablefish to be caught by trap and long line gear. A portion (approximately eight percent) of the sablefish TAC is allocated to the commercial groundfish trawl fishery.

Approximately 80 percent of Canada’s sablefish is sold in Japan’s markets, with the remainder sold in Hong Kong and throughout North America. The sablefish catch is monitored (100 percent) at designated landing locations, of which there are no designated ports in the Queen Charlotte Islands. As noted earlier, the sablefish fishery is one of the most lucrative fisheries on the coast as “the ex-vessel prices was usually less than \$8,000 per tonne, but has fluctuated from \$6,610 to \$10,360 per tonne.”



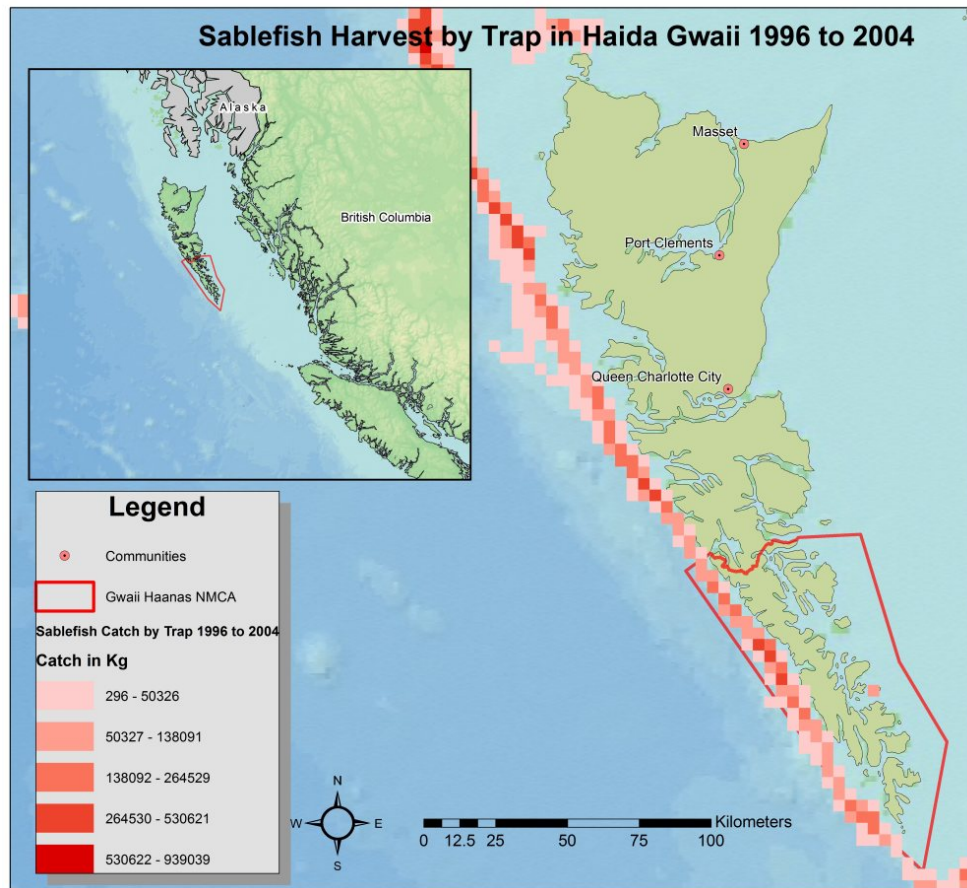
**Figure 17: Coast-wide Commercial Sablefish Catch (mt) by Trap from 1990 to 2004**



**Figure 18: Coast-wide Commercial Sablefish Catch by Long Line (mt) 1990 to 2004**

### Location

The waters around the Queen Charlotte Islands, including the areas in and around Gwaii Haanas, support sablefish fishing. Sablefish fishing is a deepwater fishery targeting depths of between 300 and 1,000 metres. Figure 19 illustrates that the majority of sablefish trap fishing in proximity to the Gwaii Haanas NMCA occurs along the continental shelf, in the offshore area.



**Figure 19: Location of Commercial Sablefish Trap Fisheries in Haida Gwaii 1996 to 2004**

### Stock Assessment

Sablefish stock assessment data are available from two trap surveys, directed trap fishery catch rates, trawl observer data and offshore releases/recoveries of tagged sablefish. Catch rates from the 1990 to 2006 standardized surveys have declined approximately 38 percent since 2003. In contrast, mean catch rates from the 2006 stratified random survey are about the same as those observed at the start of this survey series in 2003. Monthly mean catch rates derived from trap fishery logbook data for early 2006 were low relative to the historical series and remained at about the 2001 to 2002 level during the last half of the year. Sablefish catch rates in the shallow water (< 550m) component of the trawl fishery off the west coast of Vancouver Island increased in response to the incoming 1999 to 2000 year classes and have declined over the last two years. Catch rates deeper than 550m in the same area have increased over the last few years, presumably as fish from the 2000 year class move to deeper waters.

### User Role

The Sablefish Advisory Committee (SAC) is the sablefish consultative body, (includes industry, recreational sector, NGOs, First Nations, provincial government, coastal communities and DFO), who advise DFO on strategic approaches on changes to fisheries

management in and off season. Industry is a key presence with DFO and makes significant contributions in stock assessment, research, monitoring and management.

### Recreational

For more information on recreational fishing for sablefish see the general section on page 53.

### First Nations

For more information on First Nations' fishing for sablefish see the general section on page 53.

### Schedule II Fishery – Other Groundfish Species

**Table 18: General Overview of the Schedule II Fishery – Other Groundfish Species**

| Area and Fishery         | Season                   | # Licences       | Gear          | TAC 2006   | Landing 2006                              | Value 2006  |
|--------------------------|--------------------------|------------------|---------------|--|---|-------------|
| Commercial               | April 1 to March 31      | 1228 Category C  | Hook and Line | <b>Queen Charlotte Lingcod</b><br>Hook and Line<br>420 mt<br><br><b>Coast-wide Dogfish</b><br>Hook and Line<br>8160 mt                                 | 1940 mt                                   | \$1,813,575 |
| North Coast Recreational | January 1 to December 31 | Individual Sport | Hook and Line | <b>Lingcod</b><br>3 Per Day<br>6 Possession<br><br><b>Sole/Flounder</b><br>8 Per Day<br>16 Possession<br><br><b>Skate</b><br>1 Per Day<br>2 Possession | <b>Lingcod</b><br>5207 pcs in <b>2005</b> | N/A         |
| Coast-wide First Nations | April 1 to March 31      | 8 Category FC    | Hook and Line | N/A  | N/A                                       | N/A         |

### History

The offshore hook and line lingcod fishery has been increasing in most areas with 1,329 tonnes landed coast-wide in 1993, compared to 921 tonnes in 1989. The lingcod stock in the Strait of Georgia and vicinity is at an extremely low level of abundance. Since 1990, retention of lingcod by commercial fish harvesters has been prohibited throughout most areas in the Strait of Georgia. The dogfish fishery is conducted in two main areas on the Pacific Coast: the West Coast of Vancouver Island and the Strait of Georgia. Fishing effort is on the rise due to poor salmon seasons. Coast-wide landings in 1996 were 3,523 tonnes, compared to 666 tonnes in 1993.

## Overview

The Schedule II hook and line fishing licence involves a fishing privilege that is given to all commercial vessel-based licence eligibilities. “Schedule II” refers to *Schedule II, Part II of the Pacific Fishery Regulations, 1993*. A registered commercial fishing vessel that is eligible for any vessel based licence, communal commercial licence or a valid N licence is eligible to commercially harvest Schedule II species, which are lingcod, dogfish, sole, flounder, skate and Pacific cod. Directed trips have primarily targeted lingcod and dogfish, although more recently there has been directed effort for skate. Licence documents are valid from the date of issue till December 31 of each calendar year.

The Schedule II fishery evolved to account for all the other species caught as “by-catch”. Harvest plans are developed annually for commercial, recreational and First Nation fisheries. In this fishery, Stock Management Areas describe geographically large areas but are defined by fisheries management Area and Subarea. The fishery is managed through monthly limits and area based TACs.

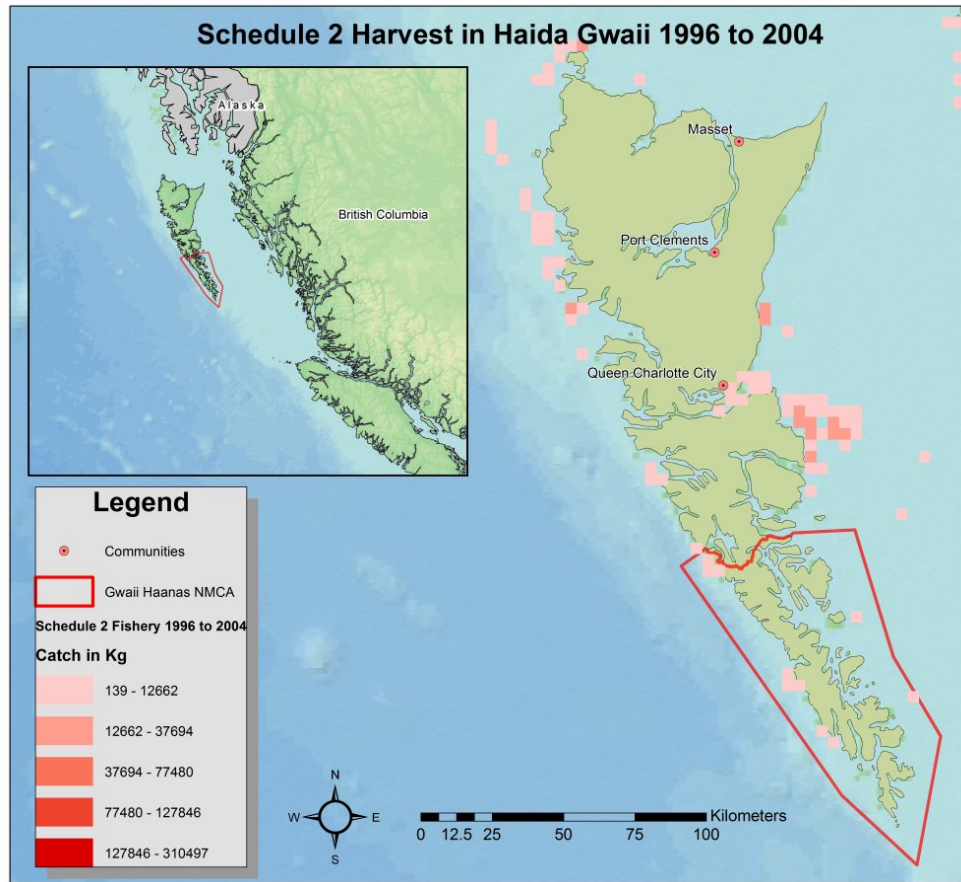
In 2002, DFO reduced the TAC by 50 percent to address conservation concerns for rockfish species caught in this fishery. Between groundfish commercial sectors (trawl, hook and line and halibut), allocation of TACs is based on percentage of quota and non-quota species. In addition, there are specified levels of rockfish allocated from the coast-wide TAC as a by-catch to the commercial halibut fishery and the spiny dogfish fishery and are managed under the Schedule II Species Management Plan. First Nation and recreational sectors have no set TAC for fishing outside rockfish by hook and line.

The Schedule II fishery utilizes various vessel and gear types. Species may be harvested by hook and line gear including long line, jig, hand line and troll. Long line gear is not permitted when fishing for lingcod. West coast long liners, hand lines, rods and reels for fishing, trolling and “jigging” are used in the Schedule II fishery.

## Location

Much of the Schedule II fishery in Haida Gwaii takes place between Skidegate Inlet and Cumshewa Channel. There is some limited effort within Gwaii Haanas in Area 2W, south of Gowgaia Bay and in the vicinity of Flamingo Inlet. In Area 2E, activity is limited to the Ramsay Island and Skincuttle Inlet areas. (Figure 20)





**Figure 20: Location of Schedule II Commercial Fisheries in Haida Gwaii 1996 to 2004**

### Stock Assessment

Interpreting CPUE data is difficult due to the unknown influence of fishery management actions on the CPUE indices. Changes in fishing behavior in response to limited entry licensing, a change to aggregated species TACs and declining annual quotas has resulted in low confidence that fishery dependent CPUE indices reflect fish abundance (Yamanaka and Lacko 2001).

### User Role

The GHLAC is the ZN consultative body, (includes industry, recreational sector, NGOs, First Nations, provincial government, coastal communities and DFO), who advise DFO on strategic approaches on changes to fisheries management in and off season. Industry is a key presence with DFO and makes significant contributions in stock assessment, research, monitoring and management.

## Recreational

For more information on recreational fishing for other groundfish species see the general section on page 53.

## First Nations

For more information on First Nations' fishing for other groundfish species see the general section on page 53.

## Groundfish Trawl

**Table 19: General Overview of the Trawl Fisheries**

| Area and Fishery         | Season              | # Licences        | Gear  | TAC 2006   | Landing 2006 | Value 2006   |
|--------------------------|---------------------|-------------------|-------|------------|--------------|--------------|
| North Coast Commercial   | April 1 to March 31 | 141<br>Category T | Trawl | 149,754 mt | 130,339 mt   | \$66,500,000 |
| Coast-wide First Nations | April 1 to March 31 | 1<br>Category FT  | Trawl | N/A        | N/A          | N/A          |

## History

The groundfish trawl fishery in BC has existed since the 1940s. Trawl fishing by Canadians began in earnest in the 1960s; however, most fishing was conducted by foreign vessels operating off the west coast until the 200-mile limit was implemented by Canada in 1977. It is the largest commercial fishery in terms of landings (Grafton, 2007). The trawl fishery exhibits a high degree of diversity in landings with roughly 35 species making up 95 percent of the landings (Sinclair, 2002). The management of this fishery reflects the diversity of landings.

## Overview

There are more than 30 different species of groundfish harvested commercially in coastal waters by trawl and hook and line vessels. Currently, 27 different species are assessed and assigned an annual TAC; these species include rockfish, Pacific hake, sablefish, flatfish, turbot, Pacific halibut and elasmobranchs. There are also different stocks for each species, including an IVQ cap for each of these species, where catch is either retained or discarded. Discarding occurs at sea and is legally defined non-retention of trawl species. The groundfish hook and line fishery is managed separately from the trawl fishery. However, both fisheries harvest similar species under the same TACs. Trawlers target the majority of groundfish species with the exception of inshore rockfish species, halibut, sablefish and some elasmobranchs. Elasmobranchs refers to fishes of the class *Chondrichthyes* characterized by a cartilaginous skeleton and placoid scales. Coast-wide, the most landed species by volume is hake followed by sharks, rays and skates. It accounts for about twice as much in terms of landed weight than the catch of all other species combined.

Management is complicated by the fact that many species caught in the fishery have location specific populations. DFO began to establish quotas and management measures to control the harvest of west coast groundfish stocks in 1979. These measures included

licence limitation, the establishment of TACs, and imposing species area closures, area time closures and vessel trip limits on groundfish of commercial importance. An IVQ program provides a stable management regime under which the industry is able to operate while DFO's objectives for a properly controlled and monitored fishery where harvest levels within established TACs are maintained. The IVQ program has moved into fishery personal accountability (individual fish harvesters are responsible for his/ her fishing activity) while fostering greater communication and cooperation in the industry. This has led to the sharing of knowledge of avoidance and selective fishing techniques. This has also lead to an increase in the value of the fishery through better marketing practices.

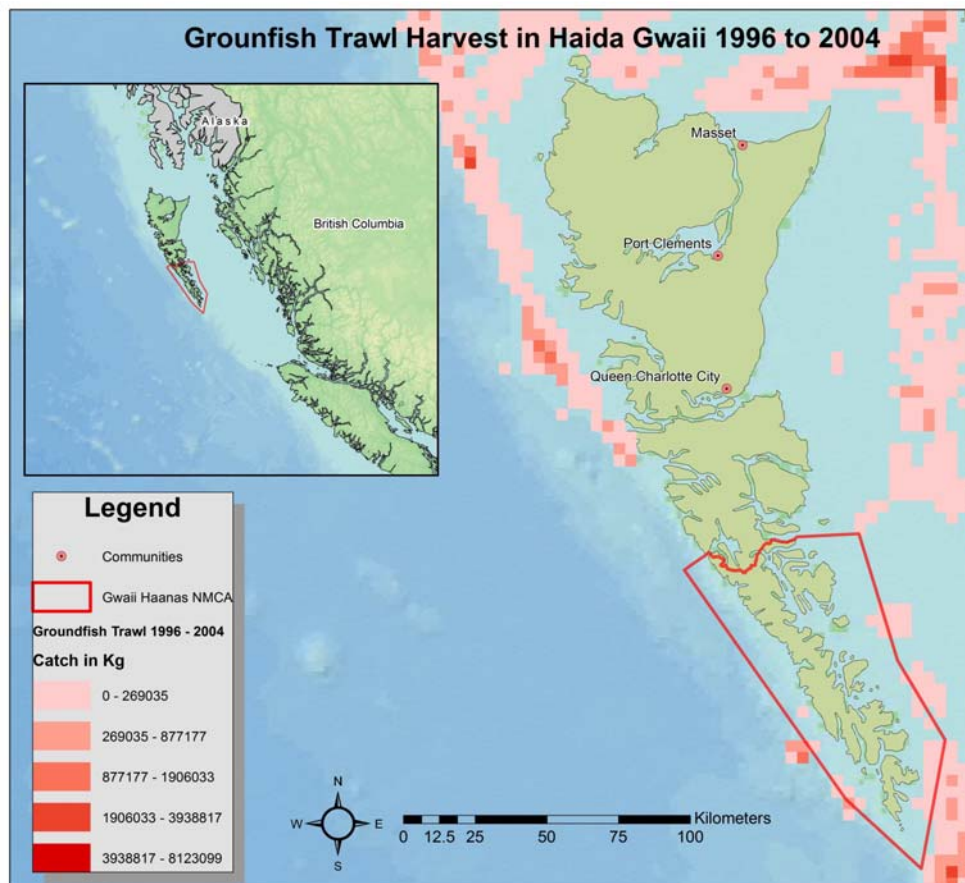
There is concern over habitat damage done by trawl nets dragged over sea floors, specifically to areas with coral and sponge populations. Sponge reefs, discovered only 10 years ago, are the only known example of living Hexactinellid sponge reefs in the world today. The reefs cover nearly 1,000 square kilometres of seabed in eastern Queen Charlotte Sound and Hecate Strait. These living fossil structures can reach more than 15 metres in height and are thought to be formed approximately 10,000 years ago. Due to the fragile skeleton nature of the reefs, it is believed that the sponge skeletons are susceptible to damage from physical contact by fishing gear and in particular trawls. Additionally, the dense coverage of sponges provides habitat for a variety of invertebrate and fish species. DFO continues to monitor fishing activity in adjacent areas to ensure current measures continue to provide the needed protection of the sponge reef ecosystems.

### **Location**

The areas in and around the proposed Gwaii Haanas NMCA are known to be fished by groundfish trawlers. Of the eight large trawl fishery management zones, three (5B, 5C and 5E) overlap with the Gwaii Haanas NMCA. PFMAs were used in the collection of data. While some PFMA exist entirely within the proposed NMCA boundary, others are limited to overlapping areas.

Considering the Gwaii Haanas NMCA defines a relatively small area, tabular data (PacHarvTrawl) was collected for all species documented within the area. Often non-targeted fish are caught which illustrates the biodiversity within the area in addition to catch composition. To spatially represent the groundfish trawl data (Spatial Rollup Database), groundfish species were assigned to aggregates while all invertebrate species were summarized as one large group. Rockfish aggregates, are typically divided into three zones: inshore, with a depth range of 0-100 fathoms, shelf, 50-100 fathoms and slope, greater than 100 fathoms (Bonnet, pers comm. 2004).

As noted in Figure 21, groundfish trawl activity is limited to the offshore areas of the Gwaii Haanas NMCA.



**Figure 21: Location of Groundfish Trawl Fisheries near Haida Gwaii 1996 to 2004**

### Stock Assessment

Interpreting CPUE data is difficult due to the unknown influence of fishery management actions on the CPUE indices. Changes in fishing behavior in response to limited entry licensing, a change to aggregated species TACs and declining annual quotas, has resulted in low confidence that fishery dependent CPUE indices reflect fish abundance (Yamanaka and Lacko 2001).

### User Role

The Groundfish Trawl Advisory Committee (GTAC) is the trawl consultative body, (includes industry, recreational sector, NGOs, First Nations, provincial government, coastal communities and DFO), who advise DFO on strategic approaches on changes to fisheries management in and off season. Industry is a key presence with DFO and makes significant contributions in stock assessment, research, monitoring and management.

### Recreational

For more information on recreational fishing for groundfish species see the general section on page 53.

## **First Nations**

For more information on First Nations' fishing for groundfish species see the general section below.

## **FIRST NATIONS FOOD SOCIAL AND CEREMONIAL FISHERIES**

DFO identifies First Nations harvests for food, social and ceremonial purposes as the first priority after conservation. This fishery is regulated through the issuance of communal licences to First Nations organizations. These licences are issued under the authority of the *Aboriginal Communal Fishing Licence Regulations*. Further arrangements for First Nations fishing may be identified in agreements between DFO and individual First Nations organizations.

Communal licences and fisheries agreements may contain provisions for the designation of individuals by the First Nations organization to access the allocation provided under the communal licence, as well as provisions for monitoring and reporting by the group of the Aboriginal fishery in co-operation with DFO.

The *Gwaii Haanas – South Moresby National Park Reserve, Review of Vertebrate Fishery Resources* that was prepared for the Canadian Parks Service provides an excellent overview of Haida usage of fish resources. With Haida input into the Gwaii Haanas NMCA process, Parks Canada may receive additional detailed information regarding the cultural importance of marine resources in traditional and modern Haida life. Consultations with the Haida, is a requirement for both the collection of needed First Nations' resource use information within Gwaii Haanas, as well as the eventual enactment of this NMCA.

## **RECREATIONAL FISHERIES**

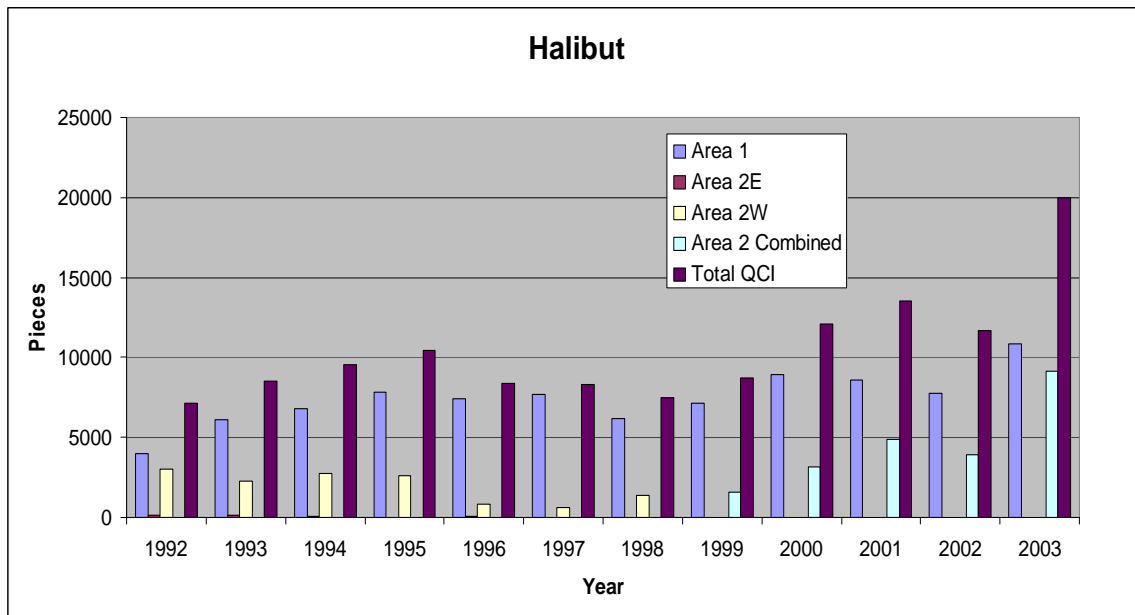
A tidal water sports fishing licence is required before any recreational fishing activity is undertaken in coastal waters. This licence is used when targeting invertebrates, pelagic or groundfish. Catch and possession limits are predetermined in the catch limits table located on the DFO website. It must be noted however, that in-season changes to these limits may occur and fish harvesters should check with local DFO offices. Anyone holding a recreational licence may fish wherever regulations allow.

The SFAB has been an advisory body to DFO on recreational issues since 1964. There are approximately two dozen local community based advisory committees, made up of representatives of local recreational fishing interests. In its current form, the SFAB usually meets twice a year to discuss and advise DFO on recreational fishing plans, recreational fishery regulations, and any areas of concern to the recreational fishing community. The SFAB also considers some issues regarding non-tidal anadromous recreational fisheries.

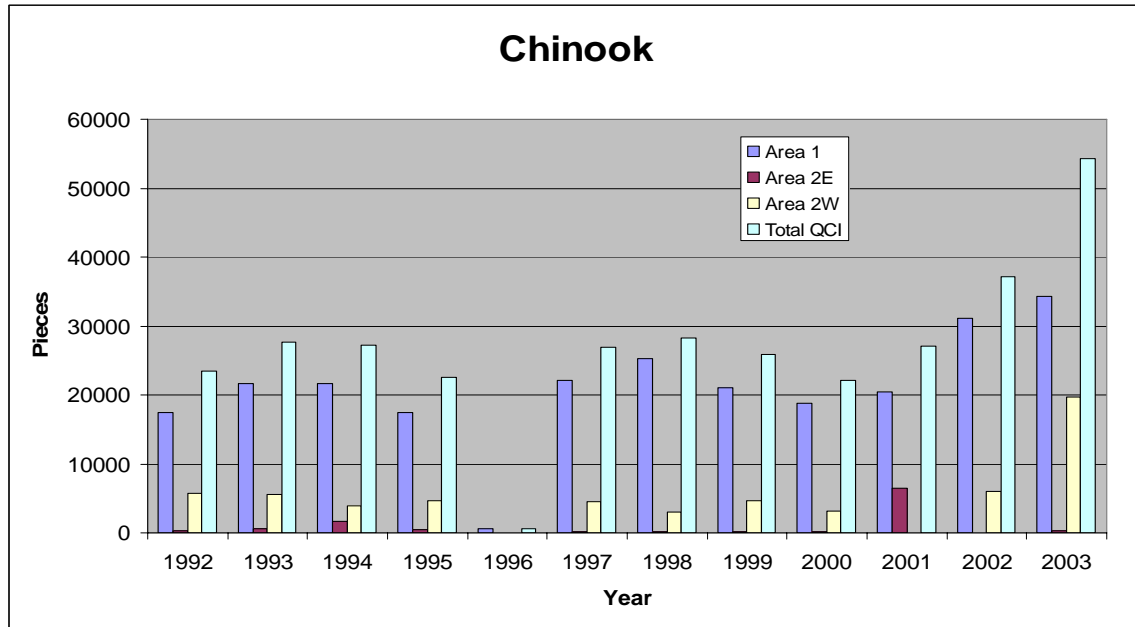
For approximately 10 years, recreational catch information has been collected by the Haida Fisheries Program. Recreational catch data was derived from creel surveys, and from the lodge logbook program. Data recorded from creel surveys is specific to various

locations and provides an “estimate” of effort and catch. Creel Surveys for sport fishing activities are “estimate(s) of angler catch and effort in freshwater systems”. Numbers are collected from lodge and charter operators on a bi-weekly basis and, since many lodges are stationary, are location specific. Location data from this work is represented by PFMA 1, 2 West and 2 East.

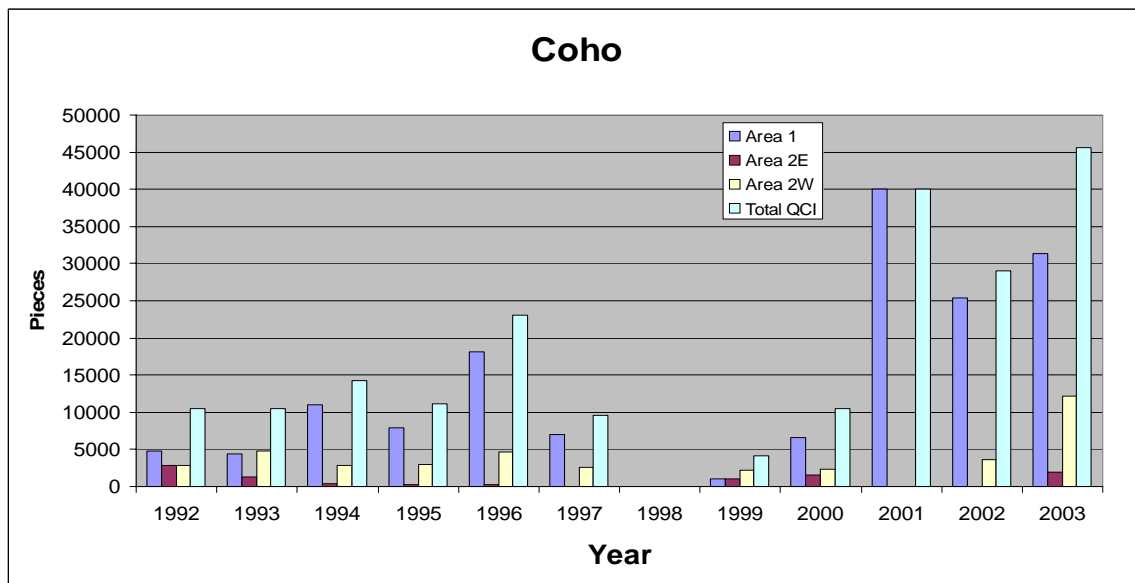
As noted in Figures 22 to 25, recreational fisheries in Haida Gwaii are remaining relatively stable. Coho, Chinook and halibut recreational harvest numbers are on the rise. Although recreational sport fishing activities occur within the proposed Gwaii Haanas NMCA, it is likely that total effort and catch are minimal. Estimates of recreational effort and catch within the NMCA may be considered speculative (Fradette, pers. Comm., 2006). However, the Pacific region’s data services unit does track the pieces count of a number of fish species caught recreationally within Areas 2E and 2W.



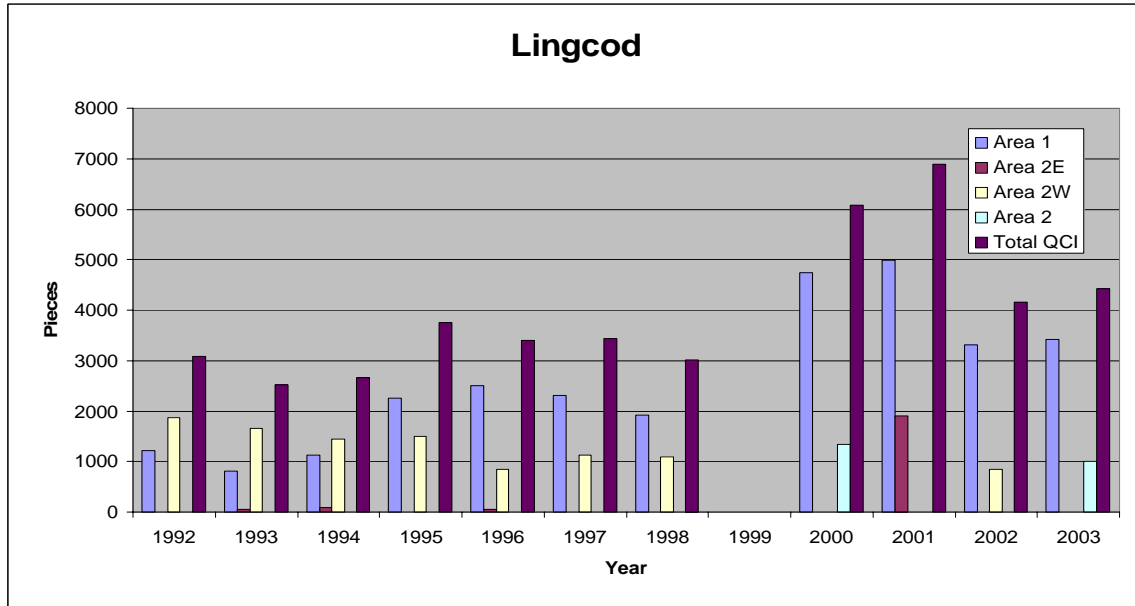
**Figure 22: Recreational Halibut Catches in Haida Gwaii in Pieces from 1992 to 2003**



**Figure 23: Recreational Chinook Salmon Catches in Haida Gwaii in Pieces from 1992 to 2003**



**Figure 24: Recreational Coho Salmon Catches in Haida Gwaii in Pieces from 1992 to 2003**

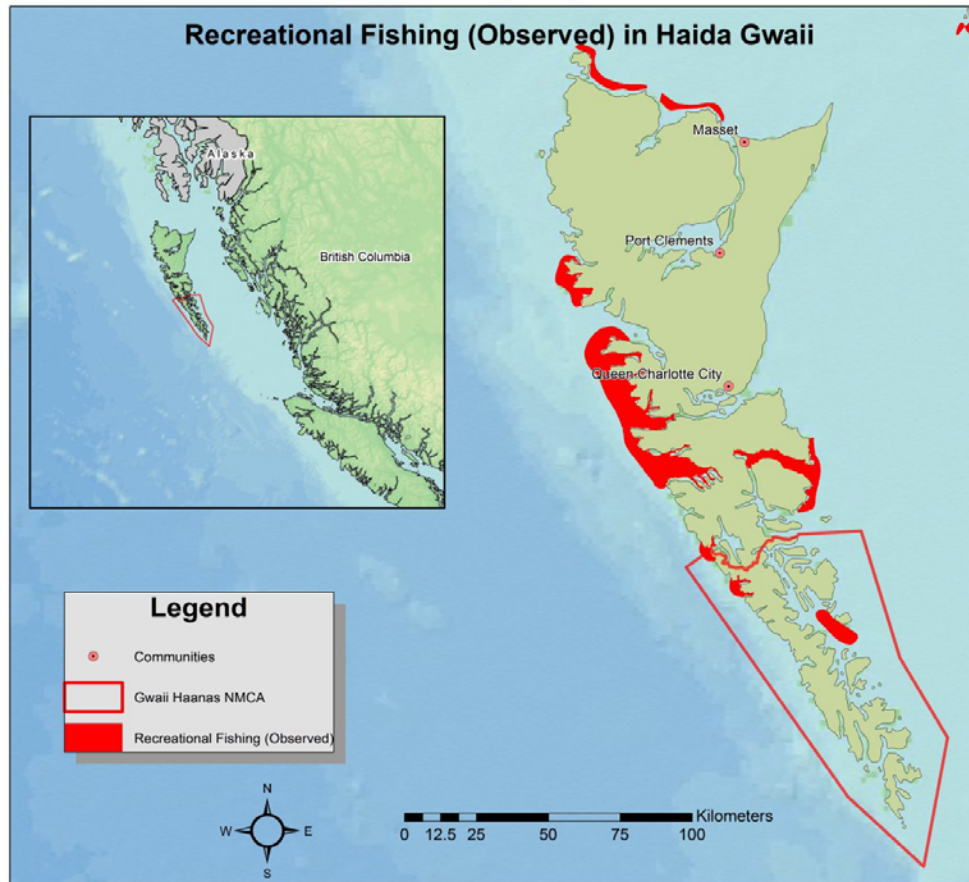


**Figure 25 Recreational Lingcod Catches in Haida Gwaii in Pieces from 1992 to 2003**

All five species of Pacific salmon have been recorded caught within these areas although Chinook are recorded as the most abundant caught species within Statistical Areas 2E and 2W. Approximately 18,374 Chinooks were caught in Areas 2E and 2W in 2005. The majority of these Chinook were taken in Area 2E (17,374). Approximately 17,500 coho were recorded caught in Areas 2E and 2W during the same time period.

Halibut is the third most numerous species caught in Area 2E with 6,700 pieces recorded. Lingcod is the fourth most numerous species caught in Area 2E, with 5,207 pieces recorded. No catch numbers for halibut or lingcod are recorded for Area 2W. Again it must be noted these numbers represent both Areas 2E and 2W of which Gwaii Haanas represents only a portion. The number of recreational fish harvesters who fish for sablefish is unknown. There is little directed recreational effort on sablefish which are mainly caught incidentally while fishing for halibut and other groundfish species.





**Figure 26: Location of the Recreational Fishery in Haida Gwaii from Anecdotal Information**

Figure 26 illustrates anecdotally collected information on the location of recreational fisheries in Haida Gwaii. The majority of recreational fishing occurs in Areas 1 and 2E with relatively minor catches reported in Area 2W. However, recreational fishing through ecotourism is growing and the recreational fishery in Haida Gwaii is a very important part of BC's overall sport fishery. For instance, in 1992, the recreational catch of halibut in Haida Gwaii represented over 48 percent of the entire recreational halibut fishery for BC. It is likely that the recreational fishery will continue to grow in Haida Gwaii. Additional information on economic profiles for the recreational fisheries occurring in the Queen Charlotte Islands can be found in the GS Gislason and Associates Ltd. (2003), and the 2000 Survey for BC Freshwater reports. Recreational fishing data is considered "public information" and it's important to note that data from recent years (i.e. 2003) are preliminary and subject to change.

**Table 20: 2002 BC Seafood and Tidal Recreational Fishing Employment Person Years (GS Gislason and Associates Ltd. 2004)**

| Region                   | Seafood      |              | Subtotal      | Sport        | Total         |
|--------------------------|--------------|--------------|---------------|--------------|---------------|
|                          | Capture      | Aquaculture  |               |              |               |
| Queen Charlotte Is.      | 105          | 0            | 105           | 100          | 205           |
| North Coast              | 1,000        | 0            | 1,000         | 220          | 1,220         |
| Central Coast            | 115          | 60           | 175           | 65           | 240           |
| North Vancouver Is.      | 335          | 1,150        | 1,485         | 210          | 1,695         |
| Mid Vancouver Is.        | 855          | 1,330        | 2,185         | 615          | 2,800         |
| South Vancouver Is.      | 570          | 95           | 665           | 255          | 920           |
| West Coast Vancouver Is. | 440          | 400          | 840           | 490          | 1,330         |
| Victoria and Area        | 455          | 75           | 530           | 415          | 945           |
| Sunshine Coast           | 265          | 165          | 430           | 110          | 540           |
| Lower Mainland and Other | 4,705        | 850          | 5,555         | 1,110        | 6,665         |
| <b>Total</b>             | <b>8,845</b> | <b>4,125</b> | <b>12,970</b> | <b>3,590</b> | <b>16,560</b> |

Of the coastal economic studies that have been conducted, evidence is mounting that recreational fishery is becoming an increasingly important component of the economy. For instance, Table 20 illustrates that in 2002, recreational fishing employed almost as many persons as the traditional capture fisheries in Haida Gwaii. Recent economic studies indicate that the overall ocean based leisure and recreation sector, which includes saltwater angling, whale watching, ocean boating and sailing, scuba diving, guided kayak trips, beach activities and marine park visitation, generated approximately \$3,791 million in 2005. (GS Gislason and Associates Ltd. 2007)

## CONCLUSION

There are many complex marine harvesting activities within the boundaries of the Gwaii Haanas NMCA. The implementation of the NMCA will likely have the greatest impact on Fisheries and Aquaculture Management and Stock Assessment Division. At the same time, as funding levels decrease, DFO relies heavily on the commercial industry to fund stock assessment and management activities. This has often required that DFO work closely with the various industry groups in order to successfully manage commercial fisheries.

As noted in the report, within the proposed Gwaii Haanas NMCA, there are numerous fisheries of significant importance to the commercial fisheries and the economy of the Queen Charlotte Islands. With the growth of ecotourism ventures on Haida Gwaii in general, and Gwaii Haanas, in particular, recreational fishing pressures are likely to increase.

Based on ecosystem assessments that Parks Canada is currently conducting, it is not inconceivable that some areas of the NMCA may be determined to be sensitive and require closures to all anthropogenic activity, including fisheries harvesting. However, at the same time, there are areas of the proposed NMCA where marine harvesting plays a vital economic role for Haida Gwaii. Examples are the invertebrate fisheries occurring in the eastern portion of the NMCA and the rockfish fisheries occurring on the western portion of the NMCA. Although, the information within this report is coarse, it does show that many activities, currently occurring within Gwaii Haanas, may be impacted by harvesting bans and closures.

For DFO one of the greatest benefits from this NMCA may be the development of a truly collaborative process between multiple agencies. Collaborations of this nature will provide an opportunity to share the workload, as well as relevant legislation (i.e. fisheries closures) in managing the marine and adjacent terrestrial resources. In other words, the establishment of this NMCA provides an opportunity to work within an integrated approach with multiple agencies, which consider the effects of the upland on marine resources as well as the effects of marine resources on upland resources. Such efforts, in light of continued budget reductions, may prove to be an effective way of managing resources in the future.

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## APPENDIX A

### Industry Groups Representing the Various Commercial Fisheries Occurring Within the Gwaii Haanas NMCA

DFO works extensively with industry groups whom provide advice via consultation processes through DFO formed advisory committees. These associations provide advice on many aspects of their interest group. For some of the fisheries, more than one industry group is consulted. This appendix identifies the industry groups and their direct contact information.

| <b>Fishery</b>         | <b>Industry Group</b>                               | <b>Contact</b>   |
|------------------------|---|--|
| Dungeness Crab         | Area A Crab Association                             | <a href="http://www.areaacrab.org">www.areaacrab.org</a>   |
| Geoduck                | Underwater Harvester's Association (UHA)            | <a href="http://www.geoduck.org">www.geoduck.org</a>   |
| Groundfish Trawl       | Deep Sea Trawlers Association                       | Stuart Nelson, Executive Director<br>(604) 541-9386  |
| Halibut                | Pacific Halibut Management Association (PHMA)       | George Cormier, Executive Director<br>(604) 760-0775   |
| Herring Spawn on Kelp  | Spawn on Kelp Operators Association (SOKOA)         | <a href="http://www.bcpspawnonkelp.com">www.bcpspawnonkelp.com</a>   |
| Prawn by Trap          | Pacific Prawn Fisher's Association                  | Chris Sporer, Executive Director<br>(604) 415-2491   |
| Red Sea Urchin         | Pacific Urchin Harvesters' Association (PUHA)       | <a href="http://www.puha.org">www.puha.org</a>   |
| Rockfish Hook and Line | Groundfish Hook and Line Advisory Committee (GHLAC) | <a href="http://www-ops2.pac.dfo-mpo.gc.ca/xnet/content/groundfish/hookline/committee.htm">www-ops2.pac.dfo-mpo.gc.ca/xnet/content/groundfish/hookline/committee.htm</a> |
| Roe Herring            | Herring Industry Advisory Board (HIAB)              | <a href="http://hcrs.bc.ca">http://hcrs.bc.ca</a>  |
| Sablefish              | Canadian Sablefish Association (CSA)                | <a href="http://www.canadiansablefish.com">www.canadiansablefish.com</a>   |
| Salmon                 | Integrated Harvest Planning Committee (IHPC)        | <a href="http://www.psc.org">www.psc.org</a>   |
| Sea Cucumber           | Pacific Sea Cucumber Harvesters Association         | Sheila Wood, Coordinator<br>(604) 541-8212   |
| Shrimp by Trawl        | Coast Shrimpers Cooperative Association (PCSCA)     | <a href="http://www.bcwildshrimp.com">www.bcwildshrimp.com</a>   |