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QUOTAS FOR THE 1992 - 1993 GEODUCK CLAM FISHERIES

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by

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ABSTRACT

Harbo, R. M., G. Thomas and K. Hobbs. 1993. Quotas for the 1992-1993 geoduck clam fisheries. Can. MS Rep. Fish. Aquat. Sci. 2179 : 201 p.

The geoduck clam fishery is managed by setting area quotas which are then equally divided for 55 Individual Vessel Quotas. The coast is divided into three licence areas: north coast, southern inside waters and the west coast of Vancouver Island. A three year rotation of fishing areas was also implemented in 1989, with the I.Q. program to reduce the annual number of landing ports.

It appears that the total harvest to date exceeds the current estimates of stock and production. This has been compensated in 1992 and 1993 by closures and quota reductions.

Due to stock uncertainties, industry agreed to reduce the quotas but on the basis of a two year plan being set so that the industry could plan their fishery and market the product. Reductions of annual quotas by 15 % each season for 1992 and 1993 were accepted by industry in 1991. A licence will be moved each year from the west coast of Vancouver Island to the north coast. Over the period, 1992-1993 a scientific review of quota options is recommended prior to determining the 1994 quota.

To determine the 1992-1993 quota options, the hectares of known commercial fishing areas were calculated (1-631 ha) and original densities were estimated as 1 geoduck/m² for southern inside waters, 2 geoducks/m² for the west coast of Vancouver Island and higher densities of 3.5 geoducks/m² for beds in the north coast. Yield options of 1% were recommended for all areas in 1992 and 1993. There is a great uncertainty as to the stock size of subtidal geoduck clams.

RÉSUMÉ

Harbo, R.M., G. Thomas et K. Hobbs.

On gère la pêche des panopes en fixant des contingents par secteur qui sont ensuite divisés également en 55 contingents individuels par bateau. La côte est divisée en trois zones de permis : côte nord, eaux continentales du sud et côte ouest de l'île de Vancouver. En 1989, on a aussi mis en oeuvre une rotation triannuelle des zones de pêche, le programme des quotas individuels permettant de réduire le nombre annuel de ports de débarquements.

Il semble qu'à l'heure actuelle le total des captures dépasse les estimations du stock et de la production. Pour compenser, on a institué pour 1992 et 1993 des fermetures et des réductions de contingents.

Étant donné l'incertitude qui règne quant aux stocks, l'industrie a convenu de réduire les contingents, mais selon un plan de deux ans établi de façon à lui permettre de planifier ses captures et de commercialiser ses produits. L'industrie a accepté en 1991 des réductions des contingents annuels de 15 % pour chaque saison de 1992 et 1993. Chaque année, un permis sera transféré de la côte ouest de l'île de Vancouver à la côte nord. Pendant la période 1992-1993, il est recommandé de procéder à une étude scientifique des diverses options avant de fixer les contingents de 1994.

Pour fixer les options de contingentement pour 1992-1993, on a calculé la superficie des zones de pêche commerciale connues (19 631 ha), et on a estimé les densités initiales à 1 panope/m² pour les eaux continentales du sud, à 2/m² pour la côte ouest de l'île de Vancouver, et une densité plus élevée de 3,5/m² pour les gisements de la côte nord. On a recommandé une production de 1 % pour tous les secteurs en 1992 et 1993. L'incertitude règne quant à la taille du stock des panopes dans la zone infratidale.

SUMMARY

The commercial fishery for geoduck clams began in British Columbia in 1976. The commercial fishery has landed over 111 million lb. (50,482 t) over the period 1976 to 1991.

Annual quotas were first set in 1979, at 8,000,000 lb. (3628 tonnes) for the coast. The quotas decreased over the period, 1981 to 1985, due to uncertainties in the stock size. Quotas increased in 1986 (3980 t) and peaked in 1987 at 9,345,000 lb. (4238 t), based on an evaluation of logbook data and additional quotas set for exploratory fisheries.

Individual Vessel Quotas (I.V.Q.'s) have been in effect since 1989-1990. The initial coast wide quotas were set at 8,800,000 lb. (3391 t) for a two year trial period for Individual Vessel Quotas (I.V.Q.'s) of 160,000 lb. for each of the 55 licences. The total quota was based on an evaluation of logbook data and area quotas were also set. The total quota was divided by 55 for equal I.V.Q.'s. The areas, north coast, southern inside waters and the west coast of Vancouver Island were then divided by the I.V.Q. This resulted in 22 IVQ's allocated to the north coast, 12 for southern inside waters and 21 on W.C.V.I.

The coastwide quota in 1991 was 7,425,000 lb. (3368 t) resulting in I.V.Q.'s of 135,000 lb. (61.2t) in 1991. This was reduced further in 1992 to 6,311,250 lb. (2863 t) for I.V.Q.'s of 114,750 lb. and again in 1993 to 5,362,500 lb. (2433 t) for I.V.Q.'s of 97,500 lb.

Due to stock uncertainties, industry agreed to reduce the quotas but on the basis of a two year plan being set so that the industry could plan their fishery and market the product. Reductions of annual quotas by 15 % each season for 1992 and 1993 were accepted by industry in 1991. A licence will be moved each year from the west coast of Vancouver Island to the north coast. Over the period, 1992-1993 a scientific review of quota options is recommended prior to determining the 1994 quota.

To determine the 1992-1993 quota options, the hectares of known commercial fishing areas were calculated and original densities were estimated as 1 geoduck/m² for southern inside waters, 2 geoducks/m² for the west coast of Vancouver Island and higher densities of 3.5 geoducks/m² for beds in the north coast. Conservative yield options of 1% were recommended for all areas in 1992 and 1993.

Harvest logs have been completed by fishers since 1978, detailing catch, effort and fishing locations. For the purposes of calculating quotas the hectares of commercial fishing areas or "beds" have been measured from nautical charts. By 1990, 484 beds were identified in the south coast. Over the period 1980 to 1990,

231 beds were identified in the north coast.

There is concern that the fishery is depleting the most accessible stocks of the highest quality. Some fishing areas have been lost due to contaminated closures. Some harvest sites with minor landings have been eliminated from area calculations and other beds were reduced in their estimate of area following consultation with fishing representatives in 1991.

For the south coast, 484 beds measured 13,896 ha (236 beds inside for 7948 ha and 248 beds on the W.C.V.I. for 5948 ha). In the north, a total of 213 beds measure 3473 ha (88 beds in the Q.C.I. for 1070 ha; 28 beds in the Prince Rupert district for 617 ha and 106 beds in the Central coast district for 1334 ha). These data include areas fished up to and including 1990.

A range of biomass estimates, harvest rates to dates and reduced quotas set for the 1992-1993 fisheries are provided.

REDUCTION OF QUOTAS IN 1992 AND 1993

The following factors account for lower quotas in 1992 and 1993:

i) several areas were closed due to conservation concerns. An analysis of landings by bed suggested that much of the past fishing taken place in a few areas. Effort needs to be directed to other beds.

ii) most exploratory fisheries have been eliminated and quotas were calculated based on known, commercially harvested sites, with the exception, in 1992, of Area 27 on the west coast of Vancouver Island for 250,000 lb. and nine areas in the north for 570,000 lb.

iii) The overall quota for Area 24 should not be increased until more is known about fishing areas and geoduck stocks. This area has supported a significant proportion of the fishery to 1992.

iv) When beds were measured in areas that had previously been assigned exploratory quotas, the measured areas could not support the quotas set in the past.

v) 1% yield was used for all areas on the coast; consistent densities were used for areas of the coast, a maximum of 1 geoduck/m² for Inside Waters; 2 geoducks/m² for the west coast of Vancouver Island, and 3.5 for areas in the north coast. This resulted in lower yield options for several areas. Areas that had been assigned densities of 5 geoducks/m² in prior years were reduced to assumed densities of 3.5 geoducks/m².

vi) bed areas (ha) were reduced in many area of the coast. Beds identified with no landings reported or beds with minor

landings were not included in quota calculations if they had not been fished for four or more years. Some beds were reduced in area because of sewage contamination closures. Most reductions, however, resulted from an assessment of the fishing history of each bed, the area (ha) assigned, the annual and total landings and qualitative assessments of the fishers. Many beds had large areas (100 ha or more) with little fishing effort. Fishers advised that these beds were not large or productive in many cases.

vi) on site surveys carried out in the north coast in 1991 indicated that for those beds surveyed, the area had been overestimated from logbooks.

It is recommended that quotas continue to be based on logbook data and that other assessments are required before quotas are significantly changed. Other specific recommendations for field surveys and research are given.

A management decision was made to limit quota reductions to 15% each year in 1992 and 1993 until further stock assessment and evaluation could be carried out. To give some stability to the industry, a two year plan was set with quotas for 1992 and 1993.

By 1991, 73% of the landings came from the south coast (26% from inside waters and 47% from the west coast of Vancouver Island) and 27 % from the north coast. A decision was made to attempt to reduce effort in the south in 1992 and 1993. This resulted in fewer licences in the south and more in the north.

RECOMMENDED CLOSURES FOR 1992-1993

Following an assessment of logbook data and landings by beds it was apparent that most of the quotas had been landed at a few sites. These sites should be closed until more is known about the stocks and yields. Fishing effort in 1992 and 1993 should be directed to other beds and to finding new beds.

A number of beds were closed for 1992 and 1993 and some were fished at reduced quotas. Some beds were fished regardless of the past fishing because of a management decision to limit the reduction of the quotas to 15% each year in 1992 and 1993.

1992 GEODUCK QUOTA RECOMMENDATIONS

The coast quota for 1992 was set at 6,311,250 lb. (2368 t). The recommended 1992 quota for the south coast was 3,672,000 lb. (1666 t). For inside waters, the 12 area quotas total 1,377,000 lb. for 12 licence quotas of 114,750 lb. each. Inside quotas were increased and adjusted to meet quota totals for the two years, a sum of 1,377,000 (1992) and 1,117,000 lb. for 1993. The Area 14 quotas were split between subareas and years.

On the west coast of Vancouver Island, for 1992, 17 area quotas total 2,295,000 lb. (1041 t) for 20 licence quotas of 114,750 lb. Over the period 1989 to 1991, 21 licence quotas had been assigned to the west coast. Three exploratory quotas were set in Area 27 for 1992, for a total of 250,000 lb. with options to take quota from Area 23 if the exploratory fisheries were not successful.

For the north coast, the recommended 1992 quota was 2,639,250 lb. (1197 t), 23 licence quotas of 114,750 lb. based on geoduck beds identified in Areas lower Area 6 and Areas 7 to 10. Twenty-four area quotas were assigned in 1992, including nine exploratory areas accounting for 570,250 lb. of the northern quota. Areas of known stock were identified if the exploratory fisheries were not successful.

1993 GEODUCK QUOTA RECOMMENDATIONS

The coastwide quota set for 1993 was 5,362,500 lb. (2433 t), a 15% decline from 1992. The recommended 1993 quota for the south coast is 3,022,500 lb. (1371 t). For inside waters, Areas 14 and 16 are divided into seven area quotas that total 1,170,000 lb. (531 t). This is divided into 12 licence quotas of 97,500 lb. each. Overall Inside area quotas were increased and adjusted to meet quota totals for the two years, a sum of 1,377,000 (1992) and 1,170,000 lb. for 1993. The Area 14 quotas were split between subareas and years, so that portions were in fished in either year. The largest areas (9,641 ha) of geoduck stocks are identified in logbooks for inside waters. As a consequence, the area quotas calculated appear to be able to support 12 I.V.Q.'s in 1992 and 1993. However, fishers caution that the inside stocks may be overestimated.

On the west coast of Vancouver Island, for 1993, Areas 24 and 26 are divided into 12 area quotas that total 1,852,500 lb. (840 t) for 19 I.V.Q.'s of 97,500 lb. Over the period 1989 to 1991, 21 I.V.Q.'s and in 1992, 20 I.V.Q.'s had been assigned to the west coast. This reduction of licences resulted from recommended closures of several heavily exploited areas on the W.C.V.I.

The proportion of licence quotas for the north increased in 1992 (23) and in 1993 (24) as a result of the past heavy exploitation in the south and advice from fishers that there is room for expansion in the north. For the north coast, the recommended 1993 quota is 2,340,000 lb. (1061 t), supporting 24 I.V.Q.'s of 97,500 lb. This is based on geoduck beds identified in Areas 3 to 6 (upper). Twenty-seven area quotas have been identified for 1993.

1.0 INTRODUCTION

This report was presented initially as a working paper (I-92-4) to the Pacific Stock Assessment Review Committee (PSARC) in August, 1992. The paper was revised according to in-season changes that occurred in 1992 and exploratory fisheries were set for 1993 in the north coast.

The geoduck fishery began in British Columbia in 1976, and has grown to be the major invertebrate fishery in landings and value. Table 1 gives the annual landings and landed values, 1976 to 1991. Annual landings peaked in 1987 at 5735 t, but annual landed values continued to increase and were \$12.5 million in 1989. Landed values declined in 1990 and 1991 as a result of quota reductions.

The fishery is documented by Cox (1979), Harbo and Peacock (1983), Harbo et al. (1986, 1987), Farlinger and Bates (1985) and Farlinger and Thomas (1988). A detailed report of the fishery, 1985 to 1989 is in preparation, Harbo et al. (in press).

Geoduck (*Panopea abrupta*, Conrad 1849) stocks have been found along the entire coast of British Columbia. The fishery started in the inside waters of Vancouver Island in 1976, and in the following year, significant stocks were found in Clayoquot Sound, on the west coast of Vancouver Island. Due to the remoteness and the lack of processing capability, the fishery did not expand into the north coast until 1980.

Landings for the north and south coast districts are shown in Table 2. A summary of landings for the south coast statistical areas is given in Table 3 and for the north coast areas in Table 4.

By 1991, 73 % of the landings came from the south coast (26% inside waters and 47% from the west coast of Vancouver Island) and 27% from the north coast.

1.1 GEODUCK BIOLOGY

Geoducks are large burrowing clams, with average weights of approximately 1 kg. These clams are among the oldest animals in the world, often reaching ages in excess of 100 years.

In spite of the large numbers of geoducks, their fecundity and longevity, the recruitment of juveniles into the populations are low. There are several papers describing the life history of geoducks (Anderson 1971, Breen and Shields 1983, Goodwin 1976, Goodwin and Pease 1987, 1989, Goodwin and Shaul 1984, Goodwin et al. 1979, Sloan and Robinson 1984).

Adult clams are separate sexes, and reach a 50% sexual maturity rate at a shell length of 75 mm, at two to eight years of

age. Initial growth rates are fast and these clams reach a near maximum shell length and size after 10 years.

Spawning takes place over a long period, March to July. Although the females may contain in excess of 20 million eggs, they are "dribble" spawners (spawning several times over the season) releasing one to two million eggs at each event.

There are several larval stages described from hatchery programs. At settlement the shell develops, a foot and byssal threads. The small geoduck can travel along the bottom by a sand-byssal thread parachute.

The small clam, at a shell length of 2 mm, buries into the substrate. The depth is related to shell length and the length of siphons. Clam "seed" from the Washington state hatchery is normally 8 to 20 mm shell length when released on clam leases.

At settlement and for the first two years, juvenile geoducks are vulnerable to number of predators. At the surface of the substrate they are easy prey to numerous snails, sea stars, crabs, shrimp and fishes. It takes fast growing clams to bury to a refuge of 60 cm or more in two years.

Geoducks soon become sedentary and grow for long periods of time. They are a major component of the subtidal biomass² of marine animals. Average abundances are estimated at 1.7 clams/m² in Puget Sound, Washington (Goodwin and Pease 1989) and densities of 1, 2, 3.5 clams/m² are estimated for British Columbia areas.

The average weight of geoducks in Washington was reported as 872 g (Goodwin and Pease 1997) and the average weight of commercially harvested geoducks was 1065 g in B.C. (Harbo et. al 1983).

2.0 MANAGEMENT OPTIONS FOR THE GEODUCK FISHERY

Table 5 summarizes the quotas, landings and management actions taken in the geoduck fishery, 1989 to 1993, since the implementation of the I.Q. fishery management.

There have been several reports documenting the fishery (as detailed above), but options other than quota management have not been proposed. Breen (1982) recommended quotas for the geoduck fishery but pointed out quotas depend on accurate available virgin biomass estimates.

Jamieson (1986) reviewed the geoduck management approach and the problems with invertebrate fishery management in general and Sloan (1985) discussed the feasibility of improving geoduck stock assessment.

Other management strategies such as minimum size limits can not be applied to this clam fishery. Once removed, geoducks are not capable of reburying into the substrate.

Due to the high efficiency of the divers, capable of harvesting up to five or more geoducks per minute, time and area closures alone, without quotas, were not effective in controlling catch levels. Licence limitation was effected in 1981 and there are currently 55 eligible licences for the geoduck and horse clam dive fisheries.

As the fishery has progressed, an increased number of quota management areas were set in an attempt to spread out effort, to find new fishing grounds and to reduce the potential for local overharvesting. In 1988 there were 44 annual quotas set for the coast (Table 5). With the implementation of a three year rotation of areas, the number of quota management units has increased. For the rotation 1989 to 1991, there were 78 quotas set. For 1992 and 1993, 107 quota management units have been set; 60 in 1992 and 47 in 1993 (Table 5).

In 1989, a trial two-year period (1989-1990) was initiated for individual vessel quotas (I.V.Q.'s), divided equally among the 55 licence holders, so that each licence holder had the opportunity to harvest 160,000 lb. Licence holders voluntarily selected one of the three areas for the season, North Coast (22 quotas), West Coast of Vancouver Island (21 quotas) and southern Inside Waters (12 quotas).

All landings since 1989 have been monitored at designated landing ports by contracted port observers. Also, in 1989, a three year rotational fishery was set, with quotas set for the two years, 1989 and 1990, as part of the I.Q. program. Rotational fisheries were implemented primarily for management reasons, to reduce the annual number of delivery ports for validation of quotas. The I.V.Q. program continued in 1991 and is extended to 1992 and 1993.

3.0 DETERMINATION OF GEODUCK QUOTAS

Harbo et al.(1992) review the history of quota management in the geoduck fishery and present the quotas set in 1991.

Quotas for 1992 and 1992 were developed in consultation with area committees of fishers. Determination of quotas has been undertaken by management support biologists, Fisheries Branch. Most quotas set were within the large ranges of potential stock and annual yield options. Some exploratory quotas were also set.

Tables 6.1 and 6.2 summarize the annual quotas by north and south coast districts, 1979 to 1993. Detailed annual quotas by management areas to 1991 are listed in Harbo et al. (1992). Quotas for the first three year rotation, 1989 to 1991, and 1992 are given

in Appendix 1. The quotas are taken from annual management plans and have been revised according to in-season changes that were made.

3.1 SOUTH COAST QUOTAS

In the past, quotas in the south coast have not been based solely on calculations from stock estimates. Stock estimates were not available for many areas. Other factors, such as development of the fishery, economics and the historical patterns of fishing were considered. Annual public meetings were held with geoduck fishers, licence holders and processors to review the annual fishing plans and quotas. Some quotas have been adjusted according to advice from industry.

Managers have attempted to keep quotas at conservative levels, 0.75 to 2%, based on an annual review of the available biological data, fishing activity as reported on harvest logbooks and advice from industry.

In 1979, an arbitrary, "conservative" annual rate of 2 to 5% of the standing stock was suggested (Shellfish Resource Board, unpublished), based on a review of compiled data from the provincial Marine Resources Branch (Cox and Charman, 1979). The survey estimates were adjusted later and the subsequent area quotas are summarized in (Harbo, et al. 1986).

The south has been generally divided into two areas, the west coast of Vancouver Island (Areas 20 to 27) and inside waters including the east coast of Vancouver Island and the mainland (Areas 11-19, 28 and 29).

Quotas have been set at high levels (in excess of the documented stock) to promote exploration and development of the fishery into new areas. In some instances "exploratory quotas" were set, or timed openings without quotas were set for new fishing grounds. These quotas eventually were rationalized to a number based on estimated fishing area (ha) and geoduck biomass (tonnes/ha).

Conversely, in Clayoquot Sound, Area 24, the major fishing grounds (see Tables 3 and 4), quotas have been set at more conservative levels than other areas. More information on stock abundance, distribution and recruitment is required before giving consideration to increasing the quota. This area appears to contain the largest stock of geoducks and should be managed conservatively for the long term stability of the fishery.

3.2 NORTH COAST QUOTAS

During the initial stages of the fishery, 1980 to 1984, in the north coast the entire quota was exploratory. Quotas in 1979 and

1980 were 3.5 million pounds, later reduced in 1981 to 2 million pounds (Table 6.1). Quotas were more or less intuitively based until fishing beds could be mapped and quotas of 1% of the virgin biomass estimated.

The fishery began in the north coast in 1980. Fishers were specific in their harvest logs in mapping the geoduck "beds" or fishing grounds. By 1986 quotas increased (Table 6) as fishing activity had taken place in the furthest reaches of the north coast, including the north coast of the Queen Charlotte Islands (Table 4). However, it was not until 1987 that all north coast quotas were taken. In 1988, 35% of the north coast quota was attributable to exploratory areas and the quotas were set arbitrarily.

In 1991, only one exploratory quota was set in the north coast (Carpenter Bay) and other quotas were based on known fishing areas.

4.0 QUOTA CALCULATIONS

Quota calculations are derived from the formula:

$$\text{Quota} = (\text{HARVEST RATE}) \times (\text{AREA}) \times (\text{GEODUCK DENSITY})$$

where

HARVEST RATE = 0.01 (within the recommended range of 0.0075 to 0.02; Breen, 1982) annually

$$\text{ORIGINAL BIOMASS} = (\text{AREA} \times \text{DENSITY}) = (\text{HA} \times \text{TONNES/HA})$$

AREA = ha as measured from harvest charts

DENSITY = wt. of geoduck/unit area using an average weight of 1.065 kg/geoduck (Harbo et al. 1983)

$$= 10.65 \text{ t/ha or } 23,500 \text{ lb./ha for } 1 \text{ geoduck/m}^2$$

$$= 21.3 \text{ t/ha or } 47,000 \text{ lb./ha for } 2 \text{ geoducks/m}^2$$

$$= 37.3 \text{ t/ha or } 82,200 \text{ lb./ha for } 3.5 \text{ geoducks/m}^2$$

For 1992 and 1993, the highest density used in the north coast was 3.5 geoducks/m². In past years, and in 1991 some areas were assigned higher densities of 5 geoducks/m² (Harbo et al. 1992).

A summary of standard weights and conversions used for quota calculations are listed in Table 7.

The three main factors (harvest rates, area and geoduck densities) in the equation are discussed below.

4.1 HARVEST RATES OR YIELD ESTIMATES

In spite of the large spawning biomass, geoducks have very low annual recruitment rates (Goodwin and Shaul 1984). Juvenile geoducks are also difficult to find in B.C. waters (Jamieson, pers. comm.). All of the available information indicates that turnover rates are low. We have continued to use a 1% annual yield for the purposes of evaluating quota options for 1992 and 1993, on the basis that the biomass estimates may be overestimated.

Recruitment of geoduck clams is generally considered to be constant and low. The effect of fishing on recruitment is not known, although evidence from Washington State studies (Goodwin and Shaul, 1984) indicates that there is a relationship between adult and juvenile abundance. In harvested areas surviving juveniles were less abundant than in unharvested areas.

The biological goal of the geoduck fishery is sustainable yield. Annual quotas are derived from estimates of standing stock and of productivity. Initial yields of 2 to 5% of the virgin biomass were considered in the setting of the first coast quotas in 1979 (Table 6). This was reduced to yields of 1.5 % in the setting of quotas over the period 1980 to 1982 (Harbo et al. 1992).

Yields were explored with Ricker Yield per Recruit and another model (Breen, 1982) using growth, recruitment and mortality information and expressed as a percentage of virgin biomass. Breen (1982) suggested that quotas should be kept within 0.75 to 2.0% of the virgin biomass depending on the relationship between population size and recruitment. The recruitment effects noted by Goodwin and Shaul (1984) suggested the lower end of the estimate. A study done in British Columbia in 1989 (Noakes and Campbell, in prep.) confirmed the low productivity and suggested that the range was reasonable.

Rates of growth, mortality and recruitment are available from Washington state studies (Goodwin, 1976; Goodwin and Shaul, 1984 and others) and from studies in British Columbia (Breen, unpublished data; Bernard, 1982; Breen and Shields, 1983; Harbo et al. 1983). Mortality in British Columbia populations is estimated at less than 0.05 (Sloan and Robinson, 1984; Harbo et al. 1983; Noakes and Campbell, in prep.). Individuals as old as 146 years were found in those studies and an average age varied from 28 years at Elbow Bank, Clayoquot Sound (Area 24) to 61 at Spider Anchorage (Area 7). Harbo et al. (1983) found geoduck recruited to the fishery at age 4 and fully recruited at 12 years.

Numerous studies confirm relatively rapid growth for 8 to 15 years, when growth in length apparently ceases and weight only increases at a slow rate after this time (Goodwin and Shaul, 1984; Harbo et al. 1983). In most populations geoducks reach close to their final size after 10 years of growth (Anderson 1971; Goodwin

1976; Breen and Shields 1983; Harbo et. al 1983).

Landings in Washington State were as high as 3922 t (8.6 million lb.) in 1977 and were 2017 t in 1987 (Goodwin and Pease 1989). Landings vary according to the number and size of the tracts leased annually. The maximum sustained yield was estimated to be 2% of the harvestable stocks (74,829 t) or 1497 t annually. The actual harvest rate has been set at 3% or 2245 t annually due to a program to reseed the clam beds with hatchery reared seed as the beds are leased and fished out.

4.2 ESTIMATED AREAS OF COMMERCIAL GEODUCK FISHING

Estimates of geoduck "bed" (discrete harvest site) areas are derived from harvest charts submitted by fishers. Bed information is transcribed to a set of reference nautical charts and measured on a computer driven digitizing tablet with Gap1 software. Submission of log data and fishing locations is discussed later. The error in area estimates is probably large. Prior to 1986, some beds were outlined following depth contours and substrate types on the nautical charts assuming it was all viable geoduck habitat. In other instances, several fishing sites were joined to form a larger "bed" resulting in an expanded area with more hectares.

Harvest logbook data was first used in quota evaluation in 1984. The submission of harvest logbooks detailing catch and effort and harvest locations has been mandatory since 1976. The fishers have cooperated in this program and the data base has been utilized in the review of annual fishing plans since 1984.

Harbo et al. (1986) first published area estimates of geoduck beds harvested as shown on harvest logs, 1978 to 1984. The areas had been measured planometrically from nautical charts. The estimates in 1984, were 10,180 ha for the south coast and 704 ha for the north coast. These estimates have been revised each year.

Additional harvest beds were identified each year which added to the total area measurements. Revised estimates of geoduck fishing areas are given in Table 8 for the south coast, 13,896 ha (1990) and in Table 9 for the north coast fishing areas, estimated to be 3021 ha (1990). Goodwin (1978b) reported a total of 13,678 ha of geoduck bearing area, between 10 and 60 feet in Puget Sound, Washington, with an estimated 117,653,000 geoducks.

Appendix 2 lists the number of beds, bed area measurements for each statistical area, and the number of new beds identified each year.

For the purposes of quota calculations for 1992 and 1993 a series of meetings were held with fishers, June to October, 1991 to review the geoduck fishing beds in each area to be fished in 1992 and 1993.

The total landings and bed area from various beds were compared. Both removal data and comments from fishers indicated that some bed areas may be overestimated. Some arbitrary criteria were set to evaluate beds from landings in the harvest log data:

- beds with no landings were not considered
- beds with cumulative landings <5000 lb. were assigned a bed area of 1 ha
- beds with cumulative landings >5000 lb. but <10,000 lb. were assigned a bed area of 2 ha
- beds with cumulative landings >10,000 but <20,000 lb. were assigned a bed area of 5 ha
- beds with cumulative landings >20,000 lb. but <50,000 lb. were assigned a bed area of 25 ha

Some beds were reduced in size based on advice from fishers and by comparing the size to other beds with similar landings over time. No beds were increased in size and only beds with landings recorded on harvest logs were considered initially. Some exploratory quotas were set for 1992 and 1993 for management purposes. This allowed for a more gradual reduction of annual vessel quotas.

Some beds were reduced in size based on the harvest reported on logs, the number of geoducks removed/m². The rates of removals were used to evaluate large geoduck beds. If there were very low rates of removal in some large beds (>100 ha), it was judged that the area assigned was too large. In some cases the beds were reduced by a factor derived from logbook data on landings from individual beds:

$$\frac{(\text{removal rate over bed from a quota area})}{(\text{removal rate over total quota area})}$$

For example, in 2E-Cumshewa Inlet, Bed #102 had an area of 124 ha and a removal rate of 0.041 g/m² and the overall removal rate for the quota area was 0.237 g/m², the area was reduced by a factor of:

$$\frac{(0.041 \text{ geoducks/m}^2 \text{ removed for the bed})}{(0.237 \text{ g/m}^2 \text{ removed for the quota area})}$$

= reduced area with increased removals

$$= 33 \text{ ha with removals of } 0.152 \text{ g/m}^2$$

These adjustments then affected the total area removals. Prior to adjustments the removal rate was 0.237 g/m², becoming 0.256 g/m² over a reduced area.

4.3 GEODUCK DENSITIES

Another significant source of uncertainty in quota calculations is the estimated average density of geoducks over a large area. Harvest locations or "beds" have been measured at 1 ha to 631 ha (Harbo et al. 1992). Estimates used are based on surveys where they are available, information from fishers, and Washington State Department of Fisheries survey data.

Initial surveys were discussed by Harbo et al. (1986) and Harbo et al. (1992). Published surveys, Cox and Charman (1979), suggested low densities of geoducks in British Columbia, 0.02 to 2.2 t/ha. However, unpublished data from later surveys (1980) of potential commercial fishing areas found densities in management areas on the west coast of Vancouver Island, ranging from 1.6 t/ha to 16.8 t/ha.

For the purposes of calculating quota options, different densities were used for three areas of the coast:

- i) *Inside waters of the south coast, Areas 11 to 19, 28 and 29:*
 $= 10.65 \text{ t/ha or } 23,500 \text{ lb./ha for } 1 \text{ geoduck/m}^2$

This density approximated the overall density of geoducks found by Goodwin (1978b). He reported a total of 13,678 ha of geoduck bearing area, between 10 and 60 feet in Puget Sound, Washington, with an estimated 117,653,000 geoducks. This gives an average density of approximately 9.15 t/ha (0.86 geoduck/m²).

- ii) *West coast of Vancouver Island, Areas 20 to 27:*
 $= 21.3 \text{ t/ha or } 47,000 \text{ lb./ha for } 2 \text{ geoducks/m}^2$

Fishers advised that densities on the west coast were twice that or more than stocks in the inside waters.

Estimates from unpublished surveys (1980), summarized in Harbo et al. (1986) for Area 25, yielded a mean density of 1.6 geoducks/m² over an area of 1,036 ha. Fishers have identified harvest areas of 34 beds for 1108 ha in Area 25 (Appendix 2). The highest density of a bed, a single fishing location, was estimated to be 31.8 t/ha (2.99 geoducks/m²) over 38 ha in Esperanza Inlet (Area 25) (1980, MRB unpublished data). In Area 24, a bed of 46 ha located at Clifford Pt. -McNeil Peninsula, was surveyed for a mean density of 20.83 t/ha or 1.95 geoducks/m² (1980, unpublished MRB data; pers. comm. B. Cox).

The average abundance of geoducks in Puget Sound in sand and mud bottoms at water depths of 6 to 18 m is 1.7 g/m² (Goodwin and Pease 1987).

- iii) North coast, Areas 1 to 10
 = 37.3 t/ha or 82,200 lb./ha for 3.5 geoducks/m²

The fishers reported greatest densities of geoducks in the north coast supported by catch and effort data (Harbo et al. 1986).

For 1992 and 1993, the highest density used in the north coast was 3.5 geoducks/m². In past years, and in 1991 some areas were assigned higher densities of 5 geoducks/m² (Harbo et al. 1992). Following surveys of beds in the north coast in 1991, there was concern that the beds were not as large as marked out on charts and may not have as high densities as were being assigned (Farlinger and Thomas, 1991 PSARC, in prep.). As a result, the highest densities used for quota calculations in 1992 and 1993 were 3.5 geoducks/m².

There are two locations in British Columbia where higher densities of 5 geoducks/m² or 53.3 t/ha geoducks have been used, in past years, 1991 and earlier: Spider Anchorage in the central coast (Area 7) where surveys show 6.25 to 9.76 geoducks/m² (Harbo, unpublished data) and the lower east side of the Queen Charlotte Islands where fishers report unusually high densities.

Density estimates for commercial geoduck leases in Washington vary greatly. Density estimates over the period 1984 to 1986 for the geoduck tracts leased annually were 18 to 68 t/ha (1.6 to 6.4 gdk/m²) over beds ranging from 16 to 116 ha (Goodwin, pers. comm.).

Goodwin and Pease (1989) reported that the total standing stock of subtidal geoduck clams in major beds in Puget Sound was estimated to be 126,984 t before commercial fishing began in 1970. Of this, only 74,829 t were actually harvestable (59%) because many of the beds were polluted, not economically or physically accessible, or were in conflict with other water uses.

Jamison et al. (1984) has reported considerable numbers of geoducks in Washington at depths between 18.5 and 111 M, shown by remote video. On over 6,000 ha of bottom, he estimated a visible population of 25.8 million geoducks (4.9 t/ha or 0.43 geoducks/m²) without any correction for "show" factors, or those geoducks that were not visible to the camera.

Sloan (1985) reviewed the history and problems of geoduck stock assessment and recommended some methods and estimated costs. The major problem in surveying geoducks is that they are not always visible or "showing". Geoduck clams spend considerable time with their siphons retracted (Goodwin 1977).

5.0 ESTIMATES OF GEODUCKS REMOVED BY FISHING

There is concern about local overharvesting of easily accessible beds of the highest quality. Landings from individual beds reported on harvest logs likely reflect a minimum figure for those beds. Not all landings are reported on harvest logs and not all harvest logs are returned with chart information of sufficient accuracy to code the landings to individual beds. It was found from harvest log data that individual beds and some areas have very high rates of harvests over the years fished, based on landings and measured areas. This led to conservation closures in 1992 and 1993, pending further evaluation.

The geoduck removal rates are calculated by:

$$\text{GEODUCK REMOVALS (no./m}^2\text{)} = \frac{\text{(no. of geoducks harvested)}}{\text{(measured bed area)}}$$

where:

$$\text{NO. GEODUCKS HARVESTED} = \frac{\text{(cumulative landings (t) over time from an Area given Table 3 and 4)}}{\text{(standard weight of a geoduck)}}$$

$$\text{STANDARD WEIGHT OF A GEODUCK} = 1.065 \text{ kg/geoduck (Harbo et al., 1983)}$$

$$\begin{aligned} \text{NO. OF GEODUCKS/TONNE} &= \frac{\text{(1000 kg/tonne)}}{\text{(1.065 kg/geoduck)}} \\ &= 939 \text{ geoducks/tonne} \end{aligned}$$

$$\text{MEASURED BED AREA (m}^2\text{)} = \text{(sum of the ha of geoduck beds in an Area, as shown in harvest logs and measured from nautical charts)} \times \text{(10,000 m}^2\text{/ha)}$$

$$\text{TOTAL AREA (m}^2\text{)} = \text{(ha of geoduck beds as measured from harvest logs; Tables 11 and 12)} \times \text{(10,000 m}^2\text{/ha)}$$

The densities of geoducks removed over time are calculated and shown in Table 10. The removal rates have been the greatest on the north coast, 5.17 t/ha or 0.49 geoducks/m² over 11 years, partly as a consequence of the larger quotas based on higher original densities.

The low removal rate for the inside waters, 1.63 t/ha or 0.15 geoducks/m² is a result of lower quotas assigned to that area and the large areas identified on the harvest charts.

Actual annual rates of removal (t/ha), based on the length of the fishery, are close to theoretical rates calculated using 1% of the densities assumed for quota calculations (1 geoduck/m² southern Inside Waters; 2 geoducks/m² west coast of Vancouver Island; 3.5 for geoduck quota units in the north coast

6.0 ESTIMATES OF TOTAL STANDING STOCK AND QUOTAS LANDED TO 1991

Based on the above information on bed areas (ha) and estimated densities for different areas, standing stock estimates are shown in Table 11.

Annual quotas are expressed as 1% of the estimated stock and years of quota taken were calculated by dividing the total landings by the annual quota.

It appears that the total harvest to date exceeds the current estimates of stock and production as shown in Tables 10 and 11. This has been compensated in 1992 and 1993 by quota reductions. However, it appears that in time the quotas may increase as new fishing grounds are measured and the years of overharvesting are compensated for.

7.0 INITIAL THREE YEAR AREA ROTATION AND QUOTA PROPOSAL 1989-1991

In 1988, the geoduck licence holders proposed and funded a two year trial of individual vessel quotas in 1989 and 1990. As a consequence the management to quota was greatly improved.

In 1989, a three year rotational fishery was implemented to minimize the number of landing ports for geoducks and to alleviate fishing each year at some locations. Landing ports were designated each year to validate individual landings as part of an individual vessel quota (I.V.Q.) or enterprise allocation. A summary of the areas, quotas, opening dates and landings is given in Appendix 1 for 1989, 1990, 1991 and 1992.

Table 12 summarizes the three years of quota. Each management unit was fished once every three years at three times the annual rate. The exception was Area 24, on the west coast of Vancouver Island, where the fishery remained on an annual basis for the major fishing grounds. The fishery in Clayoquot Sound is important to resident geoduck fishers, the local community and a processor located in Tofino. Another exception was that portions of Area 26 were fished in 1990 and again in 1991. The next fishery for 26-C should be in the annual rotation 1995-96-97.

The total coast quota for 1989 and 1990 was set at 8,800,000 lb. based on a preliminary analysis of harvest areas in logbook data. The total quota opportunity was divided by 55 licences, to give 160,000 lb. per vessel quota. Some minor manipulations had to be made in order to have the three major quota and licence areas equally divisible by 160,000 lb. To balance the quotas over a three year period, some exploratory quotas were included. In the north coast the available area and exploratory quotas were split into three equal portions.

8.0 1992 GEODUCK QUOTAS

8.1 INITIAL 1992 GEODUCK QUOTA RECOMMENDATIONS

The coast quota for 1992 was set at 6,311,250 lb. (2368 t). The recommended 1992 quota for the south coast was 3,672,000 lb. (1666 t). For inside waters, the 12 area quotas total 1,377,000 lb. for 12 licence quotas of 114,750 lb. each. Inside quotas were increased and adjusted to meet quota totals for the two years, a sum of 1,377,000 (1992) and 1,117,000 lb. for 1993. The Area 14 quotas were split between subareas and years.

On the west coast of Vancouver Island, for 1992, 17 area quotas total 2,295,000 lb. (1041 t) for 20 licence quotas of 114,750 lb. Over the period 1989 to 1991, 21 licence quotas had been assigned to the west coast. Three exploratory quotas were set in Area 27 for 1992, for a total of 250,000 lb. with options to take quota from Area 23 if the exploratory fisheries were not successful.

For the north coast, the recommended 1992 quota was 2,639,250 lb. (1197 t), 23 licence quotas of 114,750 lb. based on geoduck beds identified in Areas lower 6 to 10. Twenty-four area quotas have been assigned in 1992, including nine exploratory areas accounting for 570,250 lb. of the northern quota. Areas of known stock were identified if the exploratory fisheries were not successful.

A summary of quotas set for 1992 are presented in Tables 13, 14 and 15. Detailed quota options and recommendations for all areas are presented in Appendix 3.

Table 16 details conservation closures and concerns for south coast areas that were scheduled to be fished in 1992. We calculated the years of quota harvested to date and the original density of geoducks that would have been required to support the level of harvest. A strategy to review local overharvesting is required.

8.2 REVISED 1992 GEODUCK QUOTAS

Tables 13 (Inside waters) and 14 (W.C.V.I.) present the revised quotas for 1992, adjusted in-season. Quotas were changed due to closures as a result of paralytic shellfish poison (PSP) and safety concerns at the end of the season because of weather.

8.2.1 Inside waters-south coast

Area 13-E had an 8000 lb. quota that was not landed due to weather problems and difficulties in finding stocks that were "showing". There were minor overruns of quotas in other areas (1271 lb.) and the remaining 6,729 lb. was assigned to Baynes Sound, 14-C (Table 13; Appendix 1.8). Fishers reported finding more geoducks

than expected in 14-C.

8.2.2. West coast Vancouver Island

There were numerous area closures in 1992 on the west coast due to paralytic shellfish poison. Closures prevented the harvest in Area 27-H, Klaskino Inlet, where only 66,378 lb. were landed against the quota of 318,000 lb. (Table 14; Appendix 1.9). The Area 27 fishery was delayed to May 27 because of PSP and then closed for the summer exploratory fishery, June 1 to Aug. 31. A second attempt to harvest at Klaskino, Aug. 12 was stopped Aug. 13 because of PSP. It was considered dangerous to fish this area in the winter months due to weather conditions on the exposed coast for fishing vessels and packers.

Portions of Area 23 were also closed, July 27 to November 30 and this limited fishing opportunities. At mid- October, an opportunity was set for 24-A1. The initial quota for 24-A1 (285,000 lb) had been landed by May 9. The remaining quota for the W.C.V.I. was 455,018 lb. at Oct.15. Area 24-A1 was reopened Oct. 15 but was closed Oct. 16 due to PSP. Only 28,255 lb. were harvested and these geoducks were semi-processed before shipping.

The next area to open was 24-B3, near Ahousat (Fig.12), initially closed in 1992 and to be fished in 1993 (Tables 14, 18). This area was opened for 180,000 lb. on Oct. 31 and 179,872 lb. were landed by the closure on Nov. 13.

On Nov. 9, 24-B2, Coomes Bank (Fig. 12) was also opened for additional quota. The initial quota of 120,000 lb. (Table 14) was landed, 124,529 lb., over the period, May 1 to May 7. The Area 24 fishery was closed April 15-30 due to herring at Coomes Bank. The quota was set at 65,937 lb., the quota remaining after the balance of Area 23 fishery was tallied.

Area 23 reopened Dec. 1, and the fishery finished at 23-C Mayne Bay (Appendix 1.9).

No geoducks were landed in the exploratory fishery 27-G, June 1 to Aug. 11, 1992. As a consequence this quota was assigned to 23-C, and Areas 27-H and 27-I were opened Aug. 13, earlier than Sept.1. (Appendix 1.9).

In conclusion, adjustments for 1993 had to be made to take the remaining 1992 quota from Area 27-I Klaskino, 273,622 lb. Only 66,378 lb. were landed against the 1992 quota of 340,000 lb. (Table 14, Appendix 1.9). Quota originally assigned for 1993, was taken in 1992 in 24-A1 (27,685 lb.), 24-B2 (65,937 lb.) and 24-B3 (180,000 lb.) as shown in Table 14. These adjustments are reflected in Table 18, 1993 quotas for the W.C.V.I.

9.0 1993 GEODUCK QUOTAS

As discussed earlier, a two year plan was set for 1992 and 1993, with a limit of 15% reduction each year. As a consequence, Area 14 quota was divided over two seasons and some quotas were adjusted between years in Area 24. Some areas were fished that require further evaluation and possible conservation closures. These are summarized in Tables 16 and 17.

Similarly in the north coast, with a movement of licences from the west coast of Vancouver Island to the north (one licence each year in 1992 and 1993), some exploratory fishing was set.

The coast quota set for 1993 was 5,362,500 lb. (2433 t), a 15% decline from 1992. The recommended 1993 quota for the south coast is 3,022,500 lb. (1371 t). For inside waters, Areas 14 and 16 are divided into seven area quotas that total 1,170,000 lb. (531 t) (Table 18). This is divided for 12 licence quotas of 97,500 lb. each. Overall Inside area quotas were increased and adjusted to meet quota totals for the two years, a sum of 1,377,000 (1992) and 1,170,000 lb. for 1993. The Area 14 quotas were split between subareas and years, so that portions were in fished in either year. The largest areas (9,641 ha) of geoduck stocks are identified in logbooks for inside waters. As a consequence, the area quotas calculated appear to be able to support 12 I.V.Q.'s in 1992 and 1993. However, fishers caution that the inside stocks may be overestimated.

On the west coast of Vancouver Island, for 1993, Areas 24 and 26 were divided into 13 area quotas that total 1,852,500 lb. (840 t) for 19 I.V.Q.'s of 97,500 lb. (Table 18). Over the period 1989 to 1991, 21 I.V.Q.'s and in 1992, 20 I.V.Q.'s had been assigned to the west coast. This reduction of licences resulted from recommended closures of several heavily exploited areas on the W.C.V.I.

For the north coast, the recommended 1993 quota is 2,340,000 lb. (1061 t), supporting 24 I.V.Q.'s of 114,750 lb. (Table 19). This is based on geoduck beds identified in Areas 3 to 6 (upper). Twenty-seven area quotas have been identified for 1993.

For 1993, the second season of the three year area rotations, the fishery was planned for Areas 14 and 16 in Inside Waters and Areas 24 and 26 on the west coast of Vancouver Island. Adjustments in the 1992 fishing plan changed the final quota areas for 1993 on the west coast of Vancouver Island. The Area 27-H Klaskino quota remaining from 1992 was rescheduled for 1993. As well there were compensations for landings and increased quotas in 1992 from Area 24-A1, 24-B2 and 24-B3 that were scheduled to be fished in 1993 (Tables 14, 18).

Detailed quota options and quotas set for 1993 are given in Appendix 4.

A summary of quota reductions over 1992-1993, compared to last three year rotation 1989-1991 is given in Table 20.

10.0 CONCLUSIONS AND RECOMMENDATIONS

1. There is concern about local overharvesting of easily accessible beds of the highest quality. However, the overall quotas may be conservative for several reasons:

i) The extent of geoduck distribution is underestimated by estimating and measuring fished areas only. Only fishable stocks from 10 feet to 60 to 70 feet are considered. Geoduck stocks are known to extend well beyond these depths.

ii) Density estimates are chosen at values less than the high abundance reported by fishers. The highest densities used in calculations are 3.5 geoducks/m², in the north coast.

iii) If the biomass (original) estimates are reasonable, it appears that the overall harvest rate is slightly higher than it should have been and that local over harvesting may be a problem.

2. Conservative levels of harvest should be maintained, quotas should not be increased until research has been undertaken on the distribution and abundance of geoduck clams.

3. The current three year rotational fishery should be maintained and additional "sub-rotations" be derived, so that geoduck beds are fished only once every six or nine years. This may have a positive effect on recruitment.

4. A strategy to review local overharvesting is required. Additional information is required on geoduck densities in each management area. A program of surveys should be considered, surveying one or more areas per year.

5. Additional consultation with the area committees of fishers are required to assess fishing areas in terms of size of the beds, geoduck densities, and geoduck quality.

6. Additional studies are required to determine show factors. Geoducks are difficult to survey because they often retract their siphon so that they are not visible.

7. There are uncertainties in the area measurements for many of the geoduck beds. Some field surveys are required to determine the extent of the geoduck beds. Fishers, knowledgeable of stocks in an area, should be interviewed to determine their estimate of the

extent of the beds.

8. Average weights should be determined for geoducks from each management area and management unit where possible.
9. Additional monitoring on the grounds is required to collect biological data required to assess and set quotas.
10. A field assessment of recruitment to beds harvested heavily early in the fishery, 10 years or more, should be carried out.
11. A preliminary survey of deep stocks, i.e. those stocks now below normal diving range should be undertaken. The contribution of recruitment to the shallow stocks should be determined.

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Table 1. Landings and landed values of geoduck clams in British Columbia, 1976 to 1991 as reported on sales slips (1976 to 1988) and on validation logs (1989 to 1991).

Year	Total Landings		Total Value ¹ \$10 ⁻³	Mean Price ²		Price Range ²	
	(lb)	(t)		(\$·lb)	(\$·kg)	(\$·lb)	(\$·kg)
1976	97,002	44	N/A	N/A	N/A	N/A	N/A
1977	540,898	245	89	0.17	0.37	N/A	N/A
1978	2,239,950	1,016	569	0.25	0.55	0.15 – 0.35	0.33 – 0.77
1979	5,429,886	2,463	1,669	0.31	0.68	0.13 – 0.40	0.29 – 0.88
1980	6,186,067	2,806	2,299	0.37	0.82	0.30 – 0.48	0.66 – 1.06
1981	5,961,405	2,704	2,162	0.36	0.79	0.32 – 0.70	0.71 – 1.54
1982	6,910,800	3,134	2,814	0.40	0.89	0.22 – 0.46	0.44 – 1.01
1983	5,810,913	2,635	1,804	0.31	0.68	0.00 – 0.60	0.00 – 1.32
1984	7,678,465	3,484	2,937	0.38	0.84	0.00 – 0.95	0.00 – 2.09
1985	11,838,624	5,370	4,599	0.40	0.89	0.00 – 1.00	0.00 – 2.20
1986	11,035,396	5,005	4,605	0.39	0.86	0.00 – 0.85	0.00 – 1.87
1987	12,643,298	5,735	6,184	0.49	1.08	0.00 – 1.05	0.00 – 2.31
1988	10,068,830	4,567	9,807	0.97	2.14	0.03 – 1.88	0.07 – 4.14
1989	8,784,247	3,985	12,571	1.43	3.15	0.25 – 1.75	0.55 – 3.85
1990	8,722,366	3,956	10,581	1.21	2.67	0.14 – 2.27	0.31 – 5.00
1991	7,346,864	3,333	9,659	1.29	2.84	0.58 – 2.55	1.27 – 5.62

¹ Price ranges taken from market reports and sales slips.

² Price paid to commercial fishermen

Table 2. Cumulative landings (tonnes) of geoduck, by year for North and South Coast Areas of British Columbia, 1976 to 1988, as reported on sales slips, 1989 to 1991 on validation logs.

Year	South Coast				Coastwide Total
	North Coast (Areas 1 to 10)	E. Coast Vancouver Island (Areas 11-19, 28, 29)	W. Coast Vancouver Island (Areas 20-27)	South Coast Total	
1976	0	44	0	44	44
1977	0	239	6	245	245
1978	0	773	243	1016	1016
1979	0	1242	1221	2463	2463
1980	68	980	1758	2738	2806
1981	509	547	1648	2195	2704
1982	227	409	2498	2907	3134
1983	501	481	1653	2134	2635
1984	575	1175	1734	2909	3484
1985	1436	1055	2878	3934	5370
1986	1692	1119	2194	3313	5005
1987	2148	1448	2139	3587	5735
1988	2026	995	1546	2541	4567
1989	1600	870	1515	2387	3985
1990	1596	864	1497	2361	3957
1991	1327	734	1272	2006	3333
Totals 1976 to 1991	13705	12974	23803	36779	50482

Table 3. Summary of geoduck landings (tonnes) by South Coast Management Area 1976 to 1988, as reported on sales slips and on validation logs, 1989 to 1991. A three year rotation of areas was initiated in 1989, with the exception of area 24.

SOUTH COAST MANAGEMENT AREAS																			Annual Landings
Year	East Coast Vancouver Island											West Coast Vancouver Island							
	11	12	13	14	15	16	17	18	19	28	29	20	21	23	24	25	26	27	
1976				10			8		26										44
1977			14	9	77		137	2						6					245
1978			8	261	321	3	24	19	136			1	3	2	236	2			1016
1979		24	160	276	263	148	209	3	159					153	950	87	22	9	2463
1980			97	215	17	301	225	34	91			5		288	841	321	303		2738
1981			41	180	29	70	155	44	28			8		187	819	473	156	6	2195
1982		83	14	144	33	103	17	1	14			14		174	1218	366	726		2907
1983		16	29	340	29	42	13	2	10					84	1066	215	287	1	2134
1984	8	302	150	285	54	129	128	1	118					219	628	442	443	2	2909
1985	13	490	81	172	42	38	137	4	78			0		227	730	599	272	1050	3934
1986	21	212	148	200	137	117	136	13	124		11	96		231	803	450	226	388	3313
1987		275	112	286	98	159	265	103	50		100	40		247	661	552	398	241	3587
1988	62	290	51	191	59	95	110	2	116	1	17	49		192	633	187	206	279	2541
1989	5	662	203											538	633			345	2386
1990				605		258									540		614	343	2360
1991					258		181	37	244		14	1			416	702	153		2006
1976 to 1991	109	2354	1108	3174	1417	1464	1745	264	1194	1	142	214	3	2548	10173	4396	3806	2664	36777
Inside Waters Total:				12,973			West Coast Totals:				23,804								

Table 4. Summary of geoduck landings (tonnes) by North Coast Management Area 1980 to 1988, as reported on sales slips, and on validation logs, 1989 to 1991. A three year rotation of areas was initiated in 1989.

NORTH COAST MANAGEMENT AREA												
Year	1	2E	2W	3	4	5	6	7	8	9	10	Annual Landings
1980		31			4					28	5	68
1981		11				84	6	370	18		20	509
1982								227				227
1983								202	299			501
1984		4		3		214	8	109	183	54		575
1985		341	213			291	60	494	37			1436
1986	7	254	325	120	125	323	24	392	2	103	17	1692
1987	137	391	179	134	95	287	484	222	91	11	117	2148
1988	119	462	45	77	150	191	423	309	250			2026
1989							149	1269	40		142	1600
1990				77	356	441	721					1596
1991	91	848	388									1327
1976 to 1991	354	2341	1150	411	730	1831	1875	3594	920	196	301	13704

Table 5. Summary of quotas, landings and management actions from 1989 to 1993.

Year	Management Units Areas	Quota (tonnes)	Landings ¹ (tonnes)	Management	Eligible Licences	Vessels Fished ²
1989	North Coast - 7 management units South Coast - 13 management units	1,597 2,395	1,600 2,387	First year of trial I.Q. Coastwide quota divided equally among 55 licences; 160,000 lb., 12 Inside south, 21 west coast Vancouver Is., 22 north coast licences. First of three year area rotation.	55	47
1990	North Coast - 4 management units South Coast - 13 management units	1,597 2,395	1,596 2,361	Second year of trial I.Q. 160,000 lb./licence. Second year of the three year area rotation	55	46
1991	North Coast - 19 management units South Coast - 22 management units	1,347 2,020	1,327 2,006	Third year of I.Q. 135,000 lb/licence Third year of area rotation.	55	47
1992	North Coast - 24 management units South Coast - 37 management units	1,197 1,666	1,199 1,665	First year of area rotation. I.Q. 114,750 lb/licence. 23 licences North; 12 Inside South; 20 W.C.Vancouver Is.	55	45
1993	North Coast - 27 management units South Coast - 36 management units	1,061 1,371		Second year of area rotation. I.Q. 97,500 lb/licence. 24 licences North; 12 Inside South; 19 W.C.Vancouver Is.	55	

¹ Reported landings from sales slip submissions, revised from Harbo et. al. 1986. 1989 to 1993 landings are I.Q. validated weights.

² Some licences were transferred to other vessels or vessels were replaced so that more than one vessel may have reported landings on the same licence. Licences (quotas) were "stacked" on vessels after 1989.

Table 6.1. Summary of annual quotas (10⁻³ lb.), 1979 to 1993 in the geoduck clam fishery.

Year	South Coast				North Coast						Coast Total
	Inside Waters	West Coast V.I.		Subtotal	QCI	Prince Rupert		Central	Subtotal		
1979	NA	NA		4,500.0 (1)	NA	NA	NA	NA	NA	3,500.0 (1)	8,000.0
1980	1,700.0	2,800.0		4,500.0 (8)	NA	NA	NA	NA	NA	3,500.0 (1)	8,000.0
1981	876.0	3,125.0		4,001.0 (10)	600.0	575.0		950.0		2,175.0 (11)	6,176.0
1982	-----Coastwide quota set -----										
1983	1,000.0 (1)	3,500.0 (1)	4,500.0 (2)		650.0 (1)	350.0 (1)	1,000.0 (1)	2,000.0 (3)		6,500.0	
1984	1,500.0 (6)	3,100.0 (6)	4,600.0 (12)		650.0 (2)	350.0 (1)	1,000.0 (1)	2,000.0 (4)		6,600.0	
1985	1,650.0 (10)	2,900.0 (9)	4,550.0 (19)		650.0 (3)	500.0 (1)	850.0 (1)	2,000.0 (5)		6,550.0	
1986	2,025.0 (11)	3,500.0 (11)	5,525.0 (22)		1,350.0 (5)	850.0 (3)	1,050.0 (3)	3,250.0 (11)		8,775.0	
1987	1,850.0 (13)	3,950.0 (14)	5,800.0 (27)		1,235.0 (6)	800.0 (3)	1,510.0 (7)	3,545.0 (16)		9,345.0	
1988	1,750.0 (11)	3,350.0 (16)	5,100.0 (27)		950.0 (5)	800.0 (1)	1,725.0 (8)	3,475.0 (16)		8,575.0	
1989	1,920.0 (4)	3,360.0 (5)	5,280.0 (9)		closed	closed	3,520.0 (4)	3,520.0 (4)		8,800.0	
1990	1,920.0 (5)	3,360.0 (8)	5,280.0 (13)		closed	3,520.0 (5)	closed	3,520.0 (5)		8,800.0	
1991	1,620.0 (10)	2,835.0 (12)	4,455.0 (22)		2,970.0 (19)	closed	closed	2,970.0 (19)		7,425.0	
1992	1,377.0 (16)	2,295.0 (21)	3,672.0 (37)		closed	closed	2,639.3 (24)	2,639.3 (24)		6,311.3	
1993	1,117.0 (7)	1,852.5 (13)	3,022.5 (20)		closed	2,340.0 (27)	closed	2,340.0 (27)		5,362.5	

() * number of subquotas specified for areas or portions of areas.

Detailed area quotas are given in Appendix 1.

Table 6.2. Summary of annual quotas (tonnes), 1979 to 1993 in the geoduck clam fishery.

Year	South Coast				North Coast							Coast Total
	Inside Waters	West Coast V.I.		Subtotal	QCI		Prince Rupert		Central	Subtotal		
1979	NA	NA		2,041 (1)	NA	NA	NA	NA	NA	1,587 (1)		3,628
1980	771	1,270		2,041 (8)	NA	NA	NA	NA	NA	1,587 (1)		3,628
1981	397	1,418		1,815 (10)	272		261		431	986 (11)		2,801
1982	-----Coastwide quota set-----											930
1983	454 (1)	1,588 (1)	2,041 (2)		295 (1)		159 (1)		454 (1)	907 (3)		2,948
1984	680 (6)	1,406 (6)	2,086 (12)		295 (2)		159 (1)		454 (1)	907 (4)		2,993
1985	748 (10)	1,315 (9)	2,063 (19)		295 (3)		227 (1)		386 (1)	907 (5)		2,970
1986	919 (11)	1,588 (11)	2,506 (22)		612 (5)		386 (3)		476 (3)	1,474 (11)		3,980
1987	839 (13)	1,792 (14)	2,630 (27)		560 (6)		363 (3)		685 (7)	1,608 (16)		4,238
1988	794 (11)	1,520 (16)	2,196 (27)		431 (5)		363 (1)		782 (8)	1,576 (16)		3,772
1989	871 (4)	1,524 (5)	2,395 (9)		closed		closed		1,597 (4)	1,597 (4)		3,992
1990	871 (5)	1,524 (8)	2,395 (13)		closed		1,597 (5)		closed	1,597 (5)		3,992
1991	735 (10)	1,286 (12)	2,021 (22)		1,347 (19)		closed		closed	1,347 (19)		3,368
1992	625 (16)	1,041 (21)	1,666 (37)		closed		closed		1,197 (24)	1,197 (24)		2,863
1993	507 (7)	840 (13)	1,371 (20)		closed		1,061 (27)		closed	1,061 (27)		2,432

() * number of subquotas specified for areas or portions of areas.
 Detailed area quotas are given in Appendix 1.

Table 7. Conversion factors used in geoduck quota calculations in British Columbia (1992 – 1993).

Number of Geoducks per m ²	Virgin Biomass ¹ (t/ha)	Annual Quota at 1% Harvest Rate		3 Year Quota at 1% Harvest Rate	
		(t/ha)	(lb/ha)	(t/ha)	(lb/ha)
1	10.65	0.1065	235	0.32	704
2	21.3	0.2130	470	0.64	1409
3	31.9	0.3195	704	0.96	2113
3.5	37.3	0.3730	822	1.12	2467
5	53.3	0.5325	1174	1.60	3522

¹ assuming 1 geoduck/m² = 10.65 t/ha @ average weight of 1.065 kg per geoduck (Harbo, et al, 1983).

1 ha = 10,000 m²

1 mt = 2204.6 lb.

1 tonne = 1000 kg / ((1 geoduck/m²) / 1.065) = 939 geoducks

1 tonne/ha = 939 geoducks/ha x 1 ha/10,000 m² = 0.0939 geoducks/m²

Original densities required based on harvest =

total Landings (lb.) / (# yrs fished X 235 lb. annual quota/geoduck @ 1% X ha of beds)

Table 8. South coast summary (Areas 11–27, 28 & 29) of cumulative harvested area, cumulative number of beds fished, and number of new beds fished per year for geoducks, 1978 to 1990.

Year	TOTAL ANNUAL SUMMARY		(AREAS 11–27, (28 & 29)
	area (ha)	# beds	new beds
1978	4,260	31	(31)
1979	6,995	81	(50)
1980	8,748	130	(49)
1981	9,197	159	(29)
1982	9,582	182	(23)
1983	9,765	195	(13)
1984	10,535	227	(32)
1985	13,912	295	(68)
1986	14,846	351	(56)
1987	15,933	391	(40)
1988	16,457	438	(47)
1989	15,995	458	(28)
1990	13,896	484	(26)

¹ areas reduced due to contaminated closures and adjustments to bed sizes

Table 9. North coast summary, (Areas 1 to 10), of cumulative harvested area, cumulative number of beds fished, and number of new beds fished per year for geoducks, 1980 to 1990.

Year	TOTAL ANNUAL SUMMARY		(AREAS 1 to 10)
	area (ha)	# beds	new beds
1980	236	5	(5)
1981	466	18	(13)
1982	606	23	(5)
1983	648	29	(6)
1984	973	33	(4)
1985	1,832	60	(27)
1986	2,339	98	(28)
1987	2,846	132	(34)
1988	3,466	192	(60)
1989	3,473	213	(21)
1990	3,021	231	(20)

¹ large beds with low landings were reduced in area and beds with no landings on harvest logs were removed.

Table 10. Estimated harvest areas (1990), landings (1991) and removal of geoducks, 1976 to 1991.

Area Description	Reported Harvest Area (ha)	Number of Beds	Range in Bed Size (ha)	Landings to 1991 (t)	Density of Geoducks Removed		Years Fished	Annual Rate of Removal (t/ha)	Theoretical Rate of Removal (t/ha)
					(t/ha)	(#/m ²) ¹			
Inside of Vancouver Island (Areas 11 to 19, 28 and 29)	7,948 (57%)	236	3 - 631	12,973	1.63	0.15	16	0.10	0.11
West Coast Vancouver Island (Areas 20 to 27)	5,948 (43%)	248	2 - 265	23,804	4.00	0.38	15	0.27	0.21
South Coast Total (Areas 11 to 27, 28 and 29)	13,896	484	2 - 631	36,777	2.65	0.25	16	0.17	0.15
Queen Charlotte Islands (Areas 1, 2E and 2W)	1,070	88	1 - 41	3,845	3.59	0.34	9	0.40	0.37
Prince Rupert District (Areas 3, 4, 5)	617	37	1 - 181	2,972	4.82	0.45	9	0.54	0.37
Central Coast District (Areas 6 to 10)	1,334	106	1 - 127	6,886	5.16	0.48	12	0.43	0.37
North Coast Total (Areas 1 to 10)	3,021	231	1 - 181	13,703	4.54	0.43	12	0.38	0.37

¹ Conversion: 1 geoduck/m² = 10.65 t/ha @ average weight of 1.065 kg per geoduck (Harbo, et al, 1983)

Annual Rate of Removal = total landings (t) / (total hectares) / (years fished)
= t/ha/yr

Annual Theoretical Rate of Removal = (estimated density of geoducks) x (10.65 t/ha) x (0.01 yield)
 @1 gdk/m² = 1 x 10.65 x 0.01 = 0.11 (inside waters, south coast)
 @2 gdk/m² = 2 x 10.65 x 0.01 = 0.21 (west coast Vancouver Is.)
 @3.5 gdk/m² = 3 x 10.65 x 0.01 = 0.37 (north coast)

Table 11. Estimated geoduck standing stock, annual quotas, landings (1991) and years of quota landed for different regions of the British Columbia coast.

Area Description	Number of Beds	Reported Harvest Area (ha) to 1990	Estimated Geoduck Density ¹ (t/ha)	Estimated Stock (t)	Annual Calculated Quota (t)	Landings to 1991 (t)	Years of Quota Taken (1991)	Years Fished
Inside of Vancouver Island (Areas 11 to 19, 28 and 29)	236	7,948	10.65	84,646	846	12,973	15.3	16
West Coast Vancouver Island (Areas 20 to 27)	248	5,948	21.3	126,692	1,267	23,804	18.8	16
South Coast Total (Areas 11 to 27, 28 and 29)	484	13,896		211,339	2,113	36,777	17.4	16
Queen Charlotte Islands (Areas 1, 2E and 2W)	88	1,070	37.3	39,911	399	3,845	9.6	9
Prince Rupert District (Areas 3, 4, 5)	37	617	37.3	23,014	230	2,972	12.9	9
Central Coast District (Areas 6 to 10)	106	1,334	37.3	49,758	498	6,886	13.8	12
North Coast Total	231	3021		112,683	1,127	13703	12.2	12
Coastwide Total	715	16917		324,022	3,240	50,480	15.6	16

Annual Calculated Quota = 3240 t X 2204.6 lb./t = 7,142,904 lb. (129,870 lb./l.V.Q.)

¹ Geoduck density: 1/m² = 10.65 t/ha; 2/m² = 21.3 t/ha; 3.5/m² = 37.3 t/ha.

Table 12. Summary of 1989 - 1990 - 1991 quotas (lb.).

Year	Areas	Three Year Quota (10 ⁻³ lb)	# Licences	I.V.Q. Quota (10 ⁻³ lb)	Coast Quota (10 ⁻³ lb)
1989	<u>Inside Waters</u>				
	11, 12, 13	1,920	12	160	
	<u>W.C. Vancouver Is.</u>				
	23, 24, 27A	3,360	21	160	
1990	<u>North Coast</u>				
	lower 6 (6-14,-15,-17,-18,-19,-23, -25,-31), 7 to 10	3,520	22	160	8,800
	<u>Inside Waters</u>				
	14 and 16	1,920	12	160	
1991	<u>W.C. Vancouver Is.</u>				
	24, 26, 27 Inlets (27H,27I)	3,360	21	160	
	<u>North Coast</u>				
	3, 4, 5 and upper 6 (6-5, -9 to -13 incl.)	3,520	22	160	8,800
1991	<u>Inside Waters</u>				
	15, 17, 18, 19, 29-5	1,620	12	135	
	<u>W.C. Vancouver Is.</u>				
	20, 24, 25, 26-B, 26-C ¹	2,835	21	135	
1991	<u>North Coast</u>				
	1, 2E and 2W	2,970	22	135	7,425

¹ Area 26-C should be closed in the 92-93-94 rotation

Table 13. 1992 geoduck quotas (lb.) for southern inside waters.

Area	Description	1992 Quota (lb.)	Calculated Quota (lb.)
<u>Area 11:</u>	all sub-areas	closed	27,000
<u>Area 12:</u>			
12-A	North Islands (12-10 to -13, ptn -16)	100,000	69,000
12-B	Goletas Ch (12-15, ptn -16, Vancouver Is. shore)	closed	81,000
12-C	South and East of Dillion Pt. to Ledge Pt. (12-17, ptn 12-16)	130,000	129,000
12-D	Malcolm Is; Graeme Pt. to Black Bluff (a portion of 12-8)	125,000	123,000
12-E	Malcolm Is; Trinity Bay (ptn 12-6, ptn 12-8)	201,000	210,000
12-F	Malcolm Is. east and south (12-5, -18, ptn 12-6)	9,000	9,000
12-G	Mainland Inlets (12-7, 12-27 to 12-48)	closed	
	AREA 12 TOTAL:	565,000	621,000
<u>Area 13:</u>			
13-A	SE Quadra to Whiterock Pass (13-12 to -14 incl)	40,000	42,000
13-B	Marina Island (ptn 13-15)	closed	222,000
13-C	SW Cortes Island Whaletown to Sutil Pt. (portions of 13-14, 13-15 and 13-1)	112,000	114,000
13-D	NW Cortes, east of Read Island to Rendezvous Island (13-16, 13-17)	20,000	24,000
13-E	Other Sub-areas; Johnstone St. (13-32), Gowland Hbr (13-4), Willow Pt. (13-2), and Cape Mudge (13-1)	(8,000) ¹	9,000
	AREA 13 TOTAL:	172,000	411,000
<u>Area 14</u>			
14-A	Oyster River to Cape Lazo (ptn 14-13)	412,000	810,000
14-B	Comox Bar and East shore of Denman Is. (ptn 14-7, 14-10 and ptn 14-9)	200,000	231,000
14-C	Baynes Sound (14-11, 14-15, 14-8)	28,000	135,000
	AREA 14 TOTAL:	640,000	1,176,000
TOTAL INSIDE WATERS: 12 QUOTAS @ 114,750 LB. =		1,377,000 lb.	2,235,000

¹ quota transferred in-season to Area 14C

Table 14. 1992 geoduck quotas (lb.) for west coast Vancouver Island.

Area	Description	Calculated Quota (lb.)	1992 Initial Quota (lb.)	1992 Final Quota (lb.)
Area 23:				
23-A	Maggie River shore (portions of 23-9, 23-10 and 23-11)	240,000	240,000	240,000
23-B	Toquart Bay - Pipestem Inlet (port)	51,000	15,000	15,000
23-C	Mayne Bay, Stopper Is., Bryant Is. (23-9, portion 23-10)	174,000	35,000 ¹	165,000
23-D	North Sechart Channel, (Alma Russel closed) (ptns of 23-6 and 23-8)	162,000	145,000	145,000
23-E	Chain Group (ptns of 23-4,-5)	126,000	closed ²	closed
AREA 23 TOTAL:		753,000	435,000	565,000
Area 24:				
24-A	Inside (ptn 24-6, -7 and -9)	312,000	285,000	312,685
24-A2	Northern portion of 24-8	72,000	70,000	70,000
24-A3	Southern portion of 24-8			
	Tonquin-Echachis-Wickaninish	52,000	30,000	30,000
24-B	Outside - portion of 24-6	299,000	275,000	275,000
24-B2	Coomes Bank	159,000	120,000	185,937
24-B3	Ahousat (ptns 24-4 and 24-6)	90,000	closed	180,000
24-B4	Kutcouc/Russell Ch (ptn 24-6)	86,000	closed	closed
AREA 24 TOTAL:		1,070,000	780,000	1,053,622
Area 27:				
27-A	Quatsino (ptn 27-7, s.shore)	168,000	100,000	100,000
27-B	Cliff to Lawn Pt. (ptn 27-2)	51,000	50,000	50,000
27-C	Forward Inlet (27-3)	177,000	closed	
27-D	Kalns Island (ptn 27-1)	66,000	70,000	70,000
27-E	San Josef Bay (ptn 27-1)	156,000	175,000	175,000
27-F	Sea Otter Cove (ptn 27-1)	21,000	50,000	50,000
27-G	Outside Exploratory (ptn 27-1, ptn 27-2)	exploratory	130,000	0
27-H	Klaskino Inlet (27-5)	318,000	340,000 ³	66,378
27-I	Klaskish Inlet (27-6)	141,000	165,000	165,000
AREA 27 TOTAL:		1,098,000	1,080,000	676,378
TOTAL:		2,921,000	2,295,000 lb.	2,295,000

** Note: 1992 Quota Options Included:

¹ Area 23-C - Mayne Bay quota was to be increased to 165,000 lb if quota not achieved in Area 27-G.

² Area 23-E - Chain Group was to be fished if quota not achieved in Areas 27-B or 27-D.

³ Area 27-H (Klaskino) closed due to PSP so remaining quota (273,622 lb.) was moved to portions of Area 24.

Area 24-A plus 27,685 lb. = 312,685 lb.

Area 24-B2 plus 65,937 lb. = 185,937 lb.

Area 24-B3 plus 180,000 lb. = 180,000 lb.

Table 15. 1992 geoduck quotas for the north coast area.

Area	Description	1992 Quota (lb.)	Calculated Quota (lb.)
Area A:			
McMullin Group	7-18	131,000	130,778
McNaughton Group	7-25 - E. of Queens Snd.	301,000	301,055
Goose Island	7-25 - Goose Is shore	50,000	3,000
Spider Anchorage	7-27 - W. of Kildidt Snd.	442,000	441,683
AREA A TOTAL:		924,000	876,516
Area B:			
Seaforth Channel	7-8, 9, 12, 22	111,000	111,038
Cape Mark	7-32	120,000	170,258
Princess Alice	7-20	50,000	exploratory
Thompson Bay	7-19, 21	49,000	49,350
Joassa Channel	7-23, 24	50,000	exploratory
AREA B TOTAL:		380,000	330,646
Area C:			
Nalua Pass	7-26, 7-27 - E. of Kildidt S.; 8-4	197,000	197,401
Choked Pass	8-1 N. of Dublin Pt.; 8-3	148,000	148,050
Fitzhugh Sound	8-16, 9-12	32,000	exploratory
Calvert I. (Up)	9-1 W. - N. of Harold Pt.	50,000	exploratory
Calvert I. (Lo)	9-1 W. - Clark Pt. to Harold Pt. 10-1, 10-2	40,000	39,480
Smith Inlet	10-3, 10-4	47,000	46,883
AREA C TOTAL:		514,000	431,814
Area D:			
N. Aristazabal	6-11, 14, 15	70,000	exploratory
Laredo Inlet	6-19; 6-16E. -N. of Meyers Pt.	57,000	56,753
Kitasu Bay	6-18	20,000	19,740
Higgins Pass	6-16 East. -S. of Wilby Pt.; Upper 6-17	151,000	150,518
E. Arist.I.(Up)	6-16 - Aristazabal Is. shore	50,000	exploratory
E. Arist.I.(Lo)	6-17 and Lower 6-13 - Aristazabal Is. shore	203,250	exploratory
Price Isl. (Up)		50,000	14,805
Price Isl. (Lo)	6-17 - Price Is. shore	150,000	exploratory
Milbank Sound	7-31; 7-1, 2 - Price Is. shore, 7-3	70,000	69,090
AREA D TOTAL:		821,250	310,906
NORTH COAST TOTAL: 23 QUOTAS @ 114,750 LB. =		2,639,250 lb.	1,949,882

The list below describes Exploratory Areas and Quota that have been included

In the above table:

Princess Alice Isl.	50,000 lb	If quota is not found in this area, it will be taken from 7-31.
Joassa Ch./Raymond P.	50,000 lb	
Fitzhugh Snd.	32,000 lb	If quota is not found in this are, it will be taken from 9-1 E. and 9-2.
Calvert Isl. (Up)	50,000 lb	
E. Aristazabal I.(Up)	50,000 lb	
E. Aristazabal I.(Lo)	203,250 lb	
Price Isl. (Upper)	35,000 lb	
Price Isl. (Lower)	50,000 lb	
Milbank Snd.	50,000 lb	
TOTAL EXPLORATORY	670,250 lb	

Table 16. South coast areas recommended to be closed in 1992 due to conservation concerns or with reduced quotas.

Area	Subareas	No. of Beds	Area (ha)	Landings to Date (lb.)	Removals (#/m ²)	Annual Quota (lb.)	Calculated Years of Quota Taken	# Years Fished	Original Density Required (#/m ²)
INSIDE WATERS:									
11	11-2	10	39	240,301	0.26	9,000	27	7	3.75
12A: North Islands	12-11,-12,-13	18	98	905,533	0.39	23,000	39	9	4.37
12B: Goletas Ch.	ptns 12-15, -16	13	116	2,136,359	0.78	27,000	79	8	9.80
12G: Mainland Inlets	12-1 to -3, -20 to -48	1	10	8,227	0.04	2,350	4	3	1.17
13B: Marina Island	ptn 13-15	2	316	1,641,212	0.22	74,000	22	15	1.47
14B: Comox Bar/Denman	ptns 14-7, -10	3	328	2,208,177	0.29	77,000	29	14	2.05
WEST COAST V.I.:									
23B: West of Stopper Is.	ptn. 23-10	1	26	305,820	0.50	12,220	25	7	7.15
23C: Mayne-Stopper -Bryant-Curwen ²	ptns 23-9, -10	8	124	880,679	0.30	58,000	15	12	2.52
23D: Alma Russel Is	ptn. 23-6	3	42	517,603	0.52	20,000	26	8	6.56
23E: Chain Group	23-4,-5, ptn -7	14	90	991,169	0.47	42,000	24	8	5.86
24A2: Yarksis/Wickaninish	ptn 24-8	4	153	1,266,309	0.35	90,000	14	13	2.71
24B3: Ahousat ²	ptns of 24-4, -6	2	191	1,633,279	0.36	90,000	18	13	2.80
24B4: Russell Channel	ptn 24-6	1	184	985,451	0.23	86,000	11	3	7.60
24C: Exposed/ Sydney Inlet	24-1,-2, ptns -6 and -8	14	119	720,966	0.26	56,000	13	5	5.16
24D: Inlets	24-3,-5,-10, -12,-13,-14	22	96	578,111	0.26	45,000	13	6	4.27
27A: Quatsino Sd.	ptn 27-7, 3 beds	3	48	255,845	0.23	23,000	11	6	3.78
27C: Forward In.- Winter Hbr.	27-3	3	126	1,269,614	0.43	59,000	22	7	6.13
27F: Sea Otter Cove	ptn 27-1	1	14	161,678	0.49	7,000	23	3	16.38
27I: Klaskish In. ²	27-6	13	101	1,038,567	0.44	47,000	22	7	6.25

¹ Fished at a reduced rate in 1992

² fished 1992 but recommended closure for next rotation, possible survey site.

Removals (#/m²) = (total landings (t) x 939 geoducks/t) / (total ha x 10,000 m²/ha)

Calculated Years of Quota Taken = total landings (lb.) / annual quota option @ 1 (inside) or @ 2 (W.C.V.I.) geoducks/m²

Original Densities required based on harvest = total landings (lb.) / (# yrs fished x 235 lb. annual quota/geoduck @ 1% x ha of beds)

Table 17. South coast areas closed in 1993 due to conservation concerns or with reduced quotas.

Area	Subareas	No. of Beds	Area (ha)	Landings to Date (lb.)	Removals (#/m ²)	Annual Quota (lb.)	Calculated Years of Quota Taken	# Years Fished	Original Density Required (#/m ²)
<u>INSIDE WATERS:</u>									
16A: West Texada	16-21, -22	7	248	1,125,969	0.19	58,000	19	14	1.38
16B: Lasqueti Island	16-19,-20, ptn 14-3	11	318	1,241,173	0.17	75,000	17	13	1.28
16C: East Texada Is, Northeast Pt. to Pt Upward	16-18	3	34	458,963	0.57	8,000	57	10	5.74
16D: Entrance to Jervis In.	16-1,-2,-11, ptn -17	9	90	142,648	0.07	21,000	7	9	0.75
<u>WEST COAST V.I.:</u>									
26A: Inlets	ptns 26-7,-8,-10	8	55	516,793	0.40	26,000	20	7	5.71
26B1: Mission Group	ptns of 26-1 and -6	1	208	4,640,218	0.95	98,000	47	12	7.91
26C: Central Kyuquot Inlets	ptn 26-2, -5, -6	13	82	1,041,970	0.54	39,000	27	10	5.41

Removals (#/m²) = (total landings (t) x 939 geoducks/t) / (total ha x 10,000 m²/ha)

Calculated Years of Quota Taken =
total landings (lb.) / annual quota option @ 1 (inside) or @ 2 (W.C.V.I.) geoducks/m²

Original Densities required based on harvest =
total landings (lb.) / (# yrs fished x 235 lb. annual quota/geoduck @ 1% x ha of beds)

Table 18. 1993 geoduck quotas (lb.) for South Coast Areas

Area	Description	1993 Quota (lb.)	Calculated Quota (lb.)
INSIDE WATERS			
Area 14:			
14-D	Hornby Is. (ptns of 14-7, 14-9, 14-10 and 14-12)	253,000	270,075
14-E	South - Maplegard Pt. to Northwest Bay (14-1, -4, and -5)	517,000	651,000
AREA 14 TOTAL:		770,000	921,075
Area 16:			
16-A	W. shore Texada Is. (16-21, 16-22)	175,000	174,000
16-B	Lasqueti Island (16-19, 16-20 and ptn 14-3)	125,000	225,000
16-C	East shore Texada Is. (16-18)	50,000	24,000
16-D	Entrance to Jervis In., Thormanby Is., Frances Penn. and Bjerre Shoal (16-2, -2, -11 and ptn of 16-17)	40,000	63,000
16-E	Salmon/Sechart Inlets (16-5 to -9, 29-1)	10,000	33,000
AREA 16 TOTAL:		400,000	519,000
TOTAL INSIDE WATERS: 12 QUOTAS @ 97,500 LB. =		1,170,000 lb.	1,440,075 lb.
WEST COAST VANCOUVER ISLAND			
Area 24:			
24-A	Inside (ptn 24-6, -7 and -9)	390,000 (1)	312,000
24-A2	Northern portion of 24-8	70,000	72,000
24-A3	Southern portion of 24-8 Tonquin-Echachis-Wickaninish	43,500 (2)	52,000
24-B	Outside - portion of 24-6	275,000	299,000
24-B2	Coomes Bank (ptn. 24-6)	134,000 (3)	159,000
24-B3	Ahousaht (ptns 24-4 and 24-6)	closed (4)	90,000
24-B4	Kutcouc/Russell Ch (ptn 24-6)	180,000 (5)	86,000
AREA 24 TOTAL:		1,092,500	1,070,000
Area 26:			
26-A	N. Inlets (ptns of 26-8, -9, and -10)	100,000	78,000
26-B1	Mission Group (ptn 26-1)	closed (5)	294,000
26-B2	Mission Group (ptn 26-1)	135,000 (6)	69,000
26-C	Inside (ptns of 26-2, -5, -6)	closed (7)	117,000
26-D	South - Kyuquot/Clear Passage (ptns of 26-1 and 26-2)	250,000	243,000
AREA 26 TOTAL:		485,000	801,000
Area 27:			
27-H	Klaskino Inlet (27-5)	275,000	318,000
AREA 27 TOTAL:		275,000	318,000
WEST COAST VANCOUVER ISLAND: 19 QUOTAS @ 97,500 LB. =		1,852,500 lb.	2,189,000 lb.

(1) 285,000 lb + 134,000 not taken in 1991 but fished in Area 26.

(2) 30,000 lb + 13,500 lb of the quota not taken in 1991 but fished in Area 26.

(3) 160,000 lb + 40,000 lb delayed from 1992, when quota was 120,000 lb.

(4) 90,000 lb + 90,000 lb delayed from the 1992 closure.

(5) Quota was taken in 1991.

(6) 25,000 lb taken in 1991.

(7) 142,500 lb taken in 1991.

Table 19. 1993 geoduck quotas (lb.) for north coast areas.

Area	Description	Calculated Quota (lb.)	1993 Set Quota (lb.)	1993 Exploratory Quota (lb.)
<u>A: Surf Inlet and west</u>				
<u>Aristazabal Is.</u>				
A1 - Surf Inlet	(6-12, ptn. 6-10 E. of Duckers Is.)	101,168	101,000	
A2 - Anderson Is.	(ptn. 6-13 W. of 129° 20' W and N. of) Wiglesworth Point)	17,273	17,000	
A3 - Borrowman Bay	(ptn. 6-13 E. of 129° 20' W and N. of Wiglesworth Point)	41,948	42,000	
A4 - Kettle Inlet	(ptn. 6-13 Wiglesworth Pt. to Bonson Rk.)	59,220	59,000	
A5 - Clifford Bay (upper)	(ptn. 6-13 from Bonson Rk. ot Hawkins Rk.)	271,425	171,000	
A6 - Clifford Bay (lower)	(ptn. 6-13 from Hawkins Rk. to north tip of Arriaga Is.)		100,000	
A7 - Weeteeam Bay	(ptn. 6-13 from N. tip Arriaga Is. to 52° 28' N lat.)	152,985	153,000	
A8 - Laredo Ch. East	(ptn. 6-14 and 6-15 within .5 m. of Princess Royal Is. shore)			20,000
	A TOTAL:	644,019	643,000	20,000
<u>B: Calamity Bay, Estevan</u>				
<u>Group, Campania Is.</u>				
B1 - Calamity Bay	(ptn. 6-9 N. of Otter Pt.)	162,855	163,000	
B2 - Estevan Group	(ptn. 6-9 S. of Otter Pt.)	118,440	118,000	
B3 - Campania Is. area	(ptn. 6-10 W. of Duckers Is.)			14,000
	B TOTAL:	281,295	281,000	14,000
<u>C. Banks Island (5-22):</u>				
C1 - Wreck Is./North	(ptn. 5-22 north of Waller Bay)		111,000	
C2 - S. Banks Is.	(ptn. 5-22 Waller Bay and South)	197,400	86,000	
	C TOTAL:	197,400	197,000	

Table 19. (continued)

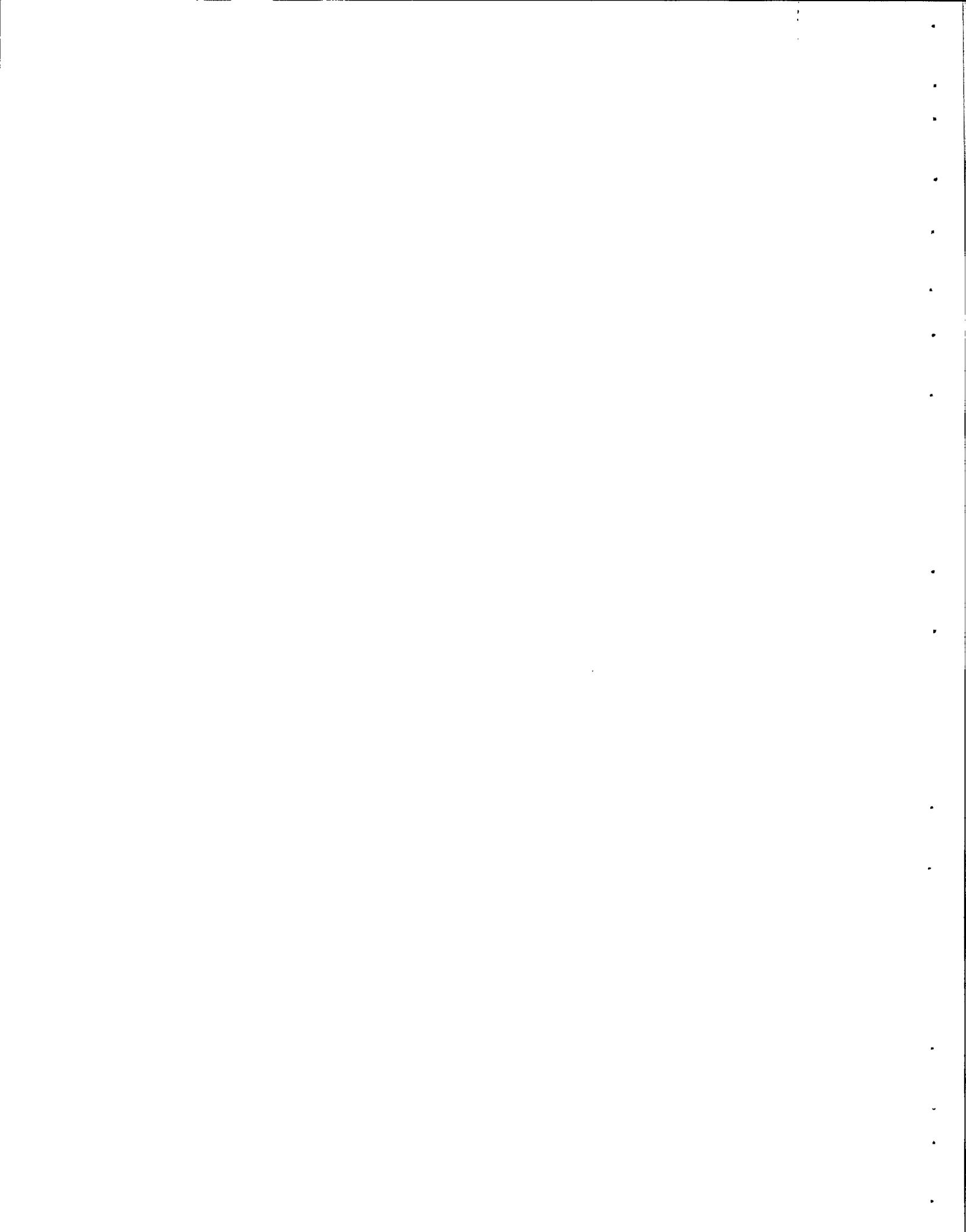
Area	Description	Calculated Quota (lb.)	1993 Set Quota (lb.)	1993 Exploratory Quota (lb.)
D. Area 5 North:				
D1 - Freeman Pass	(5-12)	5,000	25,000	
D2 - Shakes Is.	(5-10)	6,580	7,000	
D3 - Principe Ch. Upper	(5-13, 5-16, ptn. 5-17 N. of Gale Pt.)			10,000
D4 - Principe Ch. Lower	(5-17 S. of Gale Pt.)	9,870	10,000	
D5 - Griffiths Hbr.	(ptn. 5-20 N. of Solander Pt.)	397,268	398,000	
D6 - Sneath Is.	(ptn. 5-20 Solander to Laverock Pt.)	148,050	148,000	
D7 - Kingdown Inlet	(ptn. 5-20 S. of Laverock Pt., 5-21)	133,245	133,000	
D TOTAL:		700,013	721,000	10,000
E. Area 3 and Upper Area 4:				
E1 - Dundas Is.	(3-1, ptn.-2, ptn.-3)	34,545	35,000	
E2 - Wales Is to Big Bay	(ptn. 3-2, ptn. 3-3, 3-4, 3-5, 4-5 to 4-8, and 4-14)			50,000
E TOTAL:		34,545	35,000	50,000
F. Lower Area 4:				
F1 - Stephens Is.	(ptn. 4-2, 4-4, 4-9)	22,209	22,000	20,000
F2 - Oval Bay	(4-3)	24,675	25,000	
F TOTAL:		46,884	47,000	20,000
G. Melville to Archibald Is.:				
G1 - Melville/Dunira Is.	(4-1, 4-5)	187,530	188,000	
G2 - Tree Nob Group	(4-13)	96,233	96,000	
G3 - Archibald Is.	(ptn. 4-2, Archibald Is. only)	19,740	20,000	
G TOTAL:		303,503	304,000	
NORTH COAST TOTALS:		2,207,659	2,228,000	114,000

NORTH COAST TOTAL: 24 QUOTAS @ 97,500 lb. = 2,340,000 lb.

2,342,000

Table 20. Summary of quotas (lb.) and rotation of areas, 1989 to 1993.

Year	Inside Waters		West Coast V.I.		North Coast		Annual Quota Total	Annual I.V.Q.
	Areas	Quota	Areas	Quota	Areas	Quota		
First Rotation (1989-90-91)								
1989	11,12,13	1,920,000	23,24,27A	3,360,000	lower 6, 7 to 10	3,520,000	8,800,000	160,000
1990	14,16	1,920,000	24,26,27H,27I	3,360,000	3,4,5,upper 6	3,520,000	8,800,000	160,000
1991	15,17,18, 19,29-5	1,620,000	20,24,25,26B1 26B2,26C	2,835,000	1,2E,2W	2,970,000	7,425,000	135,000
Second Rotation (1992-1993-1994)								
1992	12,13,14A, 14B,14C	1,377,000	23,24A,24A2, 24A3,24B,24B2 24B3,27A,27B, 27D,27E,27F, 27G,27H,27I	2,295,000	lower 6, 7 to 10	2,639,250	6,311,250	114,750
1993	14D,14E,16	1,170,000	24A,24A2,24A3, 24B,24B2,24B4, 26A,26B2, 26D,27H	1,852,500	3,4,5,upper 6	2,340,000	5,362,500	97,500



APPENDIX 1

MANAGEMENT SUMMARIES FOR FIRST YEARS OF AREA ROTATIONS AND
INDIVIDUAL VESSEL QUOTAS, FOR 1989, 1990 AND 1991.

APPENDIX 1 – Management summaries for first years of area rotations and Individual Vessel Quotas, for 1989, 1990 and 1991.

Table 1.1 1989 Geoduck management – Summary of South Coast quotas, validated landings¹ (tonnes) and fishing dates.

Management Unit		Opening	Quota		Landings		Closure
Statistical Area	Sub-areas	Date	(lb.)	(t)	(lb.)	(t)	Date
INSIDE WATERS							
11 ²	All sub areas	Feb 6	11,067	5.0	11,067	5.0	Sept 8
12A	All sub areas	Feb 6	1,320,000	598.8	1,319,498	598.5	Oct 17
12B	Mainland:-7,-13, -27 to -48 incl.	May 1	138,933	63.0	138,867	63.0	Sept 8
13	All sub areas	May 18	450,000	204.1	448,738	203.5	Dec 31
INSIDE WATERS TOTAL:			1,920,000	870.9	1,918,170	870.1	
WEST COAST VANCOUVER IS.							
23A	Bamfield:-3 to -7	Feb 6					Jul 15
23B	West Barkley: -8 to -11 incl.	Apr 16 Aug 15 Nov 7					Aug 24 Sept 1 Dec 31
TOTAL AREA 23			1,200,000	544.3	1,185,964	538.0	
24A	Inside:-7,-8,-9, ptn -6 "inside"	Feb 6 Apr 16 Dec 11					Feb 15 May 3 Dec 31
24B	Outside:-4, ptn -6 "outside"	Feb 16	676,615	306.9	676,615	306.9	Mar 20
24C	Exposed:124-3, ptn 24-8	June 1	19,589	8.9	19,589	8.9	Sept 1
24-1	Hesquiat Hbr	June 1	3,485	1.6	3,485	1.6	Sept 1
24-2	Sidney Inlet	June 1 Aug 1 Nov 8 ³					Jul 18 Sept 1 Dec 15
24-Russell Ch. And Inlets	24-3,-5,-10,-11, -13,-14,-6(Russel)	Aug 1 Nov 8 ³					Sept 1 Dec 31
TOTAL AREA 24:			1,400,000	635.0	1,394,547	632.6	
27A	Inside:-2,-3, -7 to -11 incl.	May 1 Aug 15					Jul 15 Dec 12
WEST COAST V.I. TOTAL:			3,360,000	1,524	3,340,866	1,515	
SOUTH COAST DIVISION TOTAL:			5,280,000	2,395	5,259,036	2,385	

¹ landings from "Individual Quota" validated weights. Sales slips reported 2394 t landed for South Coast areas.

² Area 11 quota combined in season with 12B for a total of 150,000 lb.

³ Areas that re-opened Nov 8 were 24-2, 24-5, 24-14 and a portion of 24-6.

* 12 licences of 160,000 lb in the inside waters; 21 licences on the west coast of Vancouver Island.

Appendix 1 (continued)

Table 1.2 1989 Geoduck management - Summary of North Coast quotas, validated landings¹ (tonnes) and fishing dates.

Management Unit Statistical Areas	Sub-areas	Opening Date	Quota		Landings		Closure Date
			(lb.)	(t)	(lb.)	(t)	
<u>NORTH COAST</u>							
LAREDO/ KITASU	6-14,-15,-18, -19,-25	Mar 1	330,000	149.7	327,849	148.7	May 10
PRICE IS	6-17, 7-23,-31	Mar 1	480,000	217.7	492,642	223.5	Apr 20
UPPER A:7	7-1,-4 to -17, -20,-22,-24	Mar 1	375,000	170.1	359,931	163.3	Sept 16
THOMPSON /HUNTER	7-18,-19, -21, -23	Mar 1	450,000	204.1	444,993	201.8	Apr 12
SPIDER ANCHORAGE	7-25 to -28	Mar 1	1,500,000	680.4	1,499,567	680.2	Jul 11
8	All sub areas	Mar 1	85,000	38.6	87,571	39.7	Jul 11
9 and 10	All sub areas	Mar 1	300,000	136.1	312,658	141.8	Sept 16
NORTH COAST DIVISION TOTAL:			3,520,000	1597	3,525,211	1599	

¹ landings from "Individual Quota" validated weights. Sales slips reported 1571 t landed for areas 6, 7, 8 and 10.

* 22 licences of 160,000 lb. for the north coast areas.

Appendix 1 (continued)

Table 1.3 1990 Geoduck management - Summary of South Coast quotas, validated landings¹ (tonnes) and fishing dates.

Management Unit		Opening Date	Quota		Landings		Closure Date
Statistical Area	Sub-areas		(lb.)	(t)	(lb.)	(t)	
INSIDE WATERS							
Area 14 - Excluding 14-13	excluding 14-13	Jan 3 - Feb 23 May 10 - June 30 Sept 14	870,000	394.6	884,146	401.0	Feb 23 June 30 ?
Area 14-13, Cape Lazo to Campbell River	14-13	July 1 Dec 16 ³	450,000	204.1	450,443	204.3	Sept 13 Dec 31
Area 16 - W. Texada	16-19 to 16-22	Feb 24	360,000	163.3	359,585	163.1	Apr 4
Area 16 - E. side Texada and mainland	16-1, 16-2, 16-11 and 16-18	April 5	200,000	90.7	202,090	91.7	May 10
Area 16 - Sechelt Inlet, Porpoise Harbour	16-5 to 16-9		40,000	18.1	32,174	14.6	Dec 15
INSIDE WATERS TOTAL:			1,920,000	870.9	1,928,438	874.7	
WEST COAST VANCOUVER IS.							
Area 24 - Inside	ptn. 24-6, 24-7 to 24-9	Jan 1 Nov ?	450,000	204.1	385,598	174.9	Feb 15 Dec 31
Area 24 - Outside	ptn. 24-6 and 24-4	Feb 15 Aug 11, Oct 30	650,000	294.8	658,278	298.6	Apr 5 Aug 17
Area 24 - Exposed	24-2, ptn. 124-3	Aug 18	50,000	22.7	50,459	22.9	Sept 14
Area 24 - Inlets	24-5, ptn -7, -10 to -12, -14 ²	Apr 16 Sept 15	100,000	45.4	95,034	43.1	Apr 30 Oct 29
Area 26 - Central	26-3 to 26-5, ptns of 26-2, -6, 126-1	April 13 July 21	850,000	385.6	847,702	384.5	Apr 30 Aug 10
Area 26 - North	26-7 to 26-10, ptn. 126-1	June 17	200,000	90.7	205,926	93.4	July 19
Area 26 - South	ptns of each: 26-1 26-2 and 26-6	Mar 1 July 20	300,000	136.1	299,891	136.0	Apr 12 July 20
Area 27 - Klaskish/ Klaskino	27-4 to 27-6 incl.	May 1	760,000	344.7	756,704	343.2	June 16
WEST COAST V.I. TOTAL:			3,360,000	640	3,299,592	1,497	
SOUTH COAST DIVISION TOTAL:			5,280,000	1,510	3,343,420	1,517	

¹ landings from "Individual Quota" validated weights. Sales slips reported 2394 t landed for South Coast areas.² inseason change from the management plan to accommodate live market harvest from areas 24-3, -10, -13 and -14.³ remaining Gulf quota from Area 16 - Sechelt/Propoise Hbr. taken from Area 14-13.

* 12 licences of 160,000 lb. for southern inside waters; 21 licences for the west coast of Vancouver Island.

Appendix 1 (continued)

Table 1.4 1990 Geoduck management - Summary of North Coast quotas, validated landings¹ (tonnes) and fishing dates.

Management Unit Statistical Areas	Sub-areas	Opening Date	Quota		Landings		Closure Date
			(lb.)	(t)	(lb.)	(t)	
NORTH COAST							
Area 3	all	June 26	210,000	95.3	170,526	77.4	?
Area 4	all	June 26	720,000	326.6	785,387	356.3	July 28
Area 5 - North	5-1 to 5-16	June 26	30,000	13.6	3,570	1.6	?
Area 5 - South	5-17 to 5-24	Mar 1	970,000	440.0	969,335	439.7	June 26
Area 6 - Upper	6-5, 6-9 to 6-13	Mar 1	1,590,000	721.2	1,589,866	721.2	June 25
NORTH COAST DIVISION TOTAL:			3,520,000	1,597	3,518,684	1,596	

¹ landings from "Individual Quota" validated weights.

* 22 north coast licence quotas of 160,000 lb.

Appendix 1 (continued)

Table 1.5 1991 Geoduck management - Summary of South Coast Inside Waters quotas, validated landings¹ (tonnes) and fishing dates.

Management Unit Statistical Area	Sub-areas	Opening Date	Quota		Landings		Closure Date
			(lb.)	(t)	(lb.)	(t)	
INSIDE WATERS							
15A	Savary north: ptn 15-2	Feb 21	87,000	39	87,886	40	Mar 26
15B	Savary south: ptn 15-2	Feb 21	17,625	8	17,669	8	Apr 19
15C	Hernando:ptns of -2 and -3	Feb 21, Sept 12	74,730	34	74,217	34	?
15D	Remaining subareas	Mar 26, Sept 12	389,735	177	389,866	177	Jun 3, Oct 19
17A	Nanoose: -18, -19, -20	Jan 29	108,000	49	107,238	49	Feb 18
17B	Balance of Area 17	Jan 1, Nov 19	293,085	133	291,887	132	Jan 28, Dec 31
29-5	29-5	Sept 5	30,000	14	30,195	14	Sept 20
18A	Boatswain Bank: ptn of 18-7	Nov 7	33,000	15	32,975	15	Nov 12
18B	Balance of Area 18	Oct 24	48,000	22	48,185	22	Nov 15
19	All except: 19-7 to -12	Jun 4	538,825	244	538,273	244	Sept 4
INSIDE WATERS TOTAL:			1,620,000	735	1,618,391	734	
SOUTH COAST TOTAL			4,455,000				

¹ landings from "Individual Quota" validated weights.

Appendix 1 (continued)

Table 1.6 1991 Geoduck management - Summary of west coast Vancouver Island quotas, validated landings¹ (tonnes) and fishing dates.

Management Unit Statistical Area	Sub-areas	Opening Date	Quota		Landings		Closure Date
			(lb.)	(t)	(lb.)	(t)	
20	Sooke: -5, ptn -6	July 6	2,871	1	2,871	1	Oct 11
24A	Inside: -7, -9, ptn -6	Jan 1	150,862	68	150,862	68	Jan 31
24A2	24-8, north ptn	Apr 25	70,000	32	69,561	32	Jun 30
24A3	24-8, south ptn	Oct 26	10,554	5	10,554	5	Oct 31
24B	Outside: ptn -6	Feb 1	360,000	163	361,235	164	Feb 18, Mar 25
24B2	Coomes Bank	Apr 3	160,000	73	161,641	73	Apr 19
24B3	Ahousat: ptn -4 and ptn -6	Feb 1, Oct 23	90,000	41	88,717	40	Mar 25, Oct 25
24B4	Russell Ch: ptn 24-6	Oct 11	72,129	33	73,610	33	Oct 25
25A	Esperanza: -9, -11, -12, ptn -13	Jan 1	560,000	254	563,186	255	May 24
25B	Nuchatlitz: -14, ptn 25-13	May 1, Sept 4	785,000	356	785,431	356	Jun 30, Oct 11
25C	Rosa Harbour: ptn 25-13	Jan 1, Apr 16	100,000	45	102,647	47	Feb 15
25D	Nootka Snd: -3 to -8, -15	Jan 1, Mar 5	100,000	45	97,033	44	Feb 28, Mar 7
26B1	Mission Grp: ptn 26-1	Nov 21	200,000	91	163,813	74	Dec 31
26B2	Mission Grp: ptn 26-1	Nov 21	25,152	11	25,231	11	Dec 16
26C	Kyuquot-Inlets: ptns -2, -3, -6	Nov 21	142,500	65	147,712	67	Dec 23
Mid-season overage adjustment ¹ :			5932				
WEST COAST TOTAL			2,835,000	1,283	2,804,104	1,272	
SOUTH COAST TOTAL			4,455,000				

¹ Quota from area 24 was transferred to area 26 due to a PSP closure late in the year. Quota overages were subtracted from the transfer total.

Appendix 1 (continued)

Table 1.7. 1991 Geoduck management - Summary of North Coast quotas, validated landings¹ (tonnes) and fishing dates.

Management Unit	Opening Date	Quota		Landings		Closure Date
		(lb.)	(t)	(lb.)	(t)	
QUEEN CHARLOTTE ISLANDS						
A:						
Skidegate (2-1)	Mar 1	133,000	60	83,898	38	Nov 8
Cumshewa (2-3)	Mar 1	185,000	84	188,949	86	Apr 29
Laskeek Bay (2-6 to 2-10)	Mar 1	140,000	64	142,389	65	Apr 24
Upper Juan Perez: (2-11, ptn 2-12)	Mar 1	308,000	140	307,198	139	Apr 20
Subtotal:		766,000	347	722,434	328	
B:						
Carpenter Bay (2-17)	Apr 30	113,000	51	173,594	79	²
Houston Stewart Ch.(2-18)	Apr 30	257,000	117	257,104	117	May 13
Luxana Bay (ptn. 2-19)	Apr 30	109,000	49	109,977	50	May 10
Howe Bay (ptn. 2-19)	Apr 30	106,000	48	29,394	13	May 15
Houston Stewart Ch.(2-31)	Apr 30	252,000	114	256,178	116	May 19
Gowgaia Bay(2-38 to 2-41)	Apr 30	22,000	10	23,304	11	May 19
Subtotal:		859,000	390	849,551	385	
C:						
Lower Juan Perez and Section Cove (2-12)	May 15	274,000	124	278,369	126	May 23
Skincuttle In.(2-14,-15)	May 15	296,000	134	297,976	135	May 29
Louscoone In.(2-32 to -34)	Apr 30	34,000	15	37,131	17	May 16
Flamingo In.(2-35 to -37)	Apr 30	20,000	9	21,527	10	May 17
Subtotal:		624,000	283	635,003	288	
D:						
Area 1	May 30	195,000	88	199,810	91	Aug 18
Upper 2W (2-63 to 2-100)	May 30	526,000	239	517,571	235	Nov 8
Subtotal:		721,000	327	717,381	325	
TOTAL 1991 NORTH COAST:		2,970,000	1,347	2,924,369	1,326	

¹ landings from "Individual Quota" validated weights.² two openings: Apr. 31 to May 3 ; May 23 to May 30

Appendix 1 (continued)

Table 1.8. 1992 geoduck management - Summary of Vancouver Island inside waters quotas, validated landings, and fishing dates. (16 management units)

Management Unit Statistical Areas	Description - Sub-areas	Opening Date	Quota		Landings		Closure Date	Comments
			(lb.)	(t)	(lb.)	(t)		
Area 11:	all sub-areas	closed	-	-	-	-	-	
Area 12:								
12-A	North Islands (12-10 to -13, ptn -16)	May 7	100,000	45	99,882	45	May 9	
12-B	Goletas Ch (12-15, ptn -16, Vancouver Is. shore)	closed	-	-	-	-	-	
12-C	South and East of Dillion Pt. to Ledge Pt. (12-17, ptn 12-16)	Jan 7					Feb 15	Herring closure
		May 2	130,000	59	129,969	59	?	Quota landed
12-D	Malcolm Is; Graeme Pt. to Black Bluff (a portion of 12-8)	Jan 24						
		Feb 24	125,000	57	125,032	57	Apr 13	
12-E	Malcolm Is; Trinity Bay (ptn 12-6, ptn 12-8)	Feb 27	201,000	91	202,258	92	Apr 13	
12-F	Malcolm Is. east and south (12-5, -18, ptn 12-6)	Mar 9	9,000	4	7,581	3	Apr 13	
12-G	Mainland Inlets (12-7, 12-27 to 12-48)	closed	-	-	-	-	-	
	AREA 12 TOTAL:		565,000	256	564,722	256		
Area 13:								
13-A	SE Quadra to Whiterock Pass (13-12 to -14 incl)	July 2	40,000	18	40,043	18	July 28	
13-B	Marina Island (ptn 13-15)	closed	-	-	-	-	-	
13-C	SW Cortes Island Whaletown to Sutil Pt. (portions of 13-14, 13-15 and 13-1)	July 2	112,000	51	111,994	51	?	
13-D	NW Cortes, east of Read Island to Rendezvous Island (13-16, 13-17)	July 2	20,000	9	20,013	9	July 20	
13-E	Other Sub-areas; Johnstone St. (13-32), Gowland Hbr (13-4), Willow Pt. (13-2), and Cape Mudge (13-1)	-	8,000	4	0	0		quota moved to 14C
	AREA 13 TOTAL:		180,000	82	172,050	78		
Area 14								
14-A	Shelter Pt. to Cape Lazo (ptn 14-13)	July 30	412,000	187	411,914	187	Oct 16	
14-B	Comox Bar and East shore of Denman Is. (ptn 14-7, 14-10 and ptn 14-9)	Oct 17	200,000	91	199,981	91	Dec 31	
14-C	Baynes Sound (14-11, 14-15, 14-8)	Oct 17	20,000	9	28,556	13	Dec 31	
	AREA 14 TOTAL:		632,000	287	640,451	291		
TOTAL INSIDE WATERS: 12 QUOTAS @ 114,750 LB. =			1,377,000	625	1,377,223	625		

Appendix 1 (continued)

Table 1.9. 1992 geoduck management - Summary of west coast Vancouver Island quotas, validated landings, and fishing dates (21 management units).

Management Unit	Description - Sub-areas	Opening	Quota		Landings		Closure	Comments
Statistical Areas		Date	(lb.)	(t)	(lb.)	(t)	Date	
Area 23:								
23-A	Maggie River shore (portions of 23-9, 23-10 and 23-11)	Apr 25	240,000	109	239,698	109	May 15	Quota landed
23-B	Toquart Bay - Pipestem Inlet (portion 23-	Dec 1	15,000	7	14,994	7	Dec 31	
23-C	Mayne Bay, Stopper Is., Bryant Is. (23-9, portion 23-10)	Dec 1	165,000	75	166,118	75	Dec 31	
23-D	North Sechart Channel, (Alma Russel clos (ptns of 23-6 and 23-8)	Jan 18					Feb 14	Herring closure
		Apr 25	145,000	66	142,245	65	May 15	Quota landed
23-E	Chain Group (ptns of 23-4, -5)	closed for 1992 rotation						Closed in 1992
AREA 23 TOTAL:			565,000	256	563,055	255		
Area 24:								
24-A	Inside (ptn 24-6, -7 and -9)	Jan 23	(285,000)				Feb 4	Herring closure
		May 9					May 13	PSP
		Oct 15	312,685	142	313,255	142	Oct 16	PSP
24-A2	Northern portion of 24-8	?	70,000	32	70,319	32	?	
24-A3	Southern portion of 24-8 Tonquin-Echachis-Wickaninish	May 14	30,000	14	28,214	13	May 16	Quota landed
24-B	Outside - portion of 24-6	Feb 21	275,000	125	275,489	125	Mar 8	Quota landed
24-B2	Coomes Bank	May 1	120,000	54	124,529	56	May 7	Quota landed
		Nov 9	65,937	30	64,709	29	Dec 31	Quota transfer from 27H
24-B3	Ahousat (ptns 24-4 and 24-6)	Oct 31	180,000	82	179,872	82	Nov 13	Quota landed
24-B4	Kutcous/Russell Ch (ptn 24-6)	closed						Closed in 1992
AREA 24 TOTAL:			1,053,622	478	1,056,387	479		

Table 1.9. (continued)

Management Unit Statistical Areas	Description - Sub-areas	Opening Date	Quota		Landings		Closure Date	Comments
			(lb.)	(t)	(lb.)	(t)		
Area 27:								
27-A	Quatsino (ptn 27-7, s.shore)	May 21					May 31	Summer exploratory closure
		Aug 12	100,000	45	99,204	45	Aug 21	Quota landed
27-B	Cliff to Lawn Pt. (ptn 27-2)	June 1	50,000	23	49,823	23	June 11	Quota landed
27-C	Forward Inlet (27-3)	closed						Closed in 1992
27-D	Kains Island (ptn 27-1)	June 1	70,000	32	69,116	31	June 11	Quota landed
27-E	San Joseph Bay (ptn 27-1)	June 1	175,000	79	174,379	79	June 25	Quota landed
27-F	Sea Otter Cove (ptn 27-1)	June 1	50,000	23	49,037	22	Aug 12	Quota landed
27-G	Outside Exploratory (ptn 27-1, ptn 27-2)	June 1	(130,000)		0	0	Aug 12	no landings - quota moved to 23-C
27-H	Klaskino Inlet (27-5)	May 27	(340,000)			0	May 31	Summer exploratory closure
		Aug 12					Aug 13	PSP
		Sept 15	66,378	30	66,378		Sept 10	PSP - quota moved to area 24
27-I	Klaskish Inlet (27-6)	May 27					May 31	Summer exploratory closure
		Aug 12	165,000	75	166,379	75	Aug 15	Quota landed
AREA 27 TOTAL:			676,378	307	674,316	306		
TOTAL:			2,295,000	1,041	2,293,758	1,040		

** Note: 1992 Quota Options Included:

- ¹ Area 23-C - Mayne Bay quota was to be increased to 165,000 lb if quota not achieved in Area 27-G.
- ² Area 23-E - Chain Group was to be fished if quota not achieved in Areas 27-B or 27-D.
- ³ Area 27-H (Klaskino) was closed due to PSP so remaining quota was transferred to portions of Area 24.
 - Area 24-A plus 27,685 lb. = 312,685 lb.
 - Area 24-B2 plus 65,937 lb. = 185,937 lb
 - Area 24-B3 plus 180,000 lb. = 180,000 lb.

Appendix 1 (continued)

Table 1.10. 1992 geoduck management - Summary of North Coast quotas, validated landings, and fishing dates.

Management Unit Statistical Areas	Description - Sub-areas	Opening Date	Quota		Landings		Closure Date	Comments
			(lb.)	(t)	(lb.)	(t)		
Area A:								
McMullin Group	7-18	Mar 1	131,000	59	133,692	61	Mar 11	
McNaughton Group	7-25 - E. of Queens Snd.	Mar 1	301,000	137	302,173	137	Apr 2	
Goose Island	7-25 - Goose Is shore	Mar 1	50,000	23	50,991	23	Apr 2	
Spider Anchorage	7-27 - W. of Kildidit Snd.	Mar 1	442,000	200	441,084	200	Mar 29	
AREA A TOTAL:			924,000	419	927,940	421		
Area B:								
Seaforth Channel	7-8, 9, 12, 22	May 1	111,000	50	109,493	50	May 15	
Cape Mark	7-32	May 1	120,000	54	121,076	55	May 5	
Princess Alice	7-20	May 1	50,000	23	50,693	23	May 11	
Thompson Bay	7-19, 21	May 1	49,000	22	49,362	22	May 6	
Joassa Channel	7-23, 24	May 1	50,000	23	50,715	23	May 11	
AREA B TOTAL:			380,000	172	381,339	173		
Area C:								
Nalua Pass	7-26, 7-27 - E. of Kildidit S.; 8-4	Upon closure	197,000	89	199,202	90	Apr 14	
Choked Pass	8-1 N. of Dublin Pt.; 8-3	of Areas	148,000	67	150,809	68	Apr 5	
Fitzhugh Sound	8-16, 9-12	A and B	32,000	15	31,770	14	Apr 23	
Calvert I. (Up)	9-1 W. - N. of Harold Pt.		50,000	23	50,150	23	Apr 23	
Calvert I. (Lo)	9-1 W. - Clark Pt. to Harold Pt. 10-1, 10-2		40,000	18	40,040	18	Apr 27	
Smith Inlet	10-3, 10-4		47,000	21	45,578	21	Apr 28	
AREA C TOTAL:			514,000	233	517,549	235		
Area D:								
N. Aristazabal	6-11, 14, 15	Aug 25	70,000	32	77,373	35	Sept 3	
Laredo Inlet	6-19; 6-16E. -N. of Meyers Pt.	Oct 7	57,000	26	56,602	26	Oct 29	
Kitasu Bay	6-18	Dec 16	20,000	9	16,833	8	?	
Higgins Pass	6-16 East. -S. of Wilby Pt.; Upper 6-17	Oct 29	151,000	68	141,174	64	Dec 15	
E. Arist.I.(Up)	6-16 - Aristazabal Is. shore	Sept 21	50,000	23	49,383	22	?	
E. Arist.I.(Lo)	6-17 and Lower 6-13 - Aristazabal Is. shore	Aug 24	53,250	24	99,430	45	Oct 9	150,000 moved to Price Is (Lo)
Price Isl. (Up)		Aug 17	50,000	23	3,432	2	Aug 25	
Price Isl. (Lo)	6-17 - Price Is. shore	Jul 27	300,000	136	300,253	136	Aug 15	+150,000 lb from E. Arist.Is (Lo)
Milbank Sound	7-1, 2 - Price Is. shore, 7-3, 7-31	Apr 14	70,000	32	71,459	32	Apr 25	
AREA D TOTAL:			821,250	373	815,939	370		
NORTH COAST TOTAL: 23 QUOTAS @ 114,750 LB. =			2,639,250	1,197	2,642,767	1,199		

APPENDIX 2

ANNUAL HARVEST AREAS BY DISTRICT AND MANAGEMENT AREA

APPENDIX 2. ANNUAL HARVEST AREAS BY DISTRICT AND MANAGEMENT AREA

Table 2.1. North Coast (Queen Charlotte Islands District) cumulative harvested area, cumulative number of beds fished, and new beds fished per year for geoducks, 1980 to 1990.

Year	Management Area									Annual Summary		
	1			2E			2W			area (ha)	# beds	new beds
	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds			
1980				62	3	(3)				62	3	(3)
1981				62	3	(0)				62	3	(0)
1982				62	3	(0)				62	3	(0)
1983				62	3	(0)				62	3	(0)
1984				81	4	(1)				81	4	(1)
1985				536	21	(17)	91	6	(6)	627	27	(23)
1986				640	28	(7)	170	14	(8)	810	42	(15)
1987	47	2	(2)	729	37	(9)	188	14	(0)	964	53	(11)
1988	102	2	(0)	952	61	(21)	346	25	(11)	1400	88	(35)
1989 ¹	79	2	(0)	645	61	(0)	346	25	(0)	1070	88	(0)
1990	79	2	(0)	645	61	(0)	346	25	(0)	1070	88	(0)

¹ Bed sizes and closed beds were adjusted after consultation with industry

Appendix 2 (continued)

Table 2.2. North coast (Prince Rupert District) cumulative harvested area, cumulative number of beds fished, and new beds fished per year for geoducks, 1980 to 1990.

Year	Management Area									Annual Summary		
	3			4			5			area (ha)	# beds	new beds
	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds			
1980				140	1	(1)				140	1	(1)
1981				140	1	(0)	81	3	(3)	221	4	(3)
1982				140	1	(0)	81	3	(0)	221	4	(0)
1983				140	1	(0)	81	3	(0)	221	4	(0)
1984				140	1	(0)	387	6	(3)	527	7	(3)
1985				194	1	(0)	414	6	(0)	608	7	(0)
1986	58	6	(6)	266	6	(5)	431	6	(0)	755	18	(11)
1987	59	7	(1)	290	8	(2)	430	6	(0)	779	21	(3)
1988	67	8	(1)	314	12	(4)	480	8	(2)	861	28	(7)
1989	67	8	(0)	314	12	(0)	480	8	(0)	861	28	(0)
1990 ¹	67	8	(0)	142	18	(6)	408	11	(3)	617	37	(9)

¹ Some very large beds with low landings were scaled down after consultation with fishermen.

Appendix 2 (continued)

Table 2.3. North Coast (Central Coast District) cumulative harvested area, cumulative number of beds fished, and number of new beds fished per year for geoducks, 1980 to 1990.

Year	Management Area												Annual Summary					
	6			7			8			9			10			area (ha)	# beds	new beds
	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds			
1980									34	1	(1)				34	1	(1)	
1981				146	9	(9)	3	1	(1)	34	1	(0)				183	11	(10)
1982				284	13	(4)	5	2	(1)	34	1	(0)				323	16	(5)
1983	29	2	(2)	297	17	(4)	5	2	(0)	34	1	(0)				365	22	(6)
1984	29	2	(0)	297	17	(0)	5	2	(0)	34	1	(0)				365	22	(0)
1985	72	3	(1)	429	20	(3)	62	2	(0)	34	1	(0)				597	26	(4)
1986	110	5	(2)	527	24	(4)	73	4	(2)	37	2	(1)	27	3	(3)	774	38	(12)
1987	328	19	(14)	571	26	(2)	73	4	(0)	39	3	(1)	92	6	(3)	1103	58	(20)
1988	354	26	(7)	584	28	(2)	136	13	(9)	39	3	(0)	92	6	(0)	1205	76	(18)
1989	412	28	(2)	855	46	(18)	137	14	(1)	39	3	(0)	99	6	(0)	1542	97	(21)
1990 ¹	592	39	(11)	584	45	(0)	109	14	(0)	16	3	(0)	33	5	(0)	1334	106	(11)

¹ Some very large beds with low landings were scaled down after consultation with fishermen.

Appendix 2 (continued)

Table 2.4. Mainland and east coast Vancouver Island (Campbell River District) cumulative harvested area, cumulative number of beds fished, and number of new beds fished per year for geoducks, 1978 to 1990.

Year	Management Area									Annual Summary		
	11			12			13			area (ha)	# beds	new beds
	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds			
1978							254	2	(2)	254	2	(2)
1979				44	2	(2)	488	10	(8)	532	12	(10)
1980				44	2	(0)	540	15	(5)	584	17	(5)
1981				44	2	(0)	540	15	(0)	584	17	(0)
1982				44	2	(0)	540	15	(0)	584	17	(0)
1983				44	2	(0)	540	15	(0)	584	17	(0)
1984	*			120	12	(10)	600	18	(3)	720	30	(13)
1985	*			745	21	(9)	730	18	(0)	1475	39	(9)
1986	*			806	24	(3)	744	23	(5)	1550	47	(8)
1987				872	30	(6)	744	23	(0)	1616	53	(6)
1988	34	10	(10)	889	33	(3)	787	27	(4)	1710	70	(17)
1989	39	10	(0)	1000	44	(11)	860	27	(0)	1899	81	(11)
1990 ¹	39	10	(0)	893	44	(0)	581	27	(0)	1513	81	(0)

* landings reported on sales slips for area 11 but not on harvest logs.

¹ Very large beds with low landings were scaled down after consultation with fishermen and beds in contaminated closures were removed from calculations.

Appendix 2 (continued)

Table 2.5. Mainland and east coast Vancouver Island (Nanaimo & Victoria Districts) cumulative harvested area, cumulative number of beds fished, and number of new beds fished per year for geoducks, 1978 to 1990.

Year	Management Area												Annual Summary								
	14			15			16			17			18			19			area (ha)	# new beds	beds
	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds	area (ha)	# beds	new beds			
1978	2097	7	(7)	586	7	(7)	200	5	(5)	263	5	(5)				595	3	(3)	3741	27	(27)
1979	2810	13	(6)	711	9	(2)	615	14	(9)	418	10	(5)				619	4	(1)	5173	50	(23)
1980	2976	16	(3)	711	9	(0)	758	19	(5)	614	19	(9)	90	2	(2)	842	10	(6)	5991	75	(25)
1981	3114	21	(5)	733	10	(1)	821	24	(5)	685	26	(7)	98	3	(1)	842	10	(0)	6293	94	(19)
1982	3154	22	(1)	733	10	(0)	826	25	(1)	688	27	(1)	98	3	(0)	842	10	(0)	6341	97	(3)
1983	3154	22	(0)	733	10	(0)	826	25	(0)	708	28	(1)	98	3	(0)	842	10	(0)	6361	98	(1)
1984	3154	22	(0)	755	12	(2)	857	28	(3)	757	31	(3)	98	3	(0)	842	10	(0)	6463	106	(8)
1985	3772	26	(4)	916	12	(0)	888	28	(0)	733	36	(5)	80	3	(0)	774	10	(0)	7163	115	(9)
1986	3775	26	(0)	916	12	(0)	1012	30	(2)	751	39	(3)	133	5	(2)	839	13	(3)	7426	125	(10)
1987	4120	29	(3)	964	13	(1)	1042	32	(2)	758	41	(2)	137	10	(5)	897	13	(0)	7918	138	(13)
1988 ¹	4132	29	(0)	1074	21	(8)	963	28	(0)	773	44	(3)	137	10	(0)	897	13	(0)	7976	145	(7)
1989 ²	4204	33	(0)	855	21	(0)	909	24	(0)	710	42	(0)	112	7	(0)	796	12	(1)	7586	139	(0)
1990 ³	2998	33	(0)	855	21	(0)	882	31	(7)	636	42	(0)	112	7	(0)	796	12	(0)	6279	146	(7)

¹ area 16, 1988, correction of statistical area boundary resulted in fewer beds and hectares.

² beds in contaminated and study areas were removed.

³ some bed areas were recalculated in 1990 after consultation with fishermen.

Appendix 2 (continued)

Table 2.6. Mainland District (Fraser River) cumulative harvested area, cumulative number of beds fished, and number of new beds fished per year for geoducks, 1986 to 1990.

Year	Management Area						Annual Summary		
	28			29			area (ha)	# beds	new beds
	area (ha)	# beds	new beds	area (ha)	# beds	new beds			
1986				12	3	(3)	12	3	(3)
1987	28	2	(2)	145	7	(4)	173	9	(6)
1988	28	2	(0)	155	7	(0)	183	9	(0)
1989 ¹	28	2	(0)	128	7	(0)	156	9	(0)
1990	28	2	(0)	128	7	(0)	156	9	(0)

¹ statistical boundaries adjusted in 1990 analysis.

Appendix 2 (continued)

Table 2.7. West Coast Vancouver Island (Management Areas 20 to 27) cumulative harvested area and cumulative number of beds fished, and number of new beds fished per year for geoducks, 1978 to 1990.

Year	Management Area															Annual Summary					
	20			23			24			25			26			27			area	#	new
	area	#	new	area	#	new	area	#	new	area	#	new	area	#	new	area	#	new	area	#	new
	(ha)	beds	beds	(ha)	beds	beds	(ha)	beds	beds	(ha)	beds	beds	(ha)	beds	beds	(ha)	beds	beds	(ha)	beds	beds
1978	*						265	2	(2)							265	2	(2)			
1979				203	5	(5)	1021	13	(11)	66	1	(1)				1290	19	(17)			
1980	*			316	11	(6)	1232	20	(7)	410	3	(2)	215	4	(4)				2173	38	(19)
1981	*			370	14	(3)	1256	23	(3)	444	6	(3)	215	4	(0)	35	1	(1)	2320	48	(10)
1982	*			422	19	(5)	1488	31	(8)	444	6	(0)	268	11	(7)	35	1	(0)	2657	68	(20)
1983				466	25	(6)	1507	32	(1)	456	7	(1)	327	14	(3)	64	2	(1)	2820	80	(12)
1984				476	26	(1)	1520	33	(1)	926	10	(3)	366	20	(6)	64	2	(0)	3352	91	(11)
1985	*			578	40	(14)	2565	41	(8)	1067	13	(3)	441	20	(0)	623	27	(25)	5274	141	(50)
1986	280	2	(2)	610	44	(4)	2704	49	(8)	1172	30	(17)	454	23	(3)	638	28	(1)	5858	176	(35)
1987	280	2	(0)	622	45	(1)	2874	57	(8)	1191	30	(0)	582	29	(6)	677	28	(0)	6226	191	(15)
1988	347	4	(2)	649	49	(4)	2908	62	(5)	1223	33	(3)	583	29	(0)	878	37	(9)	6588	214	(23)
1989 ¹	347	4	(0)	660	56	(7)	2638	70	(8)	1243	34	(1)	584	29	(0)	882	36	(0)	6354	229	(16)
1990 ¹	347	4	(0)	509	56	(0)	2562	77	(7)	1108	34	(0)	652	38	(9)	770	39	(3)	5948	248	(19)

* landings for area 20 recorded on sales slips but not on harvest logs.

¹ Some areas were recalculated after consultation with fishermen.

Some beds with no landings or within closed areas (i.e. Sea Otter Reserve or contaminated areas) were removed from calculations.

APPENDIX 3

1992 GEODUCK FISHERY QUOTAS AND QUOTA OPTIONS

APPENDIX 3. 1992 GEODUCK FISHERY QUOTAS AND QUOTA OPTIONS

1.0 SOUTH COAST - 1992 QUOTA RECOMMENDATIONS

For 1992, the first season of the three year rotation, the fishery was planned for Areas 11, 12, 13 and 14 in Inside Waters and Areas 23, 24 and 27 on the west coast of Vancouver Island.

A summary of recommended quotas are presented in Tables 13 and 14. Detailed quota options and recommendations for the south coast are presented in Tables 3.1 to 3.37.

1.1 South coast- Inside Waters-1992 Quota Recommendations

Area 11 (Figs. 1,3) Subarea 11-2
10 beds; 39 ha estimated

This Area was first opened in 1985 for an exploratory fishery. It open was each summer to 1988, then in Feb. 1989 with a three year quota of 75,000 lb. (Table 3.1). This quota could not be achieved by the fishers and the mainland Area 12 exploratory quota of 75,000 lb. and the Area 11 quota were combined.

Considering the reported landings of 116 t on sales slip reports, 28 years of quota has been landed if the original density was 1 geoduck/m² over 39 ha (Table 16). Fishermen supported a closure of this area and recommended periodic rotations.

RECOMMENDATION 11: Fishery closure in 1992 and until further evaluation is carried out. The fishery has only been reported from one subarea, 11-2.

Area 12 (Fig. 1)
41 beds*, 893 ha in total for all subareas
(*3 additional beds are under contaminated closures)

Area 12 was first fished in 1979. There were minor landings in 1982 and 1983.

In 1984, a major fishery developed and 302 t were landed by 15 vessels. There was no quota set for Area 12 in 1984; it was an exploratory fishery.

In 1985, area 12 was divided into 2 areas; 12-North subareas 12-11,-12,-15,-16 and 12-South, subareas 12-1 to 12-10, 12-13,-14,-17 to -48 (Fig. 3). Landings increased to 490 t. Nineteen beds were identified in 1984 and 1985, measuring 745 ha (Appendix 2, Table 2.4).

Over the period 1986 to 1988, a quota of 400,000 lb. was set for Area 12, with no division into subquotas. Vessels could fish in any location with no restrictions on landings other than the area quota.

A three year rotation was initiated in 1989 as part of the trial period for Individual Vessel Quotas. In 1989, the Area 12 quota was 1,395,000 lb., subdivided into two sub-quotas: 75,000 lb. to a mainland Area 12 exploratory area (Fig. 3) and 1,320,000 lb. to other subareas. The mainland exploratory quota increased when the 75,000 lb. quota could not be achieved in Area 11. Area 12 was closed in 1990 and 1991 as part of a three year rotation plan (Table 12). Eleven new beds were identified in 1989 as part of the exploratory fishery, and additional area charted to existing beds, for 111 ha, in the islands north of Port Hardy and northern Goletas Channel.

By 1990, there were 44 beds, 1000 ha identified for Area 12 (Appendix 2, Table 2.4). Following a review in 1991, this was reduced to 41 beds and 893 ha due to contaminated closures in Hardy Bay and Beaver Harbour and the removal of a bed fronting an Indian Reserve at Thomas Point.

Log returns for Area 12 total 1734 t (73%) compared to sales slip returns of 2372 t.

Note: 1982 had 83 t reported on sales slips, but no log returns. This is to be investigated further.

There is concern that most of the fishing activity in recent years has been out of Port Hardy and that the beds in Goletas Channel have been heavily exploited. As a consequence effort was be in 1992 to the south of Hardy Bay and around Malcolm Island.

AREA 12 - 1992 QUOTAS AND OPTIONS

AREA 12-A northern islands, subareas 12-10 to -13, ptn. -16
18 beds, 98 ha Fig. 3
(previously 77 ha)

The islands northeast of Port Hardy, (12-10 to 12-13 inclusive) have 18 beds reported with an area of 98 ha.

This area was heavily fished in 1989 with high removals, up to 1.99 geoducks/m² in one small bed of 1 ha in one season. Harvest logs report 905,533 lb. over 6 years fishing (8 years quota with three year quota 88/89/90), equivalent to 39 years of quota (Table 3.2) at 23,000 lb./year (1% harvest rate @ 1 geoduck/m² over 98 ha).

The fishers suggested that there may be exploratory fishing opportunities in the area of Bates Passage and Vansittart Island, subarea 12-12.

RECOMMENDATION:12-A: A management decision was made to allow a 100,000 lb. fishery for 1992 based on the advice of the fishers that this area has substantial stocks.

Based on the data (Table 18), it was initially recommended that there be no fishery for this area in 1992. A further evaluation is required for this area before the next rotation.

To support the level of fishing, 8 years, 1984-1991, original densities of 5.3 geoducks/m² would be required over 98 ha (Table 16).

Area 12-B Vancouver Island, Hope and Nigei Island in Goletas Channel; subarea 12-15 and the Vancouver Island shore of 12-16 13 beds, 116 ha Fig. 3

There are high rates of removals, 2.2 geoducks/m² in a 5 ha bed, over three seasons.

i) In subarea 12-15, there are 12 sites coded as one bed along the Vancouver Island shore of Goletas Channel, measuring 31 ha; there are two sites at Nigei Island, one that has been measured at 15 ha but fished only once in 1984, for less than 10,000 lb. This site should be reduced in area to 2 ha; 2 beds, 33 ha a reduction from 46 ha or -13 ha. The other bed is only 1 ha. There is one bed at Hope Island for 8 ha.

ii) In subarea 12-16, in Goletas Channel along the Vancouver Island shore there are 11 sites forming 3 beds measuring 48 ha.

iii) Hardy Bay is under contamination closure:

iv) In subarea 12-16, from Daphne Point to Dillon Point including the Masterman Islands; 4 beds assigned 20 ha; originally measured 36 ha, one bed at Masterman Islands was reduced to 5 ha (<20,000 lb. landed in four years) from 21 ha; -15 ha.

RECOMMENDATION: 12-B: No fishery in 1992 and should remain closed pending further evaluation.

The quota options (Table 3.3) for 116 ha: @ 1 geoduck/m² = 27,000 lb.

Landings of 2,136,359 lb, = 78 years of quota landed if original density was 1 geoduck/m². The fishery has taken place over 9 years, 1983 to 1991; an original density of 9.8 geoducks over 116 ha would be required (Table 16).

Area 12-C South and east of Dillon Pt. to Ledge Pt.; subareas 12-17 and a portion of 12-16 Fig. 3
2 beds, 181 ha

Subarea 12-17, False Head to Singletree Point has 178 ha of reported fishing area, with low landings. The shore from Singletree Pt. to Ledge Pt. has only one small bed identified of 3 ha at Cluxewe River.

A separate quota was set for this area in 1992. Fishers felt that the concentrations were probably not as good as Goletas Channel beds, but may provide steady production. They suggested including the Deer Islands and the 'airport' with this quota. Beds previously described in Beaver Harbour are in a contaminated closure. A small bed (13 ha) in the vicinity of the airport fronts an Indian Reserve at Thomas Point. Fishers agreed to restrict harvest in beds fronting the Reserve. Boundaries should be reviewed for discussion with fishers, from the small immediately south east of Dillon Point to Ledge Pt.

RECOMMENDATION 12-C: The 1992 quota set was 130,000 lb. ; the calculated option: 122,000 lb. (Table 3.4).

Area 12-D Malcolm Island, Graeme Pt. to Black Bluff; a portion of 12-8; 5 beds, 175 ha Fig. 4

This area includes a portion of subarea 12-8, Graeme Point to Black Bluff that has large beds identified to support a quota of 246,000 lb.

Area 12-D has had large landings, 400,000 lb. in a season, 1985 (see additional comments on table 3.5).

Fishers expressed concerns about the exposure to weather and vessel running time and thought this area was rocky in the shallows with perhaps good substrate for geoducks deeper.

RECOMMENDATION: 12-D: The 1992 quota set was 125,000 lb., less than the calculated option (Table 3.5). Fishers were uncertain about stock in this area and advised that the measured area may be too large.

Area 12-E Malcolm Island, Trinity Bay; portions of 12-6 and 12-8; 1 bed, 300 ha Fig. 4

Trinity Bay, Boulder Point to Lizard Point (a portion of 12-6) had concerns expressed similar to 12-D. This is a very large exposed bed and the area of the bed may be over-estimated. Fishers felt that Trinity Bay was rocky out to 30 feet in depth.

RECOMMENDATION 12-E: The 1992 quota set was 201,000 lb. only slightly less than the calculated quota of 210,000 lb. (Table 3.6). This may still be too high since the area identified (300 ha) is very large relative to the fishing to date.

Area 12-F Malcolm Island - east and south, subareas 12-5, 12-18, a portion of 12-6; 2 beds, 13 ha Fig. 4

Lizard Point to Donegal Head (one bed), and subarea 12-18 (one bed) could support a quota of 9,000 lb.

The fishers interviewed had no knowledge of geoduck beds in Areas 12-1 to 12-5. A bed in 12-1 was reported in the past, but no landings were reported on logs to support it.

RECOMMENDATION 12-F: The 1992 quota set was 9,000 lb.; the calculated option (Table 3.7).

Area 12-G Mainland Inlets; Subareas 12-7, 12-27 to 12-48; Fig. 3 1 bed, 10 ha

There are additional beds identified (another 10 ha), but without reported logbook landings (Hopetown Pass; Kenneth Pass; Turnbull Cove; Kinnard Island). The advisory committee commented that surveying had found little stock in Wells Passage area.

RECOMMENDATION 12-G: This area should be closed until further evaluation.

AREA 12 TOTAL 1992-93-94: 565,000 lb. (Table 13).

This compares to 1,458,933 lb. in 1989-90-91 (Appendix 1, Table 1.1).

Area 13 (Figure 1)

Area 13 has been fished consistently since 1977, at the start of the fishery. Landings have fluctuated according to quota patterns.

Quotas for Area 11, 12 and 13 were combined in 1980. A separate quota of 40,000 lb. was set in 1981. No area restrictions were set in 1982 and 1983.

In 1984, a quota of 200,000 lb. was set for Area 13. In 1985 Area 13 was divided into 2 units: 13-A, subareas 13-1 to 13-27 for a quota of 200,000 lb. and 13-B subareas 13-28 to 13-43 inclusive as exploratory (Fig.5).

In 1986, Area 13 was divided again for different timed openings , 13-A: 13-1 to 13-27, 13-1 to 13-17 and 13-B: subareas 13-10, 13-18 to 13-43 (Fig.5).

In 1987, Area 13 was divided again, with three timed openings and a total quota of 200,000 lb.

The Area 13 quota was reduced to 150,000 lb. in 1988, with two areas and two openings.

In 1989, Area 13 had a three year quota of 450,000 lb. (3 x 150,000 lb. annual quota) with no division of the area. Area 13 was then closed in 1990 and 1991. No new beds or fishing ground were identified in 1989. **Twelve beds were fished in 1989 and 61% of the landings came from Marina Island.**

There were 27 beds, 860 ha were identified for Area 13 up to 1990. Following a review in 1991, this was reduced to 23 beds and 721 ha. In 1991, we identified contaminated closures at Manson's Landing, 29 ha; and in 13-2 south of Campbell River, 30 ha; and reduced the area at Breton Islands (less 12 ha). **Area 13 log returns total 1043 t (96%) compared to sales slip returns of 1090 tonnes.**

The fishers advise that there is not much stock other than the beds at Marina Island. The majority of landings (71%) over time from Area 13 have been from the two Marina Island beds. The fishers advised that the Marina Island beds are similar in density and the log data supports this in that the rates of removals from both beds are the same. Fishers expressed concern about sustaining the level of harvest in these beds.

In years of fishing, the highest landings from Marina Island has been 362,785 lb.. The highest landings in a season from other beds combined was 177,900 lb. in 1989. Previous to that the highest for other beds combined was 101,381 lb. in 1979.

It may be that the densities at Marina Island are greater than other beds in Area 13, and an original density greater than 1 geoducks/m² on average. There are two beds for 316 ha, total landings of 1,641,212 lb.; 22.2 years of quota at a density of 1 g/m² or 11.1 years at 2 g/m².

AREA 13-1992 QUOTAS AND OPTIONS

Area 13-A SE Quadra to Whiterock Pass; Subareas 13-12 to -14
7 beds, 60 ha (1992); Fig. 5

A portion of 13-14, southeast Quadra Island to Whiterock Pass was proposed for a rotational quota of 117,000 based on 1991 measurements of 164 ha.

Fishers felt the quota was too large for the area. Much of the bottom is muddy. After much discussion with the fishers, it was determined that this area was well surveyed with poor production and had generally small spots with low densities. The 3 beds reported from Francisco Point to Rebecca Spit on logs area likely over-estimated and area should be reduced based on formula of density of removals. The bed near Whiterock Pass should also be reduced in area.

The highest season landing for this location was 38,000 lb. in 1989.

RECOMMENDATION 13-A: A quota of 40,000 lb. was set for 1992 based on the calculations:

60 ha x 235 lb. = 14,100 lb. x 3 years = 42,300 lb. (Table 3.8).

Area 13-B Marina Island Beds, portion 13-15; Fig. 5
2 beds, 316 ha

The two beds surrounding Marina Island have been heavily fished and account for 71% of all landings reported for Area 13.

RECOMMENDATION 13-B: No fishery in 1992.
Total landings of 1,641,212 lb. on logs. (Table 3.9).

Area 13-C SW Cortes Island, Whaletown to Sutil Point
portions of subareas 13-14, 13-15 and 13-1; Fig. 5
4 beds, 160 ha

This area has not been as heavily fished as Marina Island.

RECOMMENDATION 13-C: A quota of 112,000 lb. was set (Table 3.10).
160 ha x 235 lb. = 37,600 lb. x 3 years = 112,800 lb.

Area 13-D NW Cortes, east of Read Island to Rendezvous Island,
Subareas 13-16 and 13-17 ; Fig. 5
9 beds, 34 ha

This unit has 9 small beds with 34 ha reported on logs and minor landings. Initially proposed a separate quota of 66,000 lb. based on original area of 94 ha. Fishers reported hard digging (mud) and spotty concentrations.

The highest annual landings for this location was 41,000 lb. in 1979.

RECOMMENDATION 13-D: The 1992 quota set was 20,000 lb. (Table 3.11).

Area 13-E Other subareas: Johnstone Strait (13-32); Gowland Harbour (13-4); Willow Point (13-2) and Cape Mudge (13-1)
4 beds, 11 ha Fig. 5

Fishers felt there was not a suitable fishing area from Boulder to Willow Point area; too rocky. A large bed had been identified at Cape Mudge, with no landings on logs but no one in the advisory committee had experience there. The fishers agreed that Wilby Shoals may have some stock.

Mitlenatch Island (in 13-1) may have stock, but fishing to date has only identified beds in the subarea 15-03 near the island. The question of fishing in the vicinity of the provincial park will have to be discussed.

The fishers of the advisory committee were not aware of any beds in the area of Kelsey Bay, subarea 13-32.

RECOMMENDATION 13-E: A quota of 8,000 lb. was set for 1992 (Table 3.12). Fishers were unable to find suitable fishing area. This quota was transferred in-season to Area 14-C.

Area 13 TOTAL-1992 three year quota was 180,000 lb. (Table 13). This compares to 450,000 lb. in 1989-90-91, Appendix 1, Table 1.1). This reduction was due to the closure at Marina Island.

CONTAMINATED AREAS - Area 13

In Area 13, two beds were permanently closed, 29 ha in Manson's Landing and approximately 31 ha in Willow Point area. There is also a seasonal closure at Drew Harbour, May 1 to September 30, due to potential contamination from recreational boating activities.

1 bed (4 sites coded), 25 ha estimated

Area 14 (Figure 1)
33 beds, 3028 ha estimated

Area 14 has been fished since 1976, 3174 t to 1991 for approximately 25% of the landings from inside waters (Table 3). Landings have usually been from 200 to 300 t, peaking in 1983 at 340 t (750,000 lb.).

The area of commercial fishing ground was assumed to be very large from the beginning (Appendix 2, Table 2.5), over 2000 ha in 1978. By 1991, we estimated 4204 ha over 38 beds; 55% of the area measured for Inside Waters (7668 ha) and more than all of the north coast (3470 ha over 212 beds in 1989; Table 10).

In Area 14, quotas have been set for most years for all subareas. In 1980, Area 14 was 400,000 lb.; in 1981 300,000 lb, in 1984 400,000 lb.; 1985 400,000 lb.; 1986 400,000 lb.

In 1987, Area 14 was divided so that the portion of the area from Cape Lazo to north of Oyster river, subarea 14-13 (Fig. 6) had a summer opening for 100,000 lb. **This quota was taken in six days by 15 vessels.**

In 1988, Area 14 was divided again, with the area to the north of Cape Lazo increased to 200,000 lb. (The area measured on the harvest logs was 1323 ha, assuming an average density of 1 gdk/m² the quota would calculate to 310,905 lb.; this area is likely grossly over-estimated.

As part of a three year rotation (Table 11), Area 14 was closed in 1989. It was then fished in 1990, with a three year quota of 1,320,000 lb. (3 x 440,000 lb.; 3 x 199.6 t = 598 t) (Appendix 1).

AREA 14-1992 QUOTAS

Area 14-A Cape Lazo north to Shelter Point; subarea 14-13;
 6 beds, 1151 ha (1991) Fig. 6

This southern portion, Oyster River to Cape Lazo was fished 5 years; 1978, 1979, was not fished again until the fleet was forced to by subdividing Area 14 in 1987, 1988 and 1990. Oyster Bay was fished seven years, in 1978 to 1982, 1984 and 1988.

Without subarea quota divisions, substantial landings came from this portion in 1990; 346,160 lb. on logs (approx. 77% of the 1990 Area 14 quota).

This is a large area to fish and long runs to offloading facilities at either Comox or Campbell River. From Cape Lazo to Shelter Point is approximately 12 nautical miles (22 km). The bottom is mostly sand and due to the exposure of the shore to winds

and wave action, the shows of clams are poor in winter.

The historical quotas for this area were 100,000 lb. and 200,000 lb. The last fishery (1990) took approx. 350,000 lb.

Fishers advise that there are clams all along the shoreline although sometimes spotty.

RECOMMENDATION 14-A: A quota of 412,000 lb. was set for 1992. This area should be evaluated and surveyed. It is one of the largest measured areas (1151 ha) and largest quota assigned for inside southern waters (Table 3.13).

The 1992 quota was arrived at arbitrarily by evaluating all inside waters for 1992-1993 and considering a 15% reduction of quotas in each year. The quota assigned in 1992 is far less than the quota option in Table 3.13, which appears to be grossly inflated.

Area 14-B Comox Bar: bed south of Pallisar Rock; portions of subareas 14-7, 14-9 and 14-10; Fig. 6
3 beds; 328 ha (some area under contaminated closure)
(#4601: 93 ha, 4901: 256 ha and 4902: reduced to 25 ha)

The large bed at Comox Bar (4601) is partially under closure for sewage contamination. This is a large bed, originally assigned 769 ha. It was remeasured and reduced according to the contaminated closure and advice from the fishers. The bed as charted from harvest logs runs from Cape Lazo to the navigation bell buoy (P54) and then along the eastern shore of Denman Island.

This bed represented 769 ha of 4259 ha (18%) in the 1990 estimates. Fishers advise that the most productive areas to the north of Comox Bar now fall within the contaminated closure (275 ha were measured - 1991). The bed is most productive from Pallisar Rock off Sandy Island, southeast along the eastern shore of Denman Island (47 ha). Some area, 46 ha, is south of Cape Lazo, northeast of the closure.

There is another large bed to the south, #4901- 417 ha. The bed #4902 (55 ha) at the southeast end of Denman Island, Lambert Channel has been fished 8 years, for 39,024 lb.; approximately 5000 lb. annually. This bed was remeasured on a new chart for 256 ha (1991).

The bed in the vicinity of the ferry landing on Denman Island in Lambert Channel has been coded on logs as a part of the northern bed off Komias Bluff (4902).

RECOMMENDATIONS 14-B : A quota of 200,000 lb. was set for 1992, less than the standard option of 263,000 lb. (Table 3.14). At a density of 1 geoduck/m², landings of 2,208,177 lb. are 28.7 years of quota. **An original density of 2.0 is required to support 14 years of fishing, 1978 to 1991, over 328 ha @ 1%. (Table 16).**

Area 14-C Baynes Sound: Longbeak Point to Boyle Point, west shore of Denman and Union Point to Maplegard Point; subareas 14-11, 14-15 and 14-8. Fig. 6
11 beds; 193 ha (1991)

There are four beds in subarea 14-11 for 113 ha; 30 ha at the Comox Cone Marker; 80 ha west of Seal Islets and 2 ha at Union Point. The three beds are outside the contaminated closure.

Fishers advise that in 14-11, the site at Gartley Point, bed #4704 is not productive and much of it is either rocky or muddy. It has been measured at 39 ha and should be reduced and assigned 1 ha. The last time it was fished was in 1989 for 595 lb.

There is one bed in 14-15, Henry Bay measured at 43 ha.

In subarea 14-8, there are six beds for 37 ha with 2 to 35,000 lb. cumulative landings.

RECOMMENDATION 14-C: The 1992 quota was set initially at 20,000 lb. based on fishers's recommendations. This is considerably less than the calculated quota of 145,000 lb. (Table 3.15). **Obviously the density and area estimates are too large.** Fishers were unable to find stock in area 13-E. The 13-E quota of 8,000 lb. was transferred in-season to area 14-C, for a total 1992 quota of 28,000 lb..

AREA 14 TOTAL 1992-93-94: 1,357,000 lb.: 640,000 lb. in 1992 (Table 13) + 717,000 lb. in 1993 (Table 18). This compares to 1,220,000 lb. (Appendix 1, Table 1.3). This is the only fishery area in the south where the quota has increased. However, the quota assigned is far less than calculated quota options because of the large measured areas of geoduck beds and because of a mangement decision to limit quota reductions to 15% each year for 1992-1993.

1.2 South Coast - West Coast Vancouver Island. - 1992 Quota Recommendations

In years prior to 1991, geoducks were harvested and processed at times of minor PSP blooms (Paralytic Shellfish Poisoning) on the west coast of Vancouver Island and in the north coast where there has been no PSP monitoring. This option was not available in 1992.

Area 23 (Figure 1)
5 beds, 155 ha estimated

Due to a change in PSP regulations in late 1991, fishing in Area 23 was postponed until 1992. The 1991 quota was transferred to and landed in Area 26. It was not possible to fish Area 27, as originally scheduled for this rotation, in November-December due to weather conditions.

The fishery in Area 23 has taken place since 1977, at the start of the fishery. Landings have been consistently high, 150 to 250 t, as a result of quotas set for the area.

Initial quotas in 1980, assigned 500,000 lb. to Areas 20,21 and 23 combined. This increased to 525,000 lb. (238 t) in 1981. The first separate quota for Area 23 was 400,000 lb. (181 t) in 1985. This was increased to 500,000 lb. in 1987 and then back to 400,000 lb. in 1988.

The three year quota set in 1989 was 1,200,000 lb. (544 t) for all subareas of Area 23. The area was then closed for 1990 and 1991.

There are two major portions of Area 23 closed permanently; the Broken Group Islands of the Pacific Rim National Park and a research area near Bamfield. These areas are known to contain geoduck stocks.

For 1991 and future years, Area 23 was divided into several portions to assign quotas.

AREA 23 QUOTAS AND OPTIONS

AREA 23-A Maggie River; portions of 23-9, 23-10 and 23-11
6 beds, 171 ha Fig. 8.

This area was initially scheduled to be fished in 1991 rather than the northern portion of Area 27. Fishers requested the delay in the opening of Area 27 to 1992 when the other portions of Area 27 were open. However, a PSP closure prevented a fishery in 1991 and it was fished in 1992.

RECOMMENDATION 23-A: The three year quota option was 80,370 lb.x 3 years = 241,110 lb. (Table 3.16). The 1992 quota set was 240,000 lb.

AREA 23-B Toquart Bay - Pipestem Inlet; portion of 23-10
4 beds, 10 ha Fig. 8

This area has only supported minor landings in the past, 34,745 lb.

RECOMMENDATION 23-B: The 1992 quota set was 15,000 lb. based on a reduced area of 10 ha.(Table 3.17). A closure was set at the bed west of Stopper Island where 90% of the landings (a total of 340,565 lb.) for this unit came from (Table 16).

AREA 23-C Mayne Bay - Stopper Islands - Bryant Islands - Curwen Island; portions of 23-9, 23-10 Fig. 8
8 beds, 124 ha Fig. 13

This area has been heavily fished in the past, 15 years quota taken (Table 16).

RECOMMENDATION 23-C: A management decision was made to allow for a 35,000 lb. quota (Table 3.18) with a provision for adding 130,000 lb. if the fleet could not attain the quota in 27-G exploratory (see following).

The Mayne Bay area was identified for a possible survey site.

AREA 23-D Pinkerton Islets - Canoe I.- Howard Point to Pill Point; portions of subareas 23-6 and 23-8 (Alma Russel Islands closed) 16 beds, 114 ha Fig. 8
(156 ha including Alma Russel Islands).

Approximately 52% of the reported landings on logs have come from the Alma Russel Islands. Their area is included in the quota calculation, 16 beds, 103 ha, but they should be closed in 1992 (Table 16) to spread effort into other beds.

RECOMMENDATION 23-D : A closure was set for the Alma Russel Islands where most of the landings had come from in earlier years (52%). The calculated option for the reduced area of 114 ha was 162,000 lb.(Table 3.19).

A more conservative quota of 145,000 lb. was set.

Contaminated closures may be necessary due to float homes.

AREA 23-E Chain Group - Tsartus Island - Edward King Island
14 beds, 90 ha Fig. 8

There have been nine years of fishing to 1991. Based on the area identified, 90 ha, and landings recorded on logs, 991,169 lb., 24 years of quota have been taken from this area (Table 16).

RECOMMENDATION 23-E: Fishery closure in 1992 for one or two rotations (Table 3.20).

AREA 23 TOTAL 1992-93-94: 435,000 lb. (Table 13). This compares to 1,200,000 lb. in 1989-90-91 (Appendix 1, Table 1.1).

Area 24 (Figure 1)

Area 24 has supported more fishing than any other area on the coast (Tables 3 and 4). The area was divided initially into two geoduck management areas, "inside" (24-A) and "outside" (24-B), in 1984.

In total, 23 beds, 986 ha have been identified for the "Inside" and 15 beds, 1503 ha for the "Outside" areas (Figs. 11 and 12). There were 5 beds for 24-C, the "Exposed" area and 31 beds for 24-D, the "Inlets". The areas for the beds in the inlets have not yet been evaluated.

The inside areas, 24-A, were portions of 24 that supported herring spawn or herring fisheries. These areas were closed traditionally from Feb. 15 to April 15.

In 1985 an exploratory region, 24-C, "exposed" was set to promote exploratory fishing in more exposed portions of area 24 that could not be fished until summer months. Traditionally all quotas had been reached early in the year so that the more exposed areas were not fished or explored.

In 1986 another management area was designated, 24-D, "inlets" to promote further exploration in the inlets where there was great interest in siting salmon fish farms. The exposed area was expanded in 1989 with the addition of Sydney Inlet and Hesquiat Harbour.

Since 1989, with the introduction of the three year rotational fishery, Area 24 was left with an annual quota. This was set since there was a processing plant located in Tofino, many fishers lived in Tofino and the economy of Tofino benefited from the annual fishery.

AREA 24- 1992 QUOTAS AND OPTIONS

Area 24 - Inside (Fig. 11)

In 1991, for the first time, the "inside" area was subdivided into three quota units designated 24-A, 24-AA and 24-AAA.

Some of the Area 24 fishing of the inside quota was delayed to the end of the year to maintain supply to live markets.

24-A Inside portion of 24-6, 24-7 and 24-9; (Fig.11)
19 beds, 665 ha estimated (1991)

This is traditionally the major fishing area in the "inside" areas, a portion of subarea 24-6, subarea 24-7 and 24-9.

RECOMMENDATION 24-A: The initial 1992 quota set was 200,000 lb. This quota is less than the calculated quota (Table 3.21). Area 24 quotas should not be increased until further research is carried out to determine the bed measurements and stock densities. The quota was adjusted to 312,000 lb. in-season due to PSP closures in the fall of 1992.

24-A2 Inside Yarksis; a portion of 24-8 ; Fig. 11
4 beds, 153 ha estimated

This area, a portion of 24-8, has been heavily fished at one site, Yarksis. The landings including 1991, are 1,266,309 lb. or 17.6 years of quota.

RECOMMENDATION 24-A2: The 1992 quota was set at 70,000 lb; the recommended annual quota at 2 geoducks/m² over 153 ha is 72,000 lb. (Table 3.22). This area requires further evaluation due to heavy fishing pressure (Table 16). A closure for at least one year is warranted.

24-A3 Inside Tonquin - Echachis - Wickaninish;
portion of 24-8; 1 bed, 110 ha estimated Fig. 11

There has been heavy fishing at only one site off Tonquin Island, a portion of 24-6 (210,268 lb. to 1990).

RECOMMENDATION 24-A3: The recommended annual quota for this area is 30,000 lb., less than the calculated quota (Table 3.23). See the above comments for Area 24-A. This has been measured as a large area that requires confirmation.

Area 24 Outside Fig. 12

In 1991, for the first time the "outside" area has been subdivided into four quota units designated 24-B, 24-B2, 24-3 and 24-B4.

24-B1 Outside portion of 24-6; Fig. 12
12 beds, 637 ha estimated (1991)

There has been heavy fishing pressure at 6 of the 12 beds identified in a portion of subarea 24-6. A large bed at Hobbs Islet was reduced from 29 to 10 ha based on the historical landings over the area.

RECOMMENDATION 24-B1: The 1992 quota should remain at 275,000 lb. (Table 3.24) until more is known about the Area 24 stocks. The annual calculated quota was 299,000 lb. based on an increased bed area measured in 1991.

24-B2 Outside Coomes Bank portion of 24-6; Fig. 12
1 bed, 339 ha estimated

This is one large bed measured at 339 ha. It has supported a large fishery in excess of one million lb. It was separated in 1991 as a separate quota area.

RECOMMENDATION 24-B2: The annual quota for 2 geoducks/m² over 339 ha is 160,000 lb. (Table 3.25). In order to balance quotas over the two years, 1992 and 1993, with reductions in quotas and the number of west coast licences, the initial 1992 quota was set at 120,000 lb. (-40,000 lb.). PSP closures in the fall of 1992 resulted in a final quota of 185,937 lb..

24-B3 Outside Ahousaht portions of 24-4 and 24-6
2 beds, 191 ha estimated (1991) Fig. 12

A separate annual quota is recommended to spread fishing effort throughout Area 24. This area has received heavy exploitation, 1,633,279 lb. including 1991; 18 years of quota landed if the mean density is 2 geoducks/ m² over 191 ha.

RECOMMENDATION 24-B3: The annual calculated quota was 90,000 lb. (Table 3.26). The area was recommended to be closed in 1992, to allow for a two year quota (1992-1993) of 180,000 lb. in 1993. Areas 24-B3 and 24-B4 were removed from the annual fishery. A further evaluation is required due to the heavy exploitation rate (Table 16).

This was a management decision so that the quotas could be balanced between 1992 and 1993, with a 15% reduction in quota each year. The fishery will be reviewed again for a 1994 option.

PSP closures in Area 27 resulted in a 1992 fishery in 24-B3 for 180,000 lb. and closure implemented in 1993.

24-B4 Russell Channel portion of 24-6; Fig. 12
1 bed, 184 ha estimated

A new division of Area 24 (24-BBBB) was created in October 1991, to harvest the one large bed in Russell Channel.

RECOMMENDATION 24-B4: A fishery closure is recommended for one year, 1992, so that a two year quota of 180,000 lb. (Table 3.27) can be fished in 1993. This was a management decision so that the quotas could be balanced between 1992 and 1993, with a 15% reduction in quota each year.

AREA 24-C Exposed Area and Sydney Inlet; 24-1, 24-2 and exposed portions of 24-8 and 124-3
14 beds 119 ha (1991)

There have been five beds, 21 ha, reported in the exposed portions other than Sydney Inlet in the years 1985, 1986, 1989 and 1990 for 111,952 lb. (50.8 t) in total. Fishers report that there are very small fishing areas and they were only able to land 770 lb. in 1990. The 21 ha area is likely too large; but is a reduction from 56 ha, scaled on the basis of minor landings.

In 1989 and 1990, Sydney Inlet, with nine beds of 98 ha, was included in the exposed area. Sydney Inlet was first fished in 1985, with 609,014 lb. landed over five years of fishing; 13 years of quota (Table 16).

In 1989, Hesquiat Harbour was added to the exposed area, but little ground was found and only 3595 lb. reported.

RECOMMENDATION 24-C: This area should remain closed in 1992 and 1993, pending further evaluation (Table 3.28). It was last fished in 1990.

AREA 24-D Inlets subareas 24-3,-5, -10 to -14 inclusive
22 beds, 96 ha estimated Fig. 13

The "Inlet" areas were fished over the period 1985 to 1990, for landings of 578,111 lb. (262 t). Most fishers have expressed concern that these areas have been overfished (Table 16).

RECOMMENDATION 24-D: This area should remain closed in 1992 and 1993, and until further evaluation (Table 3.29). Some bed closures may be required. Fishers report some unharvested beds in inlets, discovered during the sea cucumber fishery.

AREA 24 TOTAL 1992 (Table 14) = 1,053,622 lb. final quota.

Area 27 (Fig.1)

AREA 27 - INSIDE

Only minor landings were reported from Area 27 (<10 t) until 1985 when the fishery landed 1050 t. Twenty-five beds new were identified, with 27 beds measuring 623 ha in 1985 (Appendix 2 Table 2.7)

Up to and including 1984, the quota for Area 27 was combined with Area 26 and most of the effort was subsequently directed at Area 26.

In 1985, separate quotas were assigned to Area 27, and the area was divided into 27-A , Inlet subareas 27-7 to 27-11 and 27-B Exposed, 27-1 to 27-6 , exploratory with no quota (Fig. 11 to 13). This area included protected waters in 27-2 Winter harbour - Forward Inlet. The fishery landed 953 t in this area before it was closed, Aug. 30, 1985. Some portions of the area were closed earlier in June and July.

In 1986, Area 27 was divided into three portions, 27-A, subareas 27-2, 27-3, 27-7 to 27-11; 27-B, subareas 27-4 to 27-6 (Klaskino and Klaskish Inlets); and an exposed section described in-season from north of Kains Light to Cape Scott (27-2 portion, 27-1 and Cape Scott to Cape Sutil (12-14) (Fig. 15).

In 1988, the division of Area 27 remained the same but 300,000 lb. was set for 27-A Inside and 300,000 lb. for 27-B Outside-Inlets. No quota was set for the 27-C North Exposed area. Landings of 130 t were recorded for 27-C in 1988.

In 1989, a quota of 760,000 lb. was set for 27-A Inside, Subareas 27-2, 27-3 and 27-7 to 27-11 inclusive. This was for a three year rotation (a reduction from previous years) of the inside with 27-B Outside South to be fished in 1990 and 27-C in 1991. The fishery for 27-C North was delayed to 1992 for convenience of the fishers.

AREA 27-1992 QUOTAS AND OPTIONS

Area 27 has been divided into many more quota units to distribute effort and protect beds that have been heavily harvested in the past.

AREA 27-A Quatsino Sound Subarea 27-7 Fig. 14
6 beds , 119 ha

This area has been fished since 1985 with high removals at two of the four beds on the north shore.

Koprino Harbour has lots of bark on the bottom from log booms, no opportunity for fishing.

RECOMMENDATION 27-A : The 1992 fishery was restricted to the south shore of subarea 27-7 only, with a quota of 100,000 lb. (Table 3.30) The three year quota option is 168,000 lb. for all beds; 100,000 lb. for the beds opened in 1992 (Table 3.30). Contaminated areas need to be identified.

Area 27-B Cliffe Point to Lawn Point, a portion of 27-2
3 beds, 36 ha estimated (1991) Fig.14

Three beds have been identified with landings of only 66,000 lb. (30 t). This is an exposed area with hard packed bottom and is difficult to fish. This area will likely require a large boat to fish.

RECOMMENDATION 27-B: The 1992 quota set for this area was 50,000 lb. (Table 3.31).

Area 27-C Forward Inlet Inside Kains Point to Montgomery Point 3 beds, 126 ha Fig. 14

This area has been fished heavily since 1983, with a total of 1,262,352 lb. (573 t) reported; this is 22 years of quota at 1% and an average density of 2 geoducks/m² (Table 16).

Fishers report large numbers of small clams, "juveniles".

RECOMMENDATION 27-C: Fishery should be closed in 1992, pending further assessment (Table 3.32).

Area 27-D Kains Island - entrance to Quatsino Sound, a portion of 27-2 Fig. 14
2 beds, 46 ha

These two beds could support a modest fishery. There are geoducks, but at low densities and probably deep.

RECOMMENDATION 27-D: The 1992 quota set was 70,000 lb. (Table 3.33).

Area 27-E San Joseph Bay; portion of 27-2; Fig. 15
1 bed, 110 ha

There has only been minor fishing, 98,305 lb. recorded.

RECOMMENDATION 27-E: San Joseph Bay was opened in 1992 with a quota of 175,000 lb. This was set higher than the quota option (Table 3.34) to balance the west coast quotas and meet the management decision to reduce quotas by 15% in each of 1992 and 1993. There has been little fishing at this site relative to the area identified.

Area 27-F Sea Otter Cove; portion of 27-2 ; Fig. 15
1 bed, 14 ha

This area was fished 14 days in 1988. Fishers advise that there may be more stock at this site than identified to date. However, 23 years of quota have been taken over the 14 ha charted from harvest logs (Table 16).

There may be beds in Sea Otter Cove north of Helen Islands.

RECOMMENDATIONS 27-F: This area should have been closed in 1992 (Table 3.35). However, to balance the 1992-1993 quotas a quota of 50,000 lb. was set.

Area 27-G Exploratory: 27-1, portion of 27-2; Fig. 15

Fishers recommended an exploratory fishery in 1992, from north of Kains Islet to Cape Scott, for 130,000 lb. A decision to include Restless Bight was made in-season, July 1992 when the quota for Cliffe Point to Lawn Point (27-B) was reached, but no fishing had taken place in Restless Bight. No landings were made in 27-G in 1992; the quota was moved to Area 23-C.

RECOMMENDATION 27-G: 130,000 lb. exploratory.

Area 27-H Klaskino Inlet, subarea 27-5; Fig. 16
9 beds; 226 ha (1991)

This area was first fished in 1985 as part of an exploratory fishery, with 784,820 lb. recorded on logs. In 1990, there were 307,727 lb. landed on logs.

In a 12 ha bed at Anchorage Island, there have been 207,314 lb. landed, a removal of 0.9 geoducks/m².

RECOMMENDATION 27-H: The 1992 quota set was 340,000 lb. (Table 3.36) greater than the quota option of 318,000 lb. The reduced quota option was from the scaling down of beds from 243 ha to 226 ha based on landings criteria. Due to PSP closures in the fall of 1992 only 66,378 lb. of quota was landed; 275,000 lb. quota was deferred to the 1993 fishery.

Area 27-I Klaskish Inlet, subarea 27- 6; Fig. 16
13 beds; 101 ha (1991)

This area was combined with Klaskino in the past. In 1985, 194,950 lb. were recorded on logs. In 1990 there were 376,773 lb.

In 5 years, in a small 6 ha bed, at mouth of Klaskish Basin, 216,621 lb. were recorded; a removal of 1.9 geoducks/m². In a 2 ha bed, there were recorded landings of 101,696 lb. or 2.67 geoducks/m² removed.

RECOMMENDATION 27-I: This area should have been closed in 1992 (Table 16). However a management decision was made to reduce the 1992 and 1993 quotas by 15% each year and a fishery quota of 165,000 lb. was set.

At the quota options (Table 3.37), 22 years of quota have been taken.

The high removal rate suggests that there may be high densities in this area but the beds need to be reevaluated for area (ha.). An original density of 6.25 geoducks/m² over 101 ha (Table 16) would be required to support the fishing to 1991.

2.0 North Coast - 1992 Quota Recommendations

A summary of north coast quotas is given in Table 15 and detailed quota options and recommendations are presented in Tables 3.38 to 3.55.

The 1992 north coast quota is apportioned between four broad management areas, each containing smaller management units. The fishery is organized and scheduled to accommodate ongrounds monitoring and to prevent conflict with herring fisheries and herring spawning.

Quotas have been reduced from previous years in some areas, but in order to restrict the overall reduction to 15%, exploratory quotas were recommended for specific areas. Fishers and the ongrounds observer have provided advice on prospective locations and quantities. A total of 620,250 lb. (281.4 t) of exploratory quota equal to 24% of the north coast quota was recommended.

With the advent of the IVQ fishery and ongrounds patrol, management of minor areas and quotas is now possible. As a result, the future trend in management will likely be to further subdivision of areas to minimize local overharvest of preferred beds.

2.1 AREA A: Subareas 7-18, 7-25, and west ptn. 7-27 (McMullen Group, McNaughton Group, Goose Island, Spider Anchorage)

Subarea 7-18 - McMullin Gp., Tribal Gp., Admiral Gp.

There are four beds with a total of 53 ha identified in the management area of which one in the McMullin Gp. has been fished intermittently since 1981. The beds have not for the most part been fished for extensive periods, with years fished/bed ranging from one to five years. Large catches totalling 711,000 lb. (323 t) have been taken from the area with fishing concentrated in 1989. The catches originating from individual beds range from an equivalent of 8 to 40 years sustainable harvest at 3.5 geoduck/m², indicating overharvest has occurred. However, fishers advised that beds in the area are numerous and geoduck densities are high, providing ample opportunity for expansion of fishing area.

The recommended quota of 131,000 lb (59.3 t) was equivalent to the sustainable yield at a density of 3.5/m². Fishers are encouraged to disperse their effort and expand fishing to new beds. In the next rotation, the management area will likely be further subdivided.

Subarea 7-25 east of Queens Snd. - McNaughton Gp., Simonds Gp.

Ten beds with areas totalling 122 ha have been identified. Beds are generally small (<10 ha) though two beds have areas of 32 and 43 ha. The effective areas of two beds in the McNaughton Gp. were reduced because of low landings. Initial, small landings were made in 1985 but large quantities totalling greater than 1 million lb. (531 t) have been taken primarily in 1988 and 1989. Rates of removal have generally been higher than sustainable levels; however, fishers advise that there is substantial room for expansion in the area.

The recommended quota of 301,000 lb (137 t) was equal to sustainable yield at a density of 3.5/m². as in subarea 7-18, fishers were encouraged to expand fishing to new beds and the area would likely be further subdivided in future rotations.

Subarea 7-25 west of Queens Snd. - Goose Gp.

Only 3190 lb (1.5 t) have been reported landed from the Goose Gp., but a disproportionately large bed area was identified in logbooks. On the basis of fishers' advice that there is significant fishable area available, a quota of 50,000 lb (22.7 t) was recommended equivalent to 20 ha harvestable area.

Subarea 7-27 west of Kildidt Snd - Spider Anchorage

Spider Anchorage has supported a significant portion of the north coast fishery since 1981. Total logbook landings of 2.8 million lb (1274.9 t) have been taken from 16 beds. Removal rates in one half the beds have been considerably higher than sustainable levels, based on an assumed density of 5/m². Effective bed areas have been reduced in five beds, because of low catches or based on the 1991 survey results, to a total of 179 ha. Fishers provided no clear consensus in their advice, though some expressed concern for overharvest of the stock.

Because of the relative importance of the Spider Anchorage area fishery and the need to conserve the heavily fished stock, the assumed density of geoducks was reduced from 5 to 3.5/m², resulting in a recommended catch of 442,000 lb (379.5 t).

2.2 AREA B: Seaforth Channel, Cape Mark, Princess Alice Isl., Thompson Bay, Joassa Channel

Subareas 7-8, 7-9, 7-12, 7-22 - Seaforth Ch. area

The fishery in this area has been concentrated in two larger beds located in Ivory Isl. and at Gale Pass., though four beds with a total of 45 ha have been identified. Landings totalling 367,000 lb (166.7 t) have been taken in three years fishing between 1986

and 1989. Removal rates in the two large beds have been far greater than sustainable levels at densities of $3.5/m^2$.

Since the area has not been fished for an extended period of time the calculated quota of 111,000 lb (50.4 t) was recommended. There is some concern for conservation of geoduck in two identified beds and fishers are requested to expand fishing to new beds. Present beds may require protection in future rotations.

Subarea 7-32 - Cape Mark

Large catches totalling 697,000 lb. (316.2 t) have been taken in seven years fishing since 1981. Most of the catch originated from one large bed south of Cp. Mark, though a second bed has been identified in St. John's Hbr.. This management area was closed to fishing in 1989 because of reports by fishers of stock problems. For 1992, the effective area of the large Cp. Mark bed was reduced by half based on high rates of removal; the St. John's Hbr. bed was reduced because of low landings.

The total quota recommended for the area was 170,000 lb (77.1 t) based on a harvest area of 69 ha at a density of $3.5/m^2$. As a further conservation measure, 50,000 lb (22.7 t) equivalent to 20 ha is transferred for exploration of subarea 7-20, leaving 120,000 lb. (54.5 t) at Cp. Mark.

Subarea 7-20 - Princess Alice Isl. area

No beds have been identified but fishers requested an opportunity to explore the area. 50,000 lb (22.7 t) was transferred from Cp. Mark (see above) to promote exploration.

Subareas 7-19 and 7-21 - Thompson Bay

79,000 lb (35.8 t) has been landed, primarily in 1989, from two beds totalling 20 ha. Removal rates from the beds have not been excessive. The quota calculated for the area based on densities of $3.5/m^2$ was 49,000 lb. (22.2 t).

Subareas 7-23, 7-24 - Joassa Ch., Raymond Pass

No beds have been identified in logs but fishers claim to have found beds in surveys. In 1992, 50,000 lb (22.7 t) was applied to this area to facilitate exploration.

2.3 AREA C: Nalua Pass, Choked Pass, Fitz Hugh Sound, Calvert Island-Upper and Lower

Subareas 7-26, 7-27 east of Kildidit Sn., 8-4

A total of 577,000 lb (261.8 t) has been taken from ten of 11 beds in the area fished intermittently since 1983. The total

harvestable area is 80 ha including one bed with no reported harvest. Removal rates in some beds has been high but these beds have only been fished for one or two years.

The recommended quota was 197,000 lb. (89.3 t) based on sustained yield at densities of $3.5/m^2$.

Subarea 8-1 north of Dublin Pt., 8-2, 8-3 - Choked Pass area

Large catches totalling 386,000 lb. (175 t) have been taken in seven years fishing since 1982. The area was closed to fishing in 1989 based on reports of overfishing. Because of excessive removal rates in the largest bed of the six in the area, it's effective area was reduced by half. Based on an effective fishable area of 60 ha, the recommended quota was 148,000 lb. (67.2 t).

Subareas 8-16, 9-12 - Fitz Hugh Snd.

There is no record of catch from Fitz Hugh Snd., but fishers expressed an interest in exploring the area. 32,000 lb (14.5 t) was transferred from calculated quota in adjacent subareas 9-1 and 9-2 in Rivers Inlet to facilitate exploration.

Subarea 9-1 north of Harold Pt. on Calvert Isl.

No beds identified; 50,000 lb (22.7 t) applied to promote exploration.

Subarea 9-1 Clark Pt. to Harold Pt., 10-1, 10-2 on Calvert Isl.

The two beds identified on lower Calvert Isl. have been fished for two years only, with catches totalling 436,000 lb (197.8 t). Most of the catch was taken from a bed at Cp. Calvert. Removal rates from the harvestable area of 16 ha has been greatly in excess of sustainable levels. Fishers advise that other beds exist in locations such as Chic Chic Bay.

The effective harvest area is not reduced in the area, but fishers are encouraged to explore new locations. The recommended quota was 40,000 lb (18.1 t) based on a density of $3.5/m^2$.

Subareas 10-3, 10-4 - Smith Inlet

Landings totalling 173,000 lb have been taken from four beds in Smith Inlet in two years fishing since 1986. Landings in two large beds have been negligible so the effective areas have been reduced. The total harvestable area is 19 ha. Geoduck densities in the inlet are reputed to be low.

The recommended quota was 47,000 lb (21.3 t) based on a density of $3.5/m^2$.

2.4 Area D: Laredo Ch., Laredo Inlet, Kitasu Bay, Higgins Pass, E. Aristazabal Isl.-Upper and Lower, Price Isl.-upper and Lower, and Milbank Sound

Subareas 6-11, 6-14, 6-15 - north ptn. Laredo Ch.

Landings totalling 129,000 lb (58.5 t) have been made from two beds in 6-11 and one bed on the north end of Aristazabal Isl. in subarea 6-14. The beds have been fished for only one or two years. The total recommended quota based on a bed area of 28 ha at a density of $3.5/m^2$ was 70,000 lb. (28.4 t). Fishers were encouraged to explore subarea 6-15.

Subareas 6-19, 6-16 north of Meyers Pass in Laredo In.

In the two years fished in Laredo Inlet since 1988, 490,000 lb. (222 t) have been taken from the six identified beds. Removal rates have exceeded sustainable levels, especially at Aitken Island.

The recommended quota of 57,000 lb (25.9 t) was not reduced but fishers were encouraged to disperse effort from known beds.

Subarea 6-18 - Kitasu Bay

One bed has been identified in Kitasu Bay with an area of 8 ha. In 1989, 14,000 lb (6.4 t) was landed from the bed. The recommended quota based on sustainable yield at a geoduck density of $3.5/m^2$ was 20,000 lb (9.1 t).

Subareas 6-16 south of Wilby Pt., upper ptn. of 6-17 - Higgins Pass

Large quantities of geoduck were taken from three major beds in Higgins Pass in the four years from 1985 to 1988. A total of 813,000 lb (368.8 t) was harvested from beds with a total area of 122 ha. Removal rates are approximately double sustainable levels. This management area was not opened in 1989 due to reports of overfishing.

Because of the reported stock problem in the area and high removal rates, a quota one-half of the sustainable amount at a density of $3.5/m^2$, equal to 151,000 lb. (68.5 t) was recommended. One bed extends from Higgins Pass into subarea 6-17, so the upper portion of that subarea was included in the management area.

Subarea 6-16 - Aristazabal Isl. shore

No beds identified; quota of 50,000 lb (22.7 t) applied to encourage exploration.

Subareas 6-17 (upper), lower ptn. 6-13 - south Aristazabal Isl. shore.

No beds have been identified in the area, but one fisher has reported large quantities of geoduck from surveys. A large quota of 203,250 lb. (92.2 t) is applied to this area, simply to bring the total allowable catch in the north coast to the required level (15% reduction from previous year). It was recognized that sufficient stock may not be available in the area and that quota may be moved.

Subarea 6-17 (lower) - west Price Isl. shore

One 6 ha bed has been identified and 98,000 lb. (44.5 t) has been taken over two years fishing. The removal rate from this bed is far greater than sustainable levels, but fishers report other beds in the area. To provide an opportunity for exploration, a further 35,000 lb. (15.9 t) was added to the calculated quota of 15,000 lb. (6.8 t) for a total recommended quota of 50,000 lb. (22.7 t). Fishers were encouraged to fish new beds.

Subareas 7-31, 7-1, 7-2 - lower Price Isl. shore

The two beds identified in the area were only fished in 1989, but substantial catches totalling 399,000 lb. (181 t) were taken. Removal rates are far greater than sustainable levels. The area is reported to have remained largely unharvested because of its exposure, but beds are reputed to be extensive and contain good quality geoduck.

The calculated quota for the 20 ha of identified bed area was 50,000 lb. (22.7 t). A further 100,000 lb. (45.4 t) was added to encourage exploration for a total recommended quota of 150,000 lb. (68 t).

Subarea 7-3 - Milbank Snd.

112,000 lb. (50.8 t) was harvested in 1988 from two small beds (8 ha), one on the east side of Price Isl. and one outside Moss Pass. In the Moss Pass area (subarea 7-9), digging is reported to be difficult and geoduck stunted.

The quota for the area based on a sustainable yield at a density of $3.5/m^2$ is 20,000 lb. (9.1 t). To encourage exploration, a further 50,000 lb. (22.7 t) has been added for a total recommended quota of 70,000 lb. (31.8 t). The fishery may be extended into subarea 7-9 if fishers request.

TABLE 3.1

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	11 SUBAREAS 11-2, -3					
REPORTED HARVEST AREAS:	39 HA (1991)	# BEDS: 10				
CUMULATIVE LANDINGS TO 1990:	109 TONNES 240345 POUNDS					
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 lb.)				
		0.75%	1.0%	1.5%	2.0%	
1	916	7	9	14	18	
2	1832	14	18	27	37	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	415	3	4	6	8	
21.3	831	6	8	12	17	

COMMENTS:

AREA 11 WAS OPEN FOR EXPLORATORY FISHING IN 1985, JULY 1 TO SEPTEMBER 30
1986, OPEN JULY 1 - SEPT. 30
1987, OPEN JULY 1 - AUG. 31
1988, OPEN JULY 1 - SEPT. 19
1989, OPEN FEB. 6 UNTIL QUOTA OF 75,000 LB. TAKEN. THIS WAS NOT ACHIEVED
AND QUOTA WAS COMBINED WITH MAINLAND AREA 12 QUOTA, SO MOST OF THE
LANDINGS CAME FROM THE 12B MAINLAND EXPLORATORY FISHERY.

LANDINGS FROM HARVEST LOGS = 26 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

THE RECOMMENDED QUOTA FOR A THREE YEAR ROTATION IS
9000 lb. x 3 years = 27,000 lb. ~30,000 lb.
CONSIDERING PAST HARVEST LEVELS, 255,780 LB. / 9000 LB. ANNUAL QUOTA =
28 YEARS OF QUOTA LANDED. THIS AREA SHOULD REMAIN CLOSED UNTIL NEW BEDS
ARE DESCRIBED.

TABLE 3.2

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREAS:	12A: 12-10,12-11,12-12, 12-13, PTN 12-16 ISLANDS NE OF PORT HARDY					
REPORTED HARVEST AREAS:	98 HA (1991)	# BEDS: 18				
CUMULATIVE LANDINGS TO 1990:	411 TONNES 905533 POUNDS					
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	2301	17	23	35	46	
2	4603	35	46	69	92	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	1044	8	10	16	21	
21.3	2087	16	21	31	42	

COMMENTS:

AREA 12-11 HAS 12 BEDS, 66 HA.; 12-12 HAS 1 BED, 1 HA.; 12-13 HAS 4 BEDS, 31 HA.
FIRST FISHED IN 1984, FISHED HEAVILY IN 1989. CLUSTERS OF SMALL BEDS
RANGING FROM 1 TO 12 HA.; HIGH RATES OF REMOVALS, TO 1.99 GEODUCKS/M²

TOTAL LANDINGS ON LOGS REPORTED 905,533 LB. OVER 5 YEARS FISHING.
THE FISHERY IN 1988 WAS EQUAL TO 3 YEARS OF QUOTA.

THERE HAVE BEEN 7 YEARS OF FISHING EFFORT IN THIS AREA INCLUDING 1992.

LANDINGS FROM HARVEST LOGS = 39 YEARS OF QUOTA TAKEN @ 1 GDK/M²
20 YEARS OF QUOTA TAKEN @ 2 GDK/M²

RECOMMENDATIONS:

DUE TO HEAVY FISHING PRESSURE OVER THE PERIOD 1984 TO 1989, THIS AREA
SHOULD BE CLOSED IN 1992 (FOR 2 ROTATIONS, 6 YEARS AT LEAST)

IN 1992 A FISHERY TOOK PLACE WITH A REDUCED QUOTA OF 100,000 LB.

TABLE 3.3

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 12B: PTNS OF 12-15 AND 12-16 GOLETAS CHANNEL

REPORTED HARVEST AREA 116 HA (1991) # BEDS: 13

CUMULATIVE LANDINGS TO 1990: 1185.6 TONNES
2,136,359 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2724	20	27	41	54
2	5448	41	54	82	109

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1235	9	12	19	25
21.3	2471	19	25	37	49

COMMENTS:

THIS AREA IS FROM SHUSHARTIE BAY TO DILLON PT. ON VANCOUVER ISLAND
AND ALONG THE SW SHORE OF NIGIE ISLAND.

THIS AREA WAS HEAVILY FISHED IN 1989, FISHED SINCE 1984, FOR A TOTAL OF SIX YEARS
GENERALLY HIGH RATES OF REMOVALS, UP TO 2.2 GEODUCKS/M²

FOR 9 YEARS (1983 TO 1991) AT 1%, AN INITIA; DENSITY OF 9.2 GEODUCKS/M² WOULD
BE REQUIRED; THIS IS GREATER THAN THE DENSITY USED FOR PRODUCTIVE AREAS
IN THE NORTH COAST. CONSIDERING THE HIGH RATES OF REMOVAL IN A SHORT PERIOD,
THE DENSITY IS IN QUESTION.

NOTE: AREA REDUCTION FOR CONTAMINATION: HARDY BAY BED 202, 10 HA. (12-16);
FISHING IN 1989, 1485 REPORTED.

LANDINGS FROM HARVEST LOGS = 78 YEARS OF QUOTA TAKEN @ 1 GDK/M²
39 YEARS OF QUOTA TAKEN @ 2 GDK/M²

RECOMMENDATIONS:

THIS AREA SHOULD REMAIN CLOSED IN 1992 DUE TO PAST HARVEST.

TABLE 3.4

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 12C: PTN. OF 12-16, DEER, PEEL AND ROUND IS., FALSE HD.
12-17 FALSE HD. TO LEDGE PT.

REPORTED HARVEST AREAS: 181 HA (1991) # BEDS: 2

CUMULATIVE LANDINGS TO 1991: 53.4 TONNES
117,656 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	4250	32	43	64	85
2	8501	64	85	128	170

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1928	14	19	29	39
21.3	3855	29	39	58	77

COMMENTS:

LARGE BED FALSE HD. TO SINGLETREE PT. (178 HA.) WITH LOW LANDINGS FOR ONLY
TWO YEARS; 1985 (92,042 LB.) AND 1989 (1540 LB.)

CLUXEWE RIVER HAS A SMALL 3 HA. BED FISHED ONE YEAR IN 1986 (24,074 LB.)

BOUNDARIES EXPANDED NORTH TO INCLUDE ISLANDS SOUTH OF HARDY BAY AND
SOUTH TO LEDGE PT., CONTAMINATED CLOSURE AT BEAVER HBR. -BED 0301, 43 HA.
BED CLOSURE AT THOMAS PT. FRONTING AN INDIAN RESERVE

LANDINGS FROM HARVEST LOGS = 2.8 YEARS OF QUOTA TAKEN @ 1GDK/M²

RECOMMENDATIONS:

A SEPARATE QUOTA SHOULD BE ALLOCATED TO THIS PORTION OF AREA 12.

ANNUAL QUOTA = 85,000 lb. FOR A LARGE AREA ONLY 1.4 YEARS OF QUOTA LANDED
THREE YEAR ROTATIONAL QUOTA = 3 x 43,000 LB. = 122,000 LB. @ 1 GDK/M².

1992 QUOTA WAS SET AT 130,000 LB.

TABLE 3.5

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	12-D: ptn. 12-8 - MALCOLM ISLAND: GRAEME PT. TO MALCOLM PT. TO BLACK BLUFF				
REPORTED HARVEST AREAS:	175 HA (1991)	# BEDS:	5		
CUMULATIVE LANDINGS TO 1991:	180 TONNES 396,953 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	4110	31	41	62	82
2	8219	62	82	123	164
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1864	14	19	28	37
21.3	3728	28	37	56	75

COMMENTS:

THIS AREA WAS HEAVILY FISHED IN 1985, BUT ONLY FOR A MINOR AMOUNT IN 1989.

LANDINGS FROM HARVEST LOGS = 9.7 YEARS OF QUOTA TAKEN @ 1GDK/M²
4.8 YEARS OF QUOTA TAKEN @ 2 GDK/M²

RECOMMENDATIONS:

A SEPARATE QUOTA SHOULD BE ALLOCATED TO THIS PORTION OF THE SUBAREA.
THE MEASURED AREA MAY BE TOO LARGE; COULD BE REDUCED FOR QUOTA CALCULATION

QUOTA FOR 3 YEAR ROTATION:

3 x 82,000 = 246,000 LB. @2 GEODUCKS/M²
3 x 41,000 = 123,000 LB. @ 1 GEODUCK/M²

FISHERS QUESTIONED STOCK SIZE IN THIS AREA AND REQUESTED A LOWER QUOTA
THE 1992 QUOTA WAS SET AT 125,000 LB.

TABLE 3.6

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	12-E: ptn 12-6: MALCOLM ISLAND: TRINITY BAY, BDWLDER PT. TO LIZARD PT				
REPORTED HARVEST AREAS:	300 HA (1991)	# OF BEDS:	1		
CUMULATIVE LANDINGS TO 1990:	56 TONNES 122,893 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	7045	53	70	106	141
2	14090	106	141	211	282
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	3195	24	32	48	64
21.3	6390	48	64	96	128

COMMENTS:

THIS AREA WAS FISHED IN 1985 FOR 122,893 LB. ON LOGS, LESS THAN
THE ANNUAL QUOTA OF 141,000 LB.

LANDINGS FROM HARVEST LOGS = 1.7 YEARS OF QUOTA TAKEN @ 1 GEODUCK/M²
0.9 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

A SEPARATE QUOTA SHOULD BE ALLOCATED TO THIS PORTION OF THE SUBAREA.
THE MEASURED AREA MAY BE TOO LARGE SO SHOULD BR REDUCED FOR QUOTA CALCULATON

THE THREE YEAR ROTATIONAL QUOTA AT THE GIVEN AREA WOULD BE:
3 x 70,000 LB. = 210,000 LB.

THE 1992 QUOTA WAS SET AT 201,000 LB.

TABLE 3.7

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 12-F: 12-5, ptn 12-6, 12-18 MALCOLM ISLAND: LIZARD PT. TO
DONEGAL HEAD, WEYNTON PASS

REPORTED HARVEST AREAS: 13 HA (1989) # BEDS: 2

CUMULATIVE LANDINGS TO 1991: 11 TONNES
23,190 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	305	2	3	5	6
2	611	5	6	9	12

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	138	1	1	2	3
21.3	277	2	3	4	6

COMMENTS:

12-6: 1 BED, 11 HA; 12-18 1 BED, 2 HA; LANDINGS IN 1985 AND 1988 (WP)

LANDINGS FROM HARVEST LOGS = 7.6 YEARS OF QUOTA TAKEN @ 1 GEODUCK/M²
3.8 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

THE THREE YEAR LOW RISK ROTATIONAL QUOTA =
3 x 3,000 LB. = 9,000 LB.

THE 1992 QUOTA WAS SET AT 9,000 LB.

TABLE 3.8

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 13A: PORTION OF S/A 13-14 SE QUADRA ISLAND AND
AND WHITEROCK PASSAGE (13-12)

REPORTED HARVEST AREAS: 60 HA (1991) # BEDS: 7

CUMULATIVE LANDINGS TO 1990: 45 TONNES
98,952 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1409	11	14	21	28
2	2818	21	28	42	56

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	639	5	6	10	13
21.3	1278	10	13	19	26

COMMENTS:

FRANCISCO PT. TO REBECCA SPIT, 3 BEDS, 80 HA., REDUCED TO 9 HA IN 1992.
DREW HBR-HERIOT BAY-OPEN BAY: 3 BEDS, 49 HA: NOTE SEASONAL CLOSURE IN DREW HBR.
WHITEROCK PASSAGE (13-12), 1 BED, 12 HA., MINOR LANDINGS
NOTE: BED 1102, BRETON IS. WAS REDUCED TO 1 HA BASED ON LOW LANDINGS.
ALL BEDS IN THIS PORTION OF AREA 13 HAVE LOW LANDINGS.

LANDINGS FROM HARVEST LOGS = 7.0 YEARS OF QUOTA TAKEN @ 1 GEODUCK/M²
3.5 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

A SEPARATE QUOTA SHOULD BE ALLOCATED TO THIS PORTION A/O OF AREA 13.

THE THREE YEAR QUOTA OPTION IS
3 x 14,000 LB. = 42,000 LB.

THE QUOTA SET FOR 1992 WAS 40,000 LB.

TABLE 3.9

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 13B: MARINA ISLAND BEDS						
REPORTED HARVEST AREAS:	316 HA (1991)	# BED	2			
CUMULATIVE LANDINGS TO 1989:	744 TONNES	1,641,212 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)				
		0.75%	1.0%	1.5%	2.0%	
1	7421	56	74	111	148	
2	14841	111	148	223	297	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	3365	25	34	50	67	
21.3	6731	50	67	101	135	

COMMENTS:

2 BEDS SURROUNDING MARINA ISLAND HAVE BEEN HEAVILY FISHED, 71% OF AREA 13 LANDINGS REPORTED ON HARVEST LOGS ARE FROM MARINA ISLAND BEDS. FISHERS HAVE COMMENTED IN THE PAST THAT THERE ARE LARGE NUMBERS OF JUVENILES IN SOME LOCATIONS.

RECOMMENDATIONS:

RECOMMEND NO FISHERY AT MARINA ISLAND

@ 1 GEODUCK/M2:

3 X 74,000 = 222,000 LB QUOTA

LANDINGS OF 1,641,212 LB / 74,000 LB/YR = 22.2 YEARS OF QUOTA TAKEN.

@ 2 GEODUCKS/M2:

3 X 148,000 = 444,000 lb

LANDINGS OF 1,641,212 / 148,000 LB/YR = 11.1 YEARS OF QUOTA TAKEN

* OPTIONS AT LOW RISK NO FISHERY TO MED-HIGH RISK FISHERY AT 222,000 TO 444,000 LB.

THIS AREA REMAINED CLOSED IN 1992 AND A STOCK SURVEY WAS INITIATED.

TABLE 3.10

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 13C: PORTIONS OF S/A 13-1,-14, AND 13-15: SW CORTES, WHALETOWN TO SUTIL POINT						
REPORTED HARVEST AREAS:	160 HA (1991)	# BEDS:	4			
CUMULATIVE LANDINGS TO 1990:	199 TONNES	439,768 POUNDS (excluding closed areas)				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	3757	28	38	56	75	
2	7515	56	75	113	150	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	1704	13	17	26	34	
21.3	3408	26	34	51	68	

COMMENTS:

MANSONS LANDING CONTAMINATED CLOSURE, BEO 1201, 29 HA. (LANDINGS 99,467 LB) GUIDE ISLETS, BED 1202 INCLUDED.

THIS AREA HEAVILY FISHED OVER 12 YEARS, MARINA IS. EXCLUDED.

LANDINGS FROM HARVEST LOGS = 11.7 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

3 X 38,000 = 114,000 LB QUOTA

THE 1992 QUOTA WAS SET AT 112,000 LB.

TABLE 3.11

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 13D : 13-16 AND 13-17: E. READ I. TO RENDEZVOUS IS. AND NW CORTES ISLAND						
REPORTED HARVEST AREAS:	34 HA (1991)	# BEDS:	9			
CUMULATIVE LANDINGS TO 1990:	42 TONNES 92,263 POUNDS					
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	798	6	8	12	16	
2	1597	12	16	24	32	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	362	3	4	5	7	
21.3	724	5	7	11	14	

COMMENTS:

SMALL BEDS, 4 TO 20 HA. WITH MINOR LANDINGS. BEDS WERE REDUCED IN AREA
USING SCALING CRITERIA BASED ON LANDINGS IN 1991 ANALYSIS.

LANDINGS FROM HARVEST LDGS = 11.6 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

A SEPARATE QUOTA SHOULD BE ALLOCATED FOR THIS PROTION OF AREA 13.

THE 1992 QUOTA WAS ST AT 20,000 LB.

TABLE 3.12

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 13E: JOHNSTONE STRAIT (13-32); GOWLAND HARBOUR (13-3); MITLENATCH (13-1); WILLOW POINT (13-2)						
REPORTED HARVEST AREAS:	11 HA (1991)	# BEDS:	4			
CUMULATIVE LANDINGS TO 1990:	12 TONNES 27,012 POUNDS					
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	258	2	3	4	5	
2	517	4	5	8	10	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	117	1	1	2	2	
21.3	234	2	2	4	5	

COMMENTS:

SMALL BEDS, 4 TO 9 HA. WITH MINOR LANDINGS.

NOTE: PORTIONS OF BEDS IN BIG ROCK TO WILLOW PT. (13-2) ARE NOW IN
CONTAMINATED CLOSURE. LANDINGS TOTAL 13532 LB. ESTIMATE 30 HA. OPEN
A LARGE BED (1401 - 91 HA.) WAS IDENTIFIED AT CAPE MUDGE BUT NO LANDINGS
RECORDED ON HARVEST LOGS.

LANDINGS FROM HARVEST LOGS = 10.5 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

FOR 3 DOCUMENTED "OPEN" BEDS:

THREE YEAR QUOTA OPTION =

3 x 3,000 LB. = 9,000 LB.

THE 1992 QUOTA WAS INITIALLY SET AT 8,000 LB.. FISHERS COULD NOT FIND
SUITABLE FISHING AREA SO QUOTA WAS TRANSFERRED IN-SEASON TO AREA 14-E.

TABLE 3.13

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	14-A: SUBAREA 14-13, SHELTER PT. TO CAPE LAZO				
REPORTED HARVEST AREAS:	1151 HA (1991)	# BEDS:	6		
CUMULATIVE LANDINGS TO 1990:	529 TONNES	1,166,653 POUNDS			

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
		0.75%	1.0%	1.5%	2.0%
1	27029	203	270	405	541
2	54058	405	541	811	1081

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	12258	92	123	184	245
21.3	24516	184	245	368	490

COMMENTS:

CONSERVATIVE QUOTA SET DUE TO UNCERTAINTY IN LARGE BED AREAS

LANDINGS FROM HARVEST LOGS = 4.3 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 412,000 LB.

TABLE 3.14

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	14-B: COMOX BAR /EAST SIDE DENMAN IS. (PTNS OF 14-7, -10)				
REPORTED HARVEST AREAS:	328 HA (1991)	# BEDS:	3		
CUMULATIVE LANDINGS TO 1990:	1001 TONNES	2,208,177 POUNDS			

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
		0.75%	1.0%	1.5%	2.0%
1	7703	58	77	116	154
2	15405	116	154	231	308

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	3493	26	35	52	70
21.3	6986	52	70	105	140

COMMENTS:

14 YEARS FISHED

LANDINGS FROM HARVEST LOGS = 28.7 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 200,000 LB.

TABLE 3.15

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 14-C: BAYNES SND. (PTN 14-11, -8, -15)						
REPORTED HARVEST AREAS:		193 HA (1991)	# BEDS: 11			
CUMULATIVE LANDINGS TO 1990:		153 TONNES	336,664 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	4532	34	45	68	91	
2	9065	68	91	136	181	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	2055	15	21	31	41	
21.3	4111	31	41	62	82	

COMMENTS:

LANDINGS FROM HARVEST LOGS = 7.4 YEARS OF QUOTA TAKEN

BASED ON FISHERS ADVICE, THE 1992 QUOTA WAS SET AT LESS THAN THE CALCULATED
QUOTA OF 3 X 45,000 LB. = 135,000 LB.

RECOMMENDATIONS:

THE 1992 QUOTA WAS INITIALLY SET AT 20,000 LB., INCREASED IN-SEASON TO 28,000 LB.
WITH THE TRANSFER OF QUOTA FROM AREA 13-E.

TABLE 3.16

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 23-A: MAGGIE RIVER SHORE (PTNS OF 23-9,-10 AND -11)						
REPORTED HARVEST ARE		171 HA (1991)	# BEDS: 6			
CUMULATIVE LANDINGS TO 1990:		628 TONNES	1,384,389 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	4016	30	40	60	80	
1.5	6023	45	60	90	120	
2	8031	60	80	120	161	
3	12047	90	120	181	241	
3.5	14055	105	141	211	281	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	1821	14	18	27	36	
16.0	2732	20	27	41	55	
21.3	3642	27	36	55	73	
32.0	5463	41	55	82	109	
37.3	6374	48	64	96	127	

COMMENTS:

THE AREA COULD SUPPORT 3 X 80,000 LB. = 240,000 LB. AT 2 GDK/M2.

LANDINGS FROM HARVEST LOGS = 17.2 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 240,000 LB

TABLE 3.17

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		23B: TOQUART BAY-PIPESTEM (PTN 23-10)				
REPORTED HARVEST AREAS:		36 HA (1991)	# BEDS: 5			
		10 ha excluding bed west of Stopper Islands				
CUMULATIVE LANDINGS TO 1990:		154 TONNES				
		340,565 POUNDS				
		(34,745 lb. excluding bed west of Stopper Islands)				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	845	6	8	13	17	
1.5	1268	10	13	19	25	
2	1691	13	17	25	34	
3	2536	19	25	38	51	
3.5	2959	22	30	44	59	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	383	3	4	6	8	
16.0	575	4	6	9	12	
21.3	767	6	8	12	15	
32.0	1150	9	12	17	23	
37.3	1342	10	13	20	27	

COMMENTS:

90% OF LANDINGS FROM BED 601 (26 HA), ON THE VAN. I. SHORE WEST OF STOPPER IS.
4 OTHER BEDS WERE SCALED DOWN IN SIZE USING LANDING CRITERIA, TOTAL 10 HA.

TOTAL HA INCL. BED 0601 = 36

TOTAL LANDINGS INCL 0601 = 340,565 LB; 20 YEARS OF QUOTA

ANNUAL QUOTA @ 2 GDK/M2 = 17,000 LB X 3 = 51,000 lb.

LANDINGS FROM HARVEST LOGS = 20.1 YEARS OF QUOTA TAKEN
FROM ALL 5 BEDS

RECOMMENDATIONS:

CLOSURE AT BED 0601, ON VANCOUVER ISLAND SHORE WEST OF STOPPER IS.
FISHERY IN BEDS AT TOQUART BAY, SNOWDON I., REFUGE ISLAND
QUOTA 3 X 5,000 LB. = 15,000 LB. BASED ON 10 HA OPEN AREA.

THE 1992 QUOTA WAS SET AT 15,000 LB. BASED ON THE REDUCED AREA OF 10 HA.

TABLE 3.18

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		23C: MAYNE BAY - STOPPER ISLANDS-BRYANT ISLANDS- CURWEN IS; SUBAREA 23-9 AND A PORTION OF 23-10				
REPORTED HARVEST AREAS:		124 HA (1991)	# BEDS: 8			
CUMULATIVE LANDINGS TO 1990:		399 TONNES				
		880,679 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LBS)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	2912	22	29	44	58	
1.5	4368	33	44	66	87	
2	5824	44	58	87	116	
3	8736	66	87	131	175	
3.5	10192	76	102	153	204	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	1321	10	13	20	26	
16.0	1981	15	20	30	40	
21.3	2641	20	26	40	53	
32.0	3962	30	40	59	79	
37.3	4622	35	46	69	92	

COMMENTS:

BEDS HEAVILY FISHED: STOPPER ISLANDS
ST. INNES
BRYANT
CURWEN
MAYNE BAY, HARRIS PT. TO LYALL PT.

LANDINGS FROM HARVEST LOGS = 15.1 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

RECOMMENDATIONS:

FISHERY CLOSURE
QUOTA = 3 YEARS X 58,000 LB. = 174,000 LB. @ 2 GEODUCKS/M²

THE 1992 QUOTA WAS SET AT 35,000 LB. WITH A PROVISION FOR ADDING 130,000 LB
IF THE FLEET COULD NOT ATTAIN THE QUOTA IN 27G (OUTSIDE EXPLORATORY)

TABLE 3.19

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		23D: S/A 23-8, 23-6; PINKERTON IS., -CANOE I.-HOWARD PT. (ALMA RUSSEL CLOSED) TO PILL PT.			
REPORTED HARVEST AREAS:	156 HA (1991)	# BEDS:	16		
	114 HA EXCLUDING ALMA RUSSEL		13		
CUMULATIVE LANDINGS TO 1990:	455 TONNES				
	1,002,220 POUNDS				
	484,617 EXCLUDING ALMA RUSSEL IS.				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	3663	27	37	55	73
1.5	5495	41	55	82	110
2	7327	55	73	110	147
3	10990	82	110	165	220
3.5	12822	96	128	192	256
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1661	12	17	25	33
16.0	2492	19	25	37	50
21.3	3323	25	33	50	66
32.0	4984	37	50	75	100
37.3	5815	44	58	87	116

COMMENTS:

PINKERTON ISLANDS-ALMA RUSSEL ISLANDS-VERNON BAY
ALMA RUSSEL ISLANDS (3 BEDS,42 HA) LANDINGS 517,603 LB (52%)
VERNON BAY (6 BEDS, 79 HA) LANDINGS 237,202 LB.(24%)
LANDINGS OF 9 YEARS QUOTA FOR ALL OF 23-D

LANDINGS FROM HARVEST LOGS = 6.6 YEARS OF QUOTA TAKEN
NOT INCL ALMA RUSSEL

LANDINGS FROM HARVEST LOGS = 13.7 YEARS OF QUOTA TAKEN
INCL. ALMA RUSSEL

FISHERS EXPRESSED CONCERN OVER FISHING AREA WITHOUT ALMA RUSSEL BEDS.

RECOMMENDATIONS:

FISHERY SHOULD BE CLOSED IN ALMA RUSSEL ISLANDS, OTHER PORTIONS OPEN FOR
QUOTA = 3 YEARS X 73,000 = 219,000 LB. @ 2 GEODUCKS/M2

A CONSERVATIVE 1992 QUOTA WAS SET AT 145,000 LB. BECAUSE OF THE CLOSURE
AT ALMA RUSSEL ISLANDS; BASED ON 114 HA OPEN AREA.

TABLE 3.20

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		23-E: CHAIN GROUP-TSARTUS ISLAND-EDWARD KING ISLAND (PTNS OF 23-4, 23-5 AND 23-7)			
REPORTED HARVEST AREAS:	90 HA (1991)	# BEDS:	14		
CUMULATIVE LANDINGS TO 1990:	450 TONNES				
	991,169 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2113	16	21	32	42
1.5	3170	24	32	48	63
2	4227	32	42	63	85
3	6340	48	63	95	127
3.5	7397	55	74	111	148
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	959	7	10	14	19
16.0	1438	11	14	22	29
21.3	1917	14	19	29	38
32.0	2876	22	29	43	58
37.3	3355	25	34	50	67

COMMENTS:

ANNUAL QUOTA = 42,000 LB. X 3 YEARS = 126,000 @ 2 GEODUCKS/M2

LANDINGS FROM HARVEST LOGS = 23.4 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M2

RECOMMENDATIONS:

THIS AREA WAS CLOSED IN 1992.

TABLE 3.21

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	24A: S/A 24-7, 24-9 AND PTN 24-6 - "INSIDE"		
REPORTED HARVEST AREAS:	665 HA (1991)	# BEDS:	19
CUMULATIVE LANDINGS TO 1991:	2313 TONNES 5,099,581 POUNDS (FROM VALIDATED WEIGHTS - 1991)		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	15616	117	156	234	312
1.5	23425	176	234	351	468
2	31233	234	312	468	625
3	46849	351	468	703	937
3.5	54657	410	547	820	1093

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	7082	53	71	106	142
16.0	10623	80	106	159	212
21.3	14165	106	142	212	283
32.0	21247	159	212	319	425
37.3	24788	186	248	372	496

COMMENTS:

BEDS: 1201 TO 1205, 903, 906, 1001 TO 1007, 1009, 1101, 1601 TO 1603
BED AREAS WERE SCALED WITH 1991 LANDING CRITERIA

DUE TO PSP CLOSURES IN 1991 ONLY 150,862 LB OF THE 285,000 LB QUOTA WAS
LANDED. THE BALANCE OF 134,000 LB. WAS TRANSFERRED TO AREA 26. AS A RESULT
THE 1993 QUOTA WAS PROPOSED TO INCREASED FOR 24-A.

LANDINGS FROM HARVEST LOGS = 16.3 YEARS OF QUOTA LANDED @ 2 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 285,000 LB; ADJUSTED INSEASON TO 312,685 LB DUE TO
PSP CLOSURES IN AREA 27.

THE 1993 QUOTA WAS INITIALLY SET AT 419,000 LB. (285,000 LB FOR 1993 PLUS 134,000 LB.)
FROM THE 1991 FISHERY. DUE TO THE END OF SEASON ADJUSTMENTS IN 1992, THE
1993 QUOTA WAS SET AT 390,000 LB..

TABLE 3.22

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	24-A2: NORTHERN PTN 24-8, YARKSIS AND N. END WICKANINISH I.		
REPORTED HARVEST AREAS:	153 HA (1991)	# BEDS:	4
CUMULATIVE LANDINGS TO 1991:	574 TONNES 1,266,309 POUNDS (INCLUDING 1991 VALIDATED LANDINGS)		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	3593	27	36	54	72
1.5	5389	40	54	81	108
2	7186	54	72	108	144
3	10779	81	108	162	216
3.5	12575	94	126	189	252

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1629	12	16	24	33
16.0	2444	18	24	37	49
21.3	3259	24	33	49	65
32.0	4888	37	49	73	98
37.3	5703	43	57	86	114

COMMENTS:

BEDS 1301, 1302, 1303, 1403

1991 - BEDS SCALED WITH LANDING CRITERIA

LANDINGS FROM HARVEST LOGS = 17.6 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 70,000 LB.

THE 1993 QUOTA WAS SET AT 70,000 LB.

TABLE 3.23

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 24-A3: SOUTHERN PTN 24-8, TONQUIN-ECHACHIS-
WICKANINISH

REPORTED HARVEST AREAS: 110 HA (1991) # BEDS: 1

CUMULATIVE LANDINGS TO 1991: 100 TONNES
220,822 POUNDS
(INCLUDING 1991 VALIDATED LANDINGS)

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2583	19	26	39	52
1.5	3875	29	39	58	77
2	5166	39	52	77	103
3	7749	58	77	116	155
3.5	9041	68	90	136	181

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1172	9	12	18	23
16.0	1757	13	18	26	35
21.3	2343	18	23	35	47
32.0	3515	26	35	53	70
37.3	4100	31	41	62	82

COMMENTS:
BED 1401

DUE TO A PSP CLOSURE ONLY 10,554 LB OF THE 30,000 LB QUOTA WERE LANDED.

LANDINGS FROM HARVEST LOGS = 5.7 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 30,000 LB.

THE 1993 QUOTA WAS SET AT 43,500 LB. (30,000 FOR 1993 PLUS 13,500 LB. OF 19,000 LB. NOT LANDED IN 1991). NOT ALL POUNDS WERE TRANSFERRED FROM 1991 TO 1993 DUE TO OVERALL QUOTA REDUCTIONS.

TABLE 3.24

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 24B: PTN 24-6 "OUTSIDE"

REPORTED HARVEST AREAS: 637 HA (1991) # BEDS: 12

CUMULATIVE LANDINGS TO 1991: 2764 TONNES
6,095,298 POUNDS
(INCLUDING 1991 VALIDATED LANDINGS)

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	14959	112	150	224	299
1.5	22438	168	224	337	449
2	29918	224	299	449	598
3	44876	337	449	673	898
3.5	52356	393	524	785	1047

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	6784	51	68	102	136
16.0	10176	76	102	153	204
21.3	13568	102	136	204	271
32.0	20352	153	204	305	407
37.3	23744	178	237	356	475

COMMENTS:

BEDS: 0701 TO 0704, 0706, 0707, 0801, 0802, 0803, 0806, 0607, 0902

IN 1991 SOME BEDS WERE SCALED IN AREA USING LANDING CRITERIA, WHILE OTHER BEDS INCREASED IN SIZE.

LANDINGS FROM HARVEST LOGS = 20 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA AND THE 1993 QUOTA WERE SET AT 275,000 LB.

TABLE 3.25

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	24-B2: COOMES BANK - PTN 24-6			
REPORTED HARVEST AREAS:	339 HA (1991)	# BEDS:	1	
CUMULATIVE LANDINGS TO 1991:	727 TONNES 1,603,517 POUNDS (INCLUDING 1991 VALIDATED LANDINGS)			

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	7961	60	80	119	159
1.5	11941	90	119	179	239
2	15922	119	159	239	318
3	23882	179	239	358	478
3.5	27863	209	279	418	557

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	3610	27	36	54	72
16.0	5416	41	54	81	108
21.3	7221	54	72	108	144
32.0	10831	81	108	162	217
37.3	12636	95	126	190	253

COMMENTS:
BED 0901

LANDINGS FROM HARVEST LOGS = 10.1 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

A TWO YEAR WEST COAST QUOTA WAS BALANCED BY REDUCING 1992 QUOTA BY 40,000 LB.
AND WITH THE INTENT OF INCREASING THE 1993 QUOTA BY 40,000 LB.

THE 1992 QUOTA WAS SET AT 120,000 LB. AND ADJUSTED INSEASON TO 185,937 LB.
AFTER A PSP CLOSURE IN AREA 27.

THE QUOTA FOR 1993 WAS SET AT 134,000 LB.;

160,000 LB. (CALCULATED) + 40,000 LB.(1992 EXTRA) - 66,000 LB.(1992 INSEASON INCREASE)

TABLE 3.26

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	24-B3: PTNS OF 24-4 AND 24-6, AHOUSAT			
REPORTED HARVEST AREAS:	191 HA (1991)	# BEDS:	2	
CUMULATIVE LANDINGS TO 1991:	741 TONNES 1,633,279 POUNDS (INCLUDING 1991 VALIDATED LANDINGS)			

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	4485	34	45	67	90
1.5	6728	50	67	101	135
2	8971	67	90	135	179
3	13456	101	135	202	269
3.5	15699	118	157	235	314

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	2034	15	20	31	41
16.0	3051	23	31	46	61
21.3	4068	31	41	61	81
32.0	6102	46	61	92	122
37.3	7120	53	71	107	142

COMMENTS:
BEDS 0601 AND 0606 WERE SCALED BY REMOVALS OR WITH LANDING CRITERIA.
BED 0605 - WHITESAND COVE WAS CLOSED - REMOVED FROM CALCULATION.

A NEW GEODUCK MANAGEMENT AREA, 24-B4 - RUSSELL CHANNEL, WAS CREATED
DURING THE 1991 FISHERY, WHICH REMOVED A LARGE BED - (#0603 - 184 HA)
FROM AREA 24B3.

LANDINGS FROM HARVEST LOGS = 18.2 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

BOTH AREAS 24-B3 AND 24-B4 MOVE FROM ANNUAL QUOTAS INTO A ROTATIONAL CYCLE.

AREA 24-B3 WAS SCHEDULED TO REMAIN CLOSED IN 1992, HOWEVER INSEASON ADJUSTMENTS
FOR PSP IN AREA 27 RESULTED IN A SET QUOTA OF 180,000 LB..

IN 1993 A CLOSURE WAS SET FOR THIS AREA.

TABLE 3.27

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		24-B4: RUSSELL CHANNEL, A PORTION OF 24-6			
REPORTED HARVEST AREAS:	184 HA (1991)	# BEDS:	1		
CUMULATIVE LANDINGS TO 1991:	447 TONNES 985,451 POUNDS (INCLUDING 1991 VALIDATED LANDINGS)				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	4321	32	43	65	86
1.5	6481	49	65	97	130
2	8642	65	86	130	173
3	12963	97	130	194	259
3.5	15123	113	151	227	302
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1960	15	20	29	39
16.0	2939	22	29	44	59
21.3	3919	29	39	59	78
32.0	5879	44	59	88	118
37.3	6859	51	69	103	137

COMMENTS:

THIS NEW GEODUCK MANAGEMENT AREA, 24-B4 - RUSSELL CHANNEL, WAS CREATED DURING THE 1991 FISHERY, TARGETTING ON A LARGE BED - (#0603 - 184 HA) WITH MINOR LANDINGS SINCE 1984, REPRESENTING 11 YEARS OF QUOTA OVER 10 YEARS OF FISHING.

LANDINGS FROM HARVEST LOGS = 11.4 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

AREA 24-B4 WAS CLOSED IN 1992.

THE QUOTA FOR 1993 WAS SET AT 180,000 LB, EQUIVILANT TO 2 YEARS OF FISHING (1992-1993).

TABLE 3.28

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		24C: EXPOSED (24-1,-2 AND EXPOSED PORTIONS 124-3 AND 24-8)			
REPORTED HARVEST AREAS:	119 HA (1992) 98 HA SYDNEY INLET 21 HA OTHER BEDS	# BEDS:	14		
CUMULATIVE LANDINGS TO 1990:	276 TONNES 720,966 POUNDS TOTAL 609,014 POUND FROM SYDNEY INLET 111,952 POUNDS FROM OTHER BEDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LBS)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
		0.75%	1.0%	1.5%	2.0%
1	2795	21	28	42	56
1.5	4192	31	42	63	84
2	5589	42	56	84	112
3	8384	63	84	126	168
3.5	9781	73	98	147	196
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1267	10	13	19	25
16.0	1901	14	19	29	38
21.3	2535	19	25	38	51
32.0	3802	29	38	57	76
37.3	4436	33	44	67	89

COMMENTS:

5 BEDS, 21 HA IN EXPOSED; 9 BEDS, 98 HA IN SYDNEY INLET

LANDINGS FROM HARVEST LOGS = 12.9 YEARS OF QUOTA TAKEN FROM 24-C
LANDINGS FROM SYDNEY INLET = 13 YEARS OF QUOTA.

RECOMMENDATIONS:

SHOULD REMAIN CLOSED FOR 1992-1993. LAST FISHED IN 1990.

TABLE 3.29

1992-1993 RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		24D: OTHER INLETS: 24-3 TO -5, -10, -11, -13, -14			
REPORTED HARVEST AREAS:	96 HA (1990)	# BEDS:	22		
CUMULATIVE LANDINGS TO 1990:	262 TONNES		578,111 POUNDS		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LBS)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
		0.75%	1.0%	1.5%	2.0%
1	2254	17	23	34	45
1.5	3382	25	34	51	68
2	4509	34	45	68	90
3	6763	51	68	101	135
3.5	7890	59	79	118	158
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1022	8	10	15	20
16.0	1534	12	15	23	31
21.3	2045	15	20	31	41
32.0	3067	23	31	46	61
37.3	3578	27	36	54	72

COMMENTS:

BEDS SCALED ACCORDING TO LANDINGS

CLOSED IN 1991 AND 1992.

LANDINGS FROM HARVEST LOGS = 13 YEARS OF QUOTA TAKEN @ 2 GEODUCKS/M²

RECOMMENDATIONS:

REMAIN CLOSED.

CLOSED IN 1993

TABLE 3.30

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		27 A: PORTION OF S/A 27-7			
REPORTED HARVEST AREAS:	119 HA (1991)	# BEDS:	6		
	71 HA OPEN IN 1992		(3 BEDS 1992)		
CUMULATIVE LANDINGS TO 1990:	176 TONNES		387,691 POUNDS TOTAL		
			131,000 POUNDS FROM BEDS OPEN IN 1992		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LBS)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2795	21	28	42	56
1.5	4192	31	42	63	84
2	5589	42	56	84	112
3	8384	63	84	126	168
3.5	9781	73	98	147	196
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1267	10	13	19	25
16.0	1901	14	19	29	38
21.3	2535	19	25	38	51
32.0	3802	29	38	57	76
37.3	4436	33	44	67	89

COMMENTS:

FISHED SINCE 1985, 4 YEARS: 387,691 LB. FROM ALL BEDS IS S/A 27-7

HIGH REMOVALS AT NORDSTROM COVE (22 HA) AND BEDWELL ISLANDS (25 HA)

THESE TWO BEDS ARE 40% AREA BUT ACCOUNT FOR 66% LANDINGS: CLOSURE IN 1992.

POSSIBLY MORE BEDS INSIDE QUATSINO SOUND; GEODUCKS REPORTED BUT POOR QUALITY

NOTE CONTAMINATED AREAS: KOPRINO HARBOUR, MAHATTA RIVER, CLEAGH CREEK

LANDINGS FROM HARVEST LOGS = 6.9 YEARS OF QUOTA TAKEN
FROM ALL 27-A BEDS
2.3 YEARS OF QUOTA TAKEN
FROM ALL 27-A BEDS

RECOMMENDATIONS:

QUOTA = 3 YEARS X 56,000 LB. = 168,000 LB;

FOR OPEN BEDS, 71 HA, 3 X 33,000 = 99,000 LB.

FISH SOUTH SHORE ONLY, CLOSED NORDSTROM COVE, BEDWELL IS. AND SPENCER COVE

OPEN 3 OTHER BEDS (71 HA) INSIDE CLIFFE PT., KOSKIMO BAY, KOSKIMO ISLANDS

THE 1992 QUOTA WAS SET AT 100,000 LB.

TABLE 3.31

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 27 B: PORTION OF 27-2; CLIFFE PT. TO LAWN POINT						
REPORTED HARVEST AREAS:		36 HA (1991)	# BEDS:		3	
CUMULATIVE LANDINGS TO 1990:		30 TONNES	66,096 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	845	6	8	13	17	
1.5	1268	10	13	19	25	
2	1691	13	17	25	34	
3	2536	19	25	38	51	
3.5	2959	22	30	44	59	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	383	3	4	6	8	
16.0	575	4	6	9	12	
21.3	767	6	8	12	15	
32.0	1150	9	12	17	23	
37.3	1342	10	13	20	27	

COMMENTS:

FISHED SINCE 1985, THREE YEARS, 66,096 LB.

THREE BEDS: SW OF CLIFFE PT., HARVEY COVE AND GOODING COVE

NO BEDS IDENTIFIED IN RESTLESS BIGHT (SURVEYED BY BONNIE MAY
AND ALBATROSS II)

SOME BEDS WERE REDUCED IN AREA USING LANDING CRITERIA AND ADVICE
FROM FISHERMEN

LANDINGS FROM HARVEST LOGS = 3.9 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

RECOMMENDATIONS:

QUOTA= 3 YEARS X 17,000 LB. = 51,000 LB.

LESS THAN FOUR YEARS QUOTA TAKEN TO DATE FROM THIS PORTION OF INSIDE AREA

THE 1992 QUOTA WAS SET AT 50,000 LB.

TABLE 3.32

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 27 C: S/A 27-3 FORWARD INLET INSIDE A LINE FROM KAINS PT. TO MONTGOMERY PT.						
REPORTED HARVEST AREAS:		126 HA (1991)	# BEDS:		3	
CUMULATIVE LANDINGS TO 1990:		572 TONNES	1,269,614 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	2959	22	30	44	59	
1.5	4438	33	44	67	89	
2	5918	44	59	89	118	
3	8877	67	89	133	178	
3.5	10356	78	104	155	207	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	1342	10	13	20	27	
16.0	2013	15	20	30	40	
21.3	2684	20	27	40	54	
32.0	4026	30	40	60	81	
37.3	4697	35	47	70	94	

COMMENTS:

FISHED SINCE 1983, 1,262,352 LB; 21.4 YEARS QUOTA

HIGH REMOVALS AT MATHEWS ISLAND AND HUNT ISLETS

BED AT WINTER HARBOUR IN QUESTION- 72 HA

LANDINGS FROM HARVEST LOGS = 21.5 YEARS FO QUOTA TAKEN
@ 2 GEODUCKS/M²

FISHERY SHOULD BE CLOSED

POSSIBLE SURVEY SITE

RECOMMENDATIONS:

AREA 27C WAS CLOSED IN 1992.

TABLE 3.33

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	27 D: KAINS ISLAND - ENTRANCE TO QUATSINO SOUND: PORTION OF 27-2		
REPORTED HARVEST AREAS:	46 HA (1991)	# BEDS:	2
CUMULATIVE LANDINGS TO 1990:	45 TONNES 99,804 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1080	8	11	16	22
1.5	1620	12	16	24	32
2	2160	16	22	32	43
3	3241	24	32	49	65
3.5	3781	28	38	57	76

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	490	4	5	7	10
16.0	735	6	7	11	15
21.3	980	7	10	15	20
32.0	1470	11	15	22	29
37.3	1715	13	17	26	34

COMMENTS:

LANDINGS FROM HARVEST LOGS = 4.6 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

SMALL BED NE OF PILLEY SHOAL, OPPOSITE CLIFFE PT. (5 HA) WAS
REDUCED IN AREA USING LANDING CRITERIA TO 1 HA.

RECOMMENDATIONS:

QUOTA = 3 YEARS X 22,000 LB. = 66,000 LB.

THE 1992 QUOTA WAS SET AT 70,000 LB.

TABLE 3.34

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	27 E: SAN JOSE BAY		
REPORTED HARVEST AREAS:	110 HA (1991)	# BEDS:	1
CUMULATIVE LANDINGS TO 1990:	45 TONNES 98,305 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2583	19	26	39	52
1.5	3875	29	39	58	77
2	5166	39	52	77	103
3	7749	58	77	116	155
3.5	9041	68	90	136	181

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1172	9	12	18	23
16.0	1757	13	18	26	35
21.3	2343	18	23	35	47
32.0	3515	26	35	53	70
37.3	4100	31	41	62	82

COMMENTS:

A LARGE BED FISHED ONE YEAR IN 1988.

LANDINGS FROM HARVEST LOGS = 1.9 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

THIS AREA SHOULD BE OPEN IN 1992.

CONSIDERATION FOR ADDITIONAL QUOTA SO THAT WINTER HARBUR- FORWARD INLET
CAN BE CLOSED IN 1992

COULD CONSIDER SACALING DOWN AREA ACCORDING TO LANDINGS AND REMOVALS.

RECOMMENDATIONS:

QUOTA = 3 X 52,000 LB = 156,000 LB.

THE 1992 QUOTA WAS SET AT 175,000 LB. TO BALANCE WEST COAST QUOTAS.

TABLE 3.35

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	27 F - SEA OTTER COVE		
REPORTED HARVEST AREAS:	14 HA (1991)	# BEDS:	1
CUMULATIVE LANDINGS TO 1990:	76 TONNES		
	161,678 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	329	2	3	5	7
1.5	493	4	5	7	10
2	658	5	7	10	13
3	986	7	10	15	20
3.5	1151	9	12	17	23

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	149	1	1	2	3
16.0	224	2	2	3	4
21.3	298	2	3	4	6
32.0	447	3	4	7	9
37.3	522	4	5	8	10

COMMENTS:

LANDINGS FROM HARVEST LOGS = 24.6 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

RECOMMENDATIONS:

CLOSURE SHOULD BE CONSIDERED.

THE 1992 QUOTA WAS SET AT 50,000 LB. TO ALLOW FOR FISHING AND BECAUSE OF
MANAGEMENT DECISION TO LIMIT QUOTA REDUCTION TO 15% EACH YEAR FOR 1992-1993.

TABLE 3.36

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	27 H - KLASKINO INLET, S/A 27-5		
REPORTED HARVEST AREAS:	226 HA (1991)	# BEDS:	9
CUMULATIVE LANDINGS TO 1990:	76 TONNES		
	1,315,366 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	5307	40	53	80	106
0.2	1061	8	11	16	21
2	10614	80	106	159	212
3	15922	119	159	239	318
3.5	18575	139	186	279	372

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	2407	18	24	36	48
2.1	481	4	5	7	10
21.3	4814	36	48	72	96
32.0	7221	54	72	108	144
37.3	8424	63	84	126	168

COMMENTS:

LANDINGS FROM HARVEST LOGS = 12.4 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

SOME BEDS WERE SCALED WITH THE LANDING CRITERIA.

3 X 106,000 LB /YR = 318,000 LB.

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 340,000 LB. PSP CLOSURES IN THE 1992 SEASON RESULTED
IN ONLY 66378 LB. QUOTA LANDED IN 27-H.

IN 1993, A QUOTA OF 275,000 LB. WAS SET, APPROXIMATELY THE REMAINING QUOTA FROM
THE 1992 FISHERY.

TABLE 3.37

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 27 I - KLASKISH INLET, S/A 27-6					
REPORTED HARVEST AREAS: 101 HA (1991)		# BEDS: 13			
CUMULATIVE LANDINGS TO 1990: 76 TONNES		1,038,567 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2372	18	24	36	47
1.5	3558	27	36	53	71
2	4744	36	47	71	95
3	7115	53	71	107	142
3.5	8301	62	83	125	166
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1076	8	11	16	22
16.0	1613	12	16	24	32
21.3	2151	16	22	32	43
32.0	3227	24	32	48	65
37.3	3765	28	38	56	75

COMMENTS:

7 YEARS OF FISHING, 1985 TO 1991.

LANDINGS FROM HARVEST LOGS = 21.9 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

3 X 47,000 LB /YR = 141,000 LB.

RECOMMENDATIONS:

FUTURE CLOSURE SHOULD BE CONSIDERED.
POSSIBLE SURVEY SITE.

THE 1992 QUOTA WAS SET AT 165,000 LB.

TABLE 3.38

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: MCMULLEN GROUP - 7-18					
REPORTED HARVEST AREAS: 53 HA (1991)		# BEDS: 4			
CUMULATIVE LANDINGS TO 1990: 323 TONNES		711,182 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1245	9	12	19	25
1.5	1867	14	19	28	37
2	2489	19	25	37	50
3	3734	28	37	56	75
3.5	4356	33	44	65	87
5	6223	47	62	93	124
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	564	4	6	8	11
16.0	847	6	8	13	17
21.3	1129	8	11	17	23
32.0	1693	13	17	25	34
37.3	1976	15	20	30	40
53.3	2822	21	28	42	56

COMMENTS:

QUOTA = 44,000 X 3 = 132,000 LB
LANDINGS FROM HARVEST LOGS =

16.3 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 131,000 LB.

TABLE 3.39

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: MCNAUGHTON GROUP - 7-25, E. OF QUEENS SND.					
REPORTED HARVEST AREAS:		122 HA (1991)	# BEDS: 10		
CUMULATIVE LANDINGS TO 1990:		531 TONNES	1,169,712 POUNDS		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2865	21	29	43	57
1.5	4297	32	43	64	86
2	5730	43	57	86	115
3	8595	64	86	129	172
3.5	10027	75	100	150	201
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1299	10	13	19	26
16.0	1949	15	19	29	39
21.3	2599	19	26	39	52
32.0	3898	29	39	58	78
37.3	4548	34	45	68	91

COMMENTS:

QUOTA = 100,000 X 3 = 300,000 LB
LANDINGS FROM HARVEST LOGS =

11.7 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 301,000 LB.

TABLE 3.40

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: GOOSE ISLAND - 7-25, GOOSE ISLAND SHORE					
REPORTED HARVEST AREAS:		1 HA (1991)	# BEDS: 1		
CUMULATIVE LANDINGS TO 1990:		1 TONNES	3,190 POUNDS		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	23	0	0	0	0
1.5	35	0	0	1	1
2	47	0	0	1	1
3	70	1	1	1	1
3.5	82	1	1	1	2
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	11	0	0	0	0
16.0	16	0	0	0	0
21.3	21	0	0	0	0
32.0	32	0	0	0	1
37.3	37	0	0	1	1

COMMENTS:

LANDINGS FROM HARVEST LOGS =

3.9 YEARS OF QUOTA TAKEN
@ 3.55 GEODUCKS/M²

RECOMMENDATIONS:

AN EXPLORATORY QUOTA FOR 1992 QUOTA WAS SET AT 50,000 LB.

TABLE 3.42

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: SEAFORTH CHANNEL - 7-8, PTN 7-9, -12, -22						
REPORTED HARVEST AREAS:		45 HA (1991)	# BEDS:		4	
CUMULATIVE LANDINGS TO 1990:		167 TONNES	367,329 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	1057	8	11	16	21	
1.5	1585	12	16	24	32	
2	2113	16	21	32	42	
3	3170	24	32	48	63	
3.5	3699	28	37	55	74	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	479	4	5	7	10	
16.0	719	5	7	11	14	
21.3	959	7	10	14	19	
32.0	1438	11	14	22	29	
37.3	1677	13	17	25	34	

COMMENTS:

QUOTA = 3 X 37,000 LB. = 111,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 9.9 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 111,000 LB.

TABLE 3.41

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: SPIDER ANCHORAGE - 7-27, W. OF KILDIT SOUND						
REPORTED HARVEST AREAS:		179 HA (1991)	# BEDS:		16	
CUMULATIVE LANDINGS TO 1990:		1211 TONNES	2,669,726 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	4204	32	42	63	84	
1.5	6305	47	63	95	126	
2	8407	63	84	126	168	
3	12611	95	126	189	252	
3.5	14712	110	147	221	294	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	1906	14	19	29	38	
16.0	2860	21	29	43	57	
21.3	3813	29	38	57	76	
32.0	5719	43	57	86	114	
37.3	6672	50	67	100	133	

COMMENTS:

QUOTA = 3 X 147,000 LB. = 441,000 LB. @ 3.5 GEODUCKS/M²

SOME BEDS WERE SCALED DOWN IN SIZE.

THIS AREA HAS BEEN HEAVILY FISHED IN PAST YEARS. QUOTA WAS CALCULATED
ASSUMING A DENSITY OF 5 GEODUCKS/M² PRIOR TO 1992.

LANDINGS FROM HARVEST LOGS = 18.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 442,000 LB

TABLE 3.43

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	CAPE MARK - 7-32		
REPORTED HARVEST AREAS:	69 HA (1991)	# BEDS:	2
CUMULATIVE LANDINGS TO 1990:	316 TONNES	696,865 POUNDS	

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1620	12	16	24	32
1.5	2431	18	24	36	49
2	3241	24	32	49	65
3	4861	36	49	73	97
3.5	5671	43	57	85	113

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	735	6	7	11	15
16.0	1102	8	11	17	22
21.3	1470	11	15	22	29
32.0	2205	17	22	33	44
37.3	2572	19	26	39	51

COMMENTS:

QUOTA = 3 X 57,000 LB. = 171,000 LB. @ 3.5 GEODUCKS/M²

LARGE BEDS WERE SCALED DOWN IN AREA.

LANDINGS FROM HARVEST LOGS = 12.3 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 120,000 LB. FOR CAPE MARK, WITH 50,000 LB
EXPLORATORY MOVED TO 7-20, PRINCESS ALICE IS. EXPLORATORY.

TABLE 3.44

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	THOMPSON BAY - 7-19, -21		
REPORTED HARVEST AREAS:	20 HA (1991)	# BEDS:	2
CUMULATIVE LANDINGS TO 1990:	36 TONNES	78,825 POUNDS	

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	470	4	5	7	9
1.5	704	5	7	11	14
2	939	7	9	14	19
3	1409	11	14	21	28
3.5	1644	12	16	25	33

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	213	2	2	3	4
16.0	320	2	3	5	6
21.3	426	3	4	6	9
32.0	639	5	6	10	13
37.3	746	6	7	11	15

COMMENTS:

QUOTA = 3 X 16,000 LB. = 48,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 4.8 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 49,000 LB.

TABLE 3.45

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	NALUA PASSAGE - 7-26, PTN 7-27 E. OF KILDIT SND, 8-4		
REPORTED HARVEST AREAS:	80 HA (1991)	# BEDS:	10
CUMULATIVE LANDINGS TO 1990:	262 TONNES 577,160 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1879	14	19	28	38
1.5	2818	21	28	42	56
2	3757	28	38	56	75
3	5636	42	56	85	113
3.5	6575	49	66	99	132

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	852	6	9	13	17
16.0	1278	10	13	19	26
21.3	1704	13	17	26	34
32.0	2556	19	26	38	51
37.3	2982	22	30	45	60

COMMENTS:

QUOTA = 3 X 66,000 LB. = 198,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 8.8 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 197,000 LB.

TABLE 3.46

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	CHOKED PASSAGE - 8-1 N. OF DUBLIN PT; 8-2, -3		
REPORTED HARVEST AREAS:	60 HA (1991)	# BEDS:	6
CUMULATIVE LANDINGS TO 1990:	175 TONNES 386,166 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1409	11	14	21	28
1.5	2113	16	21	32	42
2	2818	21	28	42	56
3	4227	32	42	63	85
3.5	4931	37	49	74	99

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	639	5	6	10	13
16.0	959	7	10	14	19
21.3	1278	10	13	19	26
32.0	1917	14	19	29	38
37.3	2237	17	22	34	45

COMMENTS:

QUOTA = 3 X 49,000 LB. = 147,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 7.8 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 148,000 LB.

TABLE 3.47

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: CALVERT ISLAND - LOWER - PTN 9-1,10-1,10-2						
REPORTED HARVEST AREAS:		30 HA (1991)	# BEDS:		4	
CUMULATIVE LANDINGS TO 1990:		213 TONNES	470,152 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	704	5	7	11	14	
1.5	1057	8	11	16	21	
2	1409	11	14	21	28	
3	2113	16	21	32	42	
3.5	2466	18	25	37	49	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	320	2	3	5	6	
16.0	479	4	5	7	10	
21.3	639	5	6	10	13	
32.0	959	7	10	14	19	
37.3	1118	8	11	17	22	

COMMENTS:

QUOTA = 3 X 25,000 LB. = 75,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 19.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 40,000 LB.

TABLE 3.48

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: SMITH INLET - 10-3, 10-4						
REPORTED HARVEST AREAS:		19 HA (1991)	# BEDS:		4	
CUMULATIVE LANDINGS TO 1990:		79 TONNES	173,338 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	446	3	4	7	9	
1.5	669	5	7	10	13	
2	892	7	9	13	18	
3	1339	10	13	20	27	
3.5	1562	12	16	23	31	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	202	2	2	3	4	
16.0	304	2	3	5	6	
21.3	405	3	4	6	8	
32.0	607	5	6	9	12	
37.3	708	5	7	11	14	

COMMENTS:

QUOTA = 3 X 16,000 LB. = 48,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 11.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 47,000 LB.

TABLE 3.49

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	N.PTN LAREDO CH. (6-11,6-14, 6-15)		
REPORTED HARVEST AREAS:	28 HA (1991)	# BEDS:	3
	58 HA - TOTAL HA FOR 3 BEDS		
CUMULATIVE LANDINGS TO 1990:	61 TONNES		
	134,955 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	658	5	7	10	13
1.5	986	7	10	15	20
2	1315	10	13	20	26
3	1973	15	20	30	39
3.5	2301	17	23	35	46

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	298	2	3	4	6
16.0	447	3	4	7	9
21.3	596	4	6	9	12
32.0	895	7	9	13	18
37.3	1044	8	10	16	21

COMMENTS:

QUOTA = 3 X 23,000 LB. = 69,000 LB. @ 3.5 GEODUCKS/M²
THE QUOTA WAS SET BASED ON LANDINGS FROM ONE BED OF 28 HA.

LANDINGS FROM HARVEST LOGS = 5.9 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 70,000 LB.

TABLE 3.50

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	LAREDO INLET - 6-19 AND 6-16 N. OF MEYERS PASS		
REPORTED HARVEST AREAS:	23 HA (1991)	# BEDS:	9
CUMULATIVE LANDINGS TO 1990:	591 TONNES		
	1,302,314 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	540	4	5	8	11
1.5	810	6	8	12	16
2	1080	8	11	16	22
3	1620	12	16	24	32
3.5	1890	14	19	28	38

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	245	2	2	4	5
16.0	367	3	4	6	7
21.3	490	4	5	7	10
32.0	735	6	7	11	15
37.3	857	6	9	13	17

COMMENTS:

QUOTA = 3 X 19,000 LB. = 57,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 68.9 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 57,000 LB.

TABLE 3.51

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		KITASU BAY - 6-18				
REPORTED HARVEST AREAS:		8 HA (1991)	# BEDS:		1	
CUMULATIVE LANDINGS TO 1990:		6 TONNES 14,299 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	188	1	2	3	4	
1.5	282	2	3	4	6	
2	376	3	4	6	8	
3	564	4	6	8	11	
3.5	658	5	7	10	13	

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	85	1	1	1	2
16.0	128	1	1	2	3
21.3	170	1	2	3	3
32.0	256	2	3	4	5
37.3	298	2	3	4	6

COMMENTS:

QUOTA = 3 X 7,000 LB. = 21,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 2.2 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 20,000 LB.

TABLE 3.52

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		HIGGINS PASSAGE - PTNS OF 6-16 AND 6-17				
REPORTED HARVEST AREAS:		122 HA (1991)	# BEDS:		3	
CUMULATIVE LANDINGS TO 1990:		369 TONNES 812,580 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	2865	21	29	43	57	
1.5	4297	32	43	64	86	
2	5730	43	57	86	115	
3	8595	64	86	129	172	
3.5	10027	75	100	150	201	

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1299	10	13	19	26
16.0	1949	15	19	29	39
21.3	2599	19	26	39	52
32.0	3898	29	39	58	78
37.3	4548	34	45	68	91

COMMENTS:

FISHERS EXPRESSED CONCERN OVER STOCKS IN THIS AREA

QUOTA = 3 X 100,000 LB. = 300,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 8.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 151,000 LB., LESS THAN THE CALCULATED QUOTA

TABLE 3.53

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: PRICE ISLAND - UPPER - PTN. 6-17, E. SIDE LAREDO CH.						
REPORTED HARVEST AREAS:	6 HA (1991)	# BEDS:	1			
CUMULATIVE LANDINGS TO 1990:	44 TONNES 97,728 POUNDS					
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	141	1	1	2	3	
1.5	211	2	2	3	4	
2	282	2	3	4	6	
3	423	3	4	6	8	
3.5	493	4	5	7	10	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	64	0	1	1	1	
16.0	96	1	1	1	2	
21.3	128	1	1	2	3	
32.0	192	1	2	3	4	
37.3	224	2	2	3	4	

COMMENTS:

QUOTA = 3 X 5,000 LB. = 15,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 19.8 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

AN EXPLORATORY 1992 QUOTA WAS SET AT 50,000 LB.

TABLE 3.54

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: LOWER PRICE IS SHORE - 7-31, 7-1, 7-2						
REPORTED HARVEST AREAS:	20 HA (1991)	# BEDS:	2			
CUMULATIVE LANDINGS TO 1990:	181 TONNES 399,000 POUNDS					
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	470	4	5	7	9	
1.5	704	5	7	11	14	
2	939	7	9	14	19	
3	1409	11	14	21	28	
3.5	1644	12	16	25	33	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	213	2	2	3	4	
16.0	320	2	3	5	6	
21.3	426	3	4	6	9	
32.0	639	5	6	10	13	
37.3	746	6	7	11	15	

COMMENTS:

QUOTA = 3 X 16,000 LB. = 48,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 24.3 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 150,000 LB. - INCLUDING 102,000 LB EXPLORATORY QUOTA

TABLE 3.55

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: MILBANK SOUND - 7-31, -1, PNT -2, -3

REPORTED HARVEST AREAS: 8 HA (1991) # BEDS: 2

CUMULATIVE LANDINGS TO 1990: 51 TONNES
111,755 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	188	1	2	3	4
1.5	282	2	3	4	6
2	376	3	4	6	8
3	564	4	6	8	11
3.5	658	5	7	10	13

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	85	1	1	1	2
16.0	128	1	1	2	3
21.3	170	1	2	3	3
32.0	256	2	3	4	5
37.3	298	2	3	4	6

COMMENTS:

QUOTA = 3 X 7,000 LB. = 21,000 LB. @ 3.5 GEODUCKS/M²

LANDINGS FROM HARVEST LOGS = 17.0 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 70,000 LB. - INCLUDING 50,000 LB EXPLORATORY QUDTA

APPENDIX 4

1993 GEODUCK FISHERY QUOTAS AND QUOTA OPTIONS

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APPENDIX 4. 1993 GEODUCK FISHERY QUOTAS AND QUOTA OPTIONS

1.0 1993 GEODUCK FISHERY

As discussed earlier, a two year plan was set for 1992 and 1993, with a limit of 15% reduction in quota each year. As a consequence, Area 14 quota was divided over two seasons and some quotas were adjusted between years in Area 24. Some areas were fished that require further evaluation and possible conservation closures. These are summarized in Table 16.

Similarly in the north coast, with a movement of licences from the west coast of Vancouver Island to the north (one licence each year in 1992 and 1993), some exploratory fishing was set.

1.1 SOUTH COAST-1993 QUOTA RECOMMENDATIONS

For 1993, the second season of the three year area rotations, the fishery was planned for Areas 14 and 16 in Inside Waters and Areas 24 and 26 on the west coast of Vancouver Island.

A summary of recommended quotas for south coast areas in 1993 are presented in Table 18. Detailed quota options and recommendations for the south coast are presented in Tables 4.1 to 4.12.

1.1.1 South coast- Inside Waters-1993 Quota Recommendations

Area 14 (Figures 6 and 7)

Area 14D Hornby Island, portions of 14-7, -9, -10 and -12
4 beds, 404 ha Fig. 7

Fishers advise that most beds around Hornby Island are similar and productive. In total, fishers have identified 4 relatively large beds: 56, 99, 116 and 133 ha, totalling 404 ha.

i) Hornby Island: Collishaw Point to Flora Islet to St. John Pt.; portion of 14-9
1 bed #5002; 99 ha

This bed, 50-02 measures 99 ha, has been fished 5 years, most years in excess of 20,000 lb. and most recently in 1990 for 76,245 lb.

ii) Hornby Island- Collishaw Pt. to Phipps Pt. to Shingle Point; portions of 14-10 and 14-7
1 bed # 5001; 116 ha

This bed measures 116 ha, has been fished 9 years, 223,035 lb. (24,781 lb. /yr average over 9 seasons). The most recent fishery was in 1990, for 38,999 lb.

iii) Hornby Island - Shingle Point south east to Norman Point
1 bed; 56 ha

This bed (101) has been fished 7 years, 123,303 lb. (17,615 average for 7 seasons). The most recent fishery was in 1990 for 13,134 lb.

iv) Hornby Island Norman Pt./Norris Rocks to St. John Point
1 bed; 133 ha.

This is actually two beds, coded as bed (51-01), partially at Downes Point and in Tribune Bay. It has been fished 8 years for 259,828 lb., the most recent fishery was in 1990 for 34,084 lb. The average annual landings were 32,478 lb.

RECOMMENDATION: 14-D: The quota set for 1993 was 253,000 lb., less than the calculated quota (285,000 lb.) (Table 4.1). The number was set to achieve 12 (whole number) licence quotas in the Inside Waters in 1993.

Fishers recommended that a single quota be set for Hornby Island and vessels will distribute their effort as they have in the past.

Fishers supported a reduced quota, at 200,000 lb.. Some quota could then be allocated for a survey in this area. Beds need to be remeasured.

Area 14-E South Maplegard Point to Northwest Bay; 14-1,-4,-5
6 beds, 922 ha Fig. 7

i) Maplegard Point to Qualicum Beach, subarea 14- 5
2 beds, 546 ha

This portion of Area 14 has extensive shoreline beds. There are 353 ha at Qualicum Bay.

The bed # 5205, Nile Creek to Maplegard Pt., 193 ha, has had total landings of 405,846 lb. over 4 years; 101,462 lb. annual average, greater than the annual quota option.

ii) Qualicum Beach to Craig Bay; subareas 14-1 and 14-4
4 beds; 376 ha

This area includes beds:

14-1: 122 ha at French Creek
48 ha at Rathrevor Beach-Craig Bay

14-4: 17 ha at Little Qualicum
189 ha at Qualicum Beach

The large bed areas are suspect and should be reduced.

RECOMMENDATIONS: 14-E: A conservative quota of 517,000 lb. was set in 1993, due to uncertainty in the large bed sizes.

AREA 14 TOTAL: 1,349,000 lb. The 1992 fishery was set for 632,000 lb. (14-A, B, C; Table 13) and the 1993 fishery 717,000 lb. (Table 18). This compares to 1,220,000 lb. in 1988-89-90 (Appendix 1, Table 1.3).

Area 16 (Figure 21)

Area 16 has been fished since 1978 with annual landings to 301 t in 1980 (Table 3).

Annual quotas set have often been in combination with Area 15. In 1980, the combined quota was 500,000 lb. (226.8 t). In 1981 this was reduced to 90,000 lb. (40.8 t).

Area 15 and 16 were combined in 1984 for 400,000 lb. In 1985 the quota was 175,000 lb. In 1986, 1987 and 1988 the quota was 200,000 lb.

The Area 16 fishery was closed in 1989 as part of the three year rotation program. The three year quota set in 1990 was 600,000 lb. (3 years x 200,000 lb.).

In 1987 there was an exploratory fishery in subareas 16-5 to 16-9, Sechelt, Salmon and Narrows Inlet. There were 3 beds (40 ha) identified in subarea 16-5, and one bed in 16-9 (92 ha). This area was allocated a separate quota in 1990, but due to sewage contaminated closures there was difficulty in reaching the quota.

Area 16-A west shore Texada Island; subarea 16-22 and 16-21
7 beds, 248 ha Fig. 19

i) subarea 16-22: There are two beds, one at Limekiln Bay (26 ha) and one at Crescent Bay (50 ha). Most of the product has come from Crescent Bay and future closure should be considered.

ii) subarea 16-21: 5 beds, 172 ha: Three beds have been fished for long periods, 8, 9 and 11 years. There has been 928,896 lb. recorded for this portion.

In 1990, 238,223 lb. were taken from subarea 16-21 and 21,051

lb. from 16-22. This area has high removal rates relative to other inside areas. Fishers advise that this shore has more ground and more consistent digging than at Lasqueti Island.

RECOMMENDATION 16-A: 175,000 lb. quota set in 1993, for three year option (Table 4.3). Crescent Bay area should be evaluated. (Table 17).

Area 16-B Lasqueti Island; subarea 16-19 and 16-20 and a portion of 14-3
11 beds, 318 ha (1991) (previously 415 ha) Fig. 19

There is only one bed with several sites recorded for 16-20, 37 ha at Fegan Islands. Fishers advise that there are only small pockets of clams at this location.

In subarea 16-19 there are seven beds for 251 ha. There is a large site in Scottie Bay. It has been fished for 10 years for 221,673 lb., most recently in 1990 for 39,515 lb. The highest annual landing was 42,323 lb. in 1981. The annual quota for 333 ha is 175,000 lb. suggesting that the area is overestimated. In 1992 it was scaled down to 40 ha from 110 ha based on landings.

There are three beds (30 ha - 1992) at Finerty Islands and False Bay in subarea 14-3 that are included in this fishery.

RECOMMENDATION 16-B: Fishers advise that the area is limited at Lasqueti Island and recommend a quota less than the west coast of Texada Island.

A quota of 125,000 lb. was set for the 1993 fishery. This is less than the calculated quota option (Table 4.4). The measured areas are too large. Even at the measured area, there has been 16.6 years of quota landed over 12 years of fishing. Closure for a rotation may be necessary (Table 17).

Area 16-C East shore of Texada Island, Northeast Point to Point Upward, Malaspina Strait; subarea 16-18
3 beds, 34 ha Fig. 19

This area has had only sporadic fishing, with most of the effort from one location, bed 2101 (19 ha); 441,489 lb. Over six years, there has been a removal of 1 gdk/m² over 19 ha at three sites.

Fishers advise that the beds are small with high densities. Landings have been 458,233 lb. or 57 years of quota @ 1 gdk/m² (Table 17).

RECOMMENDATION 16-C: Fishery of 50,000 lb. recommended for 1993. The bed at southeast Texada, 2101, should be closed. This area needs to be evaluated prior to another fishery.

Area 16-D Entrance to Jervis Inlet, Francis Peninsula - Bjerre Shoal - Thormanby Islands; 16-11, portion of subarea 16-17; 16-01 and 16-02; Fig. 19
9 beds, 90 ha (1991)

There are 5 small beds, 1 to 4 ha, totalling 9 ha, identified at the entrance to Jervis Inlet.

There is a large bed identified (previously measured 179 ha) at Thormanby Islands that is too large, considering that over 6 years only 75,265 lb. have been taken. Much smaller beds, eg. 28 ha at Porpoise Bay, have had higher landings. This bed was scaled to 50 ha

RECOMMENDATION 16-D: A three year quota of 40,000 lb. was recommended by the fishers. Following a scaling down of beds based on landings, the calculated option was 28,000 lb. (Table 4.6).

Area 16-E Sechelt - Narrows - Salmon Inlets, subareas 16-5 to 16-9 and 29-1
7 beds, 48 ha (1991) Fig. 19

i) The inlet areas have been fished three seasons, 1987, 1988 and 1990. Much of the productive ground (28 ha) was closed under a sewage contaminated closure at the head of Porpoise Harbour and additional closures are expected with future development in the area.

ii) Subarea 29-1 Mainland, south of Sechelt; Reception Point to Gower Pt.
4 beds, 43 ha

RECOMMENDATION 16-E: Fishers recommend 10,000 to 20,000 lb. quota (Table 4.7) as few clams have been found in this area. The 1993 quota was set at 10,000 lb..

1.1.2 South Coast - West Coast Vancouver Island. - 1993 Quota Recommendations

In 1992 the number of west coast licences was reduced from 22 to 21 and in 1993 a further licence quota was moved to the north coast, leaving 19 licence quotas on the west coast.

In the formation of a two year plan, all quotas were examined

and divided between the two years to meet a 15% reduction in each year. This resulted in quota changes between years for Area 24 (24-B2, -B3, -B4).

In addition, due to PSP blooms in late 1991, quota moved from Area 24 to Area 26. This is compensated in 1993 in closures to 26-B1 and 26-C and a reduction in the quota for 26-B2. The quotas for Area 24, not landed in 1991, were reassigned in 1993 (24-A, 24-A3) to balance the Area 26 closures.

Area 24 (Figure 1)

The history of the Area 24 fishery is discussed in Appendix 3 for 1992.

In total, 23 beds, 986 ha have been identified for the "Inside" and 15 beds, 1503 ha for the "Outside" areas (Fig. 11, 12). There were 14 beds for 24-C, the "Exposed" area and 22 beds for 24-D, the "Inlets".

Since 1989, with the introduction of the three year rotational fishery, Area 24 was left with an annual quota.

Area 24 - Inside (Fig. 11)

In 1991, for the first time, the "inside" area is subdivided into three quota units designated 24-A, 24-AA and 24-AAA.

Some of the Area 24 inside quota should be saved to the end of the year to maintain supply to live markets.

24-A Inside portion of 24-6, 24-7 and 24-9; Fig. 11
19 beds, 665 ha estimated (1991)

This is traditionally the major fishing area in the "inside" areas, a portion of subarea 24-6, subarea 24-7 and 24-9.

RECOMMENDATION 24-A: The 1993 quota was set initially at 419,000 lb. The annual quota recommended is 285,000 lb. (Table 3.21) and an additional 134,000 lb. was added from the 1991 fishery. In-season changes in the fall of 1992 (Appendix 3, Table 3.21) resulted in a reduced quota of 390,000 lb. for the 1993 fishery.

24-A2 Inside Yarksis - portion of 24-8; Fig. 11
4 beds, 153 ha (1991)

This area, a portion of 24-8, has been heavily fished at one site, Yarksis.

RECOMMENDATION 24-A2: The 1993 quota set was 70,000 lb. (Table 3.22).

This area requires further evaluation due to heavy fishing pressure (Table 16).

24-A3 Inside Tonquin - Echachis - Wickanninish;
1 bed, 110 ha estimated (1991) Fig. 11

There has been heavy fishing at only one site off Tonquin Island, a portion of 24-6.

RECOMMENDATION 24-A3: The 1993 quota set was 43,500 lb.; 30,000 lb. + 13,500 lb. from the 1991 fishery.

The recommended annual quota for this area is 30,000 lb., less than the calculated quota (Table 3.23).

Area 24 Outside (Fig. 12)

In 1991, for the first time the "outside" area was subdivided into four quota units designated 24-B, -B2, -B3 and -B4.

24-B1 Outside; portion of 24-6; Fig. 12
12 beds, 637 ha estimated (1991)

There has been heavy fishing pressure at 6 of the 12 beds identified in a portion of subarea 24-6.

The Area 24-B1 area description was amended (Feb 26/93) to read:

"A portion of 24-6, "outside" or west of a straight line from a point on Vancouver Island, approximately 1/2 mile northwesterly of the western most point of Morfee Island, then true south to an unnamed point on Vargas Island, and south of line from the light at the southeast tip of Morfee Island to a floating buoy, Y11, in Calmus Pass, thence to the light at Monks Islet, then northwesterly to a line that runs due south from Kutcouc Point for **one half (0.5) nautical mile**; bounded on the south by the sub-area line from the most southwesterly point on Vargas Island, near Ahaus Point, thence northwesterly along the surfline to Rafael Point on Flores Island".

General description: A portion of a bed on the north shore of Vargas Island, beds in the vicinity of Hobbs It., Blunden Island, Bartlett-Shot-Shag-Leeke Islands. (Note permanent closure in Ahaus Bay).

RECOMMENDATION AREA 24-B1: The 1993 quota set was 275,000 lb. (Table 3.24). The quota should not be increased until more is known about the Area 24 stocks.

24-B2 Outside; Coomes Bank portion of 24-6; Fig. 12

1 bed, 339 ha estimated (1991)

This is one large bed measured at 339 ha It has supported a large fishery in excess of one million lb. It was separated as a separate quota unit in 1991.

RECOMMENDATION AREA 24-B2: The 1993 quota was set initially at 200,000 lb.; 160,000 lb. annual option (Table 3.25) + 40,000 lb. from 1992 when the quota was 120,000 lb. (Tables 14 and 18). PSP closures in the fall of 1992 (Appendix 3, Table 3.25) resulted in increased quota for 1992 (185,937 lb.) and a decreased quota set for 1993 (134,000 lb.)

24-B3 Outside; Ahousat portions of 24-4 and 24-6
2 beds, 191 ha estimated (1991) Fig. 12

A separate annual quota is recommended to spread fishing effort throughout Area 24.

RECOMMENDATION 24-B3: The 1993 quota was initially set at 180,000 lb.; 90,000 lb. calculated (Table 3.26) + 90,000 lb. from 1992 when this unit was closed. (Tables 14 and 18). Due to PSP closures in the fall of 1992 this area was fished for the 180,000 lb and a closure set for 1993.

24-B4 Russell Channel portion of 24-6; Fig. 12
1 bed, 184 ha estimated (1991)

A new division of Area 24 (24-BBBB) was created in October 1991, with the intent to harvest the one large bed in Russell Channel that reported high landings in 1983 and 1984 but very little in recent years.

The 24-B4 area description was amended (Feb 26/93) to read :

"That portion of 24-6 south of a line from Yates Point on Flores Island to the unnamed point South of Chetarpe Indian Reserve on Vancouver Island, **thence southerly to Monks Islet light**, thence westerly to intersect a line one half nautical mile due south from Kutcous Point on Flores Island, thence westerly to the unnamed point south of Yates Point in Flores Island, thence following the shore to Yates Point."

RECOMMENDATION 24-B4: The 1993 quota set was 180,000 lb.; 90,000 lb. (Table 3.27) + 90,000 lb. from 1992 when this unit was closed. (Tables 14 and 18).

AREA 24-C Exposed Area and Sydney Inlet; 24-1, 24-2
and exposed portions of 24-8 and 124-3; Fig. 13
14 beds 119 ha (1991)

There have been five beds, 21 ha, reported in the exposed

portions other than Sydney Inlet in the years 1985, 1986, 1989 and 1990 for 111,952 lb.(50.8 t) in total. Fishers report that there are only very small fishing areas and they were only able to land 770 lb. in 1990. The 21 ha area is likely too large; but is a reduction from 56 ha, scaled on the basis of minor landings.

In 1989 and 1990, Sydney Inlet, with nine beds of 98 ha, was included in the exposed area. Sydney Inlet had been fished earlier, since 1985, and has been heavily fished for 609,014 lb. over five years of fishing; 8 years of quota (Table 16).

In 1989, Hesquiat Harbour was added to the exposed area, but little ground was found and only 3595 lb. reported.

RECOMMENDATION 24-C: This area should remain closed in 1992 (Table 3.28) and 1993, pending further evaluation. It was last fished in 1990.

AREA 24-D Inlets subareas 24-3,-5, -10 to -14 inclusive
22 beds, 96 ha Fig. 13

The "Inlet" areas were fished over the period 1985 to 1990, for landings of 1,187,125 lb.(538.5 t). Most fishers have expressed concern that these areas have been overfished.

RECOMMENDATION 24-D: This area should remain closed in 1992 and 1993, and until further evaluation (Table 3.29). Some bed closures may be required. Fishers report some unharvested beds in inlets, discovered during the sea cucumber fishery.

Area 26 (Fig.1, 20)

As of November 15, there was 367,652 lb. remaining in the quota for the west coast of Vancouver Island. Openings of three portions of Area 26 were announced.

AREA 26-B1	MISSION GROUP 1 (description below)	200,000 LB.
AREA 26-B2	MISSION GROUP 2 (description below)	25,152 LB.
AREA 26-C	CENTRAL KYUQUOT- INLETS	142,500 LB.
	TOTAL:	367,652 LB.

Area 26-B Mission Group, Kyuquot Sound

For the 1991 fishery, the Mission Group, 26-B was further divided into two portions, 26-B1 and 26-B2 to shift fishing effort from the heavily exploited portion of the Mission Group.

Area 26-B1 (1991) Mission Group, north of Atkis Island to Gayward Rock, Barter Cove and to the east of Sobry and Kamils Island; a portion of subarea 26-1 and a portion of 26-6;

The area, 26-B1 is described as:

"a portion of 26-6 and a portion of 26-1, inside boundaries from Gayward Rock on the north , thence southerly to the most northeastern point of Atkis Island, following along the shore to the most southeast point of Atkis Island, thence to the most southerly point of Kamils Island, thence southeast to Raccoon Point on Union Island, thence northwest to Amos Island light, thence to the point of commencement at Gayward Rock".

This is includes the traditional fishing sites in Barter Cove - Sobry Island and to the east of Kamils Island.

Area 26- B2 (1991) Mission Group

This area 26-B2, included beds identified in the vicinity of Spring Island and in Kamils Anchorage.

For 1991, 26-B2 is described:

"a portion of 26-6 and a portion of 26-1, inside of boundaries from Gayward Rock on the north, thence southerly to the most northeastern point of Atkis Island following along the shore to the most southeast point of Atkis Island, thence to the most southerly point of Kamils island, thence southeast to Raccoon point on Union Island, thence westerly to the whistle buoy and light Mo(A) located due south of Lookout Island, thence north to the Lookout Island light, thence northeasterly to McLean Point on McLean Island, and thence easterly to the point of commencement at Gayward Rock."

Area 26-C (1991) Inside

This area is described as:

"Area 26-C includes a portion of 26-6, north of a line from Mclean Point, Mclean Island to Gayward Rock to Amos Island light to Raccoon Point on Union Island, subareas 26-3, and a portion of 26-2, north of a line from Chatchannel Point on Union Island due East to Vancouver Island."

Note: The 1990 boundary for fishing was "north of a line from Chatchannel Point on Union Island to the northeast point at the entrance to Volcanic Cove on Vancouver Island";

For 1991 the boundary was "a portion of 26-2, north of a line from Chatchannel Point on Union Island due East to Vancouver Island." Note: beds south of Chatchannel Point on Union Island and Volcanic Cove and beds south of the cove were closed.

Area 26 was first fished in 1979 most annual landings have been from 200 to 400 t, with a peak in 1982 at 726 t (1.6 million lb.). There were no area restrictions in 1982.

AREA 26 1993 QUOTAS AND OPTIONS

Area 26-A North; Nasparti, Malksope and Ououkinsh Inlets;
portions of 26-7 and 26-10, 26-8 and 26-9. Fig. 20
8 beds; 55 ha estimated (1991)

This area has been fished only a minor amount due to the distance to Fair Harbour to unload. A packer is required to economically fish this area.

A part of Nasparti Inlet falls within the actual boundaries of the Checlet Bay Ecological Reserve but outside of the Fisheries closure area (Fig. 20).

There is only one bed identified in Nasparti Inlet outside the reserve, bed 610 at the mouth of Johnson's Lagoon (12 ha). However, to maintain quota levels in 1993, all beds in Nasparti Inlet will be opened; including:

- 610 Mouth of Johnson Lagoon (12 ha)
- 602 North of Camel Island (19 ha)
- 601 N.W. of Jacobson Pt. (14 ha)
- 603 Nasparti Inlet west (5 ha)
- 611 N.W. of Jacobson Pt. (3 ha)

Nasparti Inlet: 5 beds; 39 ha

There is a bed in Malksope Inlet: 801 (5 ha);
and two in Ououkinsh Inlet: 507 South of IZARD Point (10 ha)
and 506 Ououkinsh Inlet (1 ha).

RECOMMENDATION 26-A: The 1993 quota set for Area 26-A, northern inlets was 100,000 lb.; this was greater than the 78,000 lb. option (Table 4.8). This area requires further evaluation since it is estimated that 20 years of quota has been taken.

Checlet Bay Ecological Reserve (subarea 26-7 and a portion of 26-10 and a portion of 126-1)

There are seven beds (94 ha) identified in the Ecological Reserve and fishers advise that there are many others. The beds in Nasparti Inlet are described above.

There are three other identified beds (50 ha) within the Ecological Reserve:

- 505-west of Acous Peninsula (13 ha)
- 501-N of Chekaklis Island, Bunsby Islands (30 ha)
- 502- Battle Bay-NW of Bunsby Islands (7 ha)

At 2 geoducks/m² over 94 ha, the quota option is 94 ha x 470 lb. x 3 years = 44,180 x 3 = 132,540 lb.

RECOMMENDATION:

There may be other beds in this location. For 1993, the fisheries closure remained as identified in the past, described as " the area enclosed by the coordinates 49° 59' to 50° 07'N and 127° 26' to 127° 39'W" and shown in Fig 22. To maintain the quota levels in 1993, set at 100,000 lb., the boundaries for the closure in the vicinity of the Checleset Bay Ecological Reserve were not amended to conform to the Reserve boundaries. Future fisheries may be restricted to areas outside of the actual reserve boundaries.

Area 26-B1 Mission Group, north of Atkis island to Gayward Rock, Barter Cove and to the east of Kamils Island; portions of subareas 26-1 and 26-6 Fig. 20
1 bed; 208 ha estimated (1991)

The greatest landings for the south coast from one "bed" is from this location, 4,492,232 lb. from 208 ha; removal of 0.918 geoducks/m² over 12 years of fishing (including 1990 as 3 years of fishery, as part of three year rotation). In 1991, 641,944 lb. were landed from this site.

The bed has grown over time as fishing effort expanded over the areas from north of Atkis Island to Gayward Rock, into Barter Cove, to the north and east of Sobry and Kamils Island.

There are two other smaller sites (52 ha) accounting for only 118,909 lb.

RECOMMENDATION 26-B1: This area is closed in 1993. There was a fishery in 1991 against this quota because of PSP in Area 24. There were 163,813 lb. taken in 1991.

The three year quota option is 293,071 lb. (Table 4.9). However, based on landings, 47 years of quota has been taken and this area requires further evaluation. To support the harvest to date, an original density of 7.9 geoducks / m² would be required (Table 17).

Area 26-B2 Mission Group, portions 26-1 and -6; Fig. 20
2 beds, 48 ha estimated (1991)

This area was divided for the 1993 fishery due to the heavy pressure in other parts of the Mission Group. There was a fishery in 1991 that landed 25,152 lb. in this unit.

RECOMMENDATION 26-B2: The 1993 quota was set at 135,000 lb. This is higher than the option shown in Table 4.10.

Area 26-C a portion of 26-6, north of a line from Mclean Point, Mclean Island to Gayward Rock to Amos Island light to Raccoon Point on Union Island, 26-3, 26-4, Crowther Channel-Hohoae Island and a portion of 26-2, north of a line from Chatchannel Point on Union Island due east to Vancouver Island. Fig. 20
13 beds, 82 ha

The 1990 boundary for fishing was "north of a line from Chatchannel Point on Union Island to the northeast point at the entrance to Volcanic Cove on Vancouver Island";

For 1993 the boundary is "a portion of 26-2, north of a line from Chatchannel Point on Union Island due East to Vancouver Island." Note: beds south of Chatchannel Point on Union Island and Volcanic Cove and beds south of the cove are closed.

RECOMMENDATION 26-C: This area is closed for 1993. A quota of 142,500 lb. was set and landed in 1991 due to PSP problems in Area 24. Based on the area and the standard density, 27 years of quota have been landed and further evaluation of the area is required. (Table 4.11)

Area 26-D Union Island, Kyuquot Bay, portion of 26-6, a portion of 26-2 in Kyuquot Channel and 26-1 Clear Passage
14 beds, 172 ha Fig. 20

i) Union Island, Kyuquot Bay 2 beds, 34 ha
This area is protected, but there have not been many landings reported, 149,402 lb. Fishers have reported landings from Kyuquot Bay to other area quotas.

ii) SE Union Island to Tatchu Point
12 beds, 138 ha
This is an exposed area to fish on the outside, Clear Passage, from Rugged Point to Tatchu Point. There are 5 beds, 82 ha in total (range 4 to 55 ha beds). These beds were fished first in 1987 and again for minor amounts reported in 1990. In one small bed of 4 ha, in three years 98,777 lb. were landed, a removal of 1.05 geoducks/m².

There are 7 beds in the more protected Kyuquot Channel (56 ha).

RECOMMENDATION 26-D: The 1993 quota set was 250,000 lb., approximately the quota option of 243,000 lb. (Table 4.12).

AREA 26 TOTAL 1992-1993-1994: 336,756 lb. landed in the 1991 fishery (Appendix 1, Table 1.6) + 485,000 lb. set for 1993 (Table 18) = 821,756 lb. This is a reduction from the three year option (1989-90-91) of 1,350,000 lb. fished in 1990 (Appendix 1, Table 1.3).

The last annual quota, set in 1988 was 450,000 lb.

Area 27-H Klaskino Inlet, subarea 27-5; Fig. 16
9 beds; 226 ha (1991)

This area was first fished in 1985 as part of an exploratory fishery, with 784,820 lb. recorded on logs. In 1990, there were 307,727 lb. landed on logs.

In a 12 ha bed at Anchorage Island, there have been 207,314 lb. landed, a removal of 0.9 geoducks/m².

RECOMMENDATION 27-H: The 1992 quota set was 340,000 lb. (Table 3.36) greater than the quota option of 318,000 lb. Due to a PSP closure in 1992 only 66,378 lb. were landed. This area had a quota of 275,000 lb. set for 1993. (Table 4.13)

1.2 North Coast-1993 Quota Recommendations

For 1993, the coastwide quota was reduced by 15% and an additional licence was moved from the west coast Vancouver Island to the north coast, making 24 quotas of 97,500 lb. (44.2 t) for a northern total of 2,340,000 lb. (1061.5 t).

A summary of north coast quotas for Areas 3, 4, 5 and upper 6 are given in Table 19 and detailed quota options and recommendations are presented in Tables 4.13 to 4.33.

Fishing has been carried out in the north coast since 1980, but because quotas have been apportioned to relatively broad management areas, some minor areas remain to be surveyed. For this reason fishing areas have been subdivided and some exploratory quota may be applied to unfished locations in 1993. The sum of all calculated quotas provided below is short of the 2.34 million lb. (1061.7 t) required for 24 IVQ's. The remaining quota required will be made up in exploratory areas after consultation with fishers.

All quota calculations have been based on a geoduck density of 3.5/m².

Quota areas given below have been ordered geographically from north to south.

1.2.1 AREA A: southern Area 6 (Surf In. and west Aristazabal Isl.) Fig.21

Surf In. area - Subareas 6-10 and 6-12 (A1)

Landings of 413,000 lb. (187.2 t), split between Duckers Isl. and Sager Isl., have been landed since 1987. 57,000 lb. (25.9 t) was landed in the most recent fishery in 1990. Total bed area identified is 41 ha. The recommended quota based on sustainable yield was 101,168 lb. (45.9 t). The 1993 quota was set at 101,000 lb.. (Table 4.14)

Anderson Isl. (Aristazabal Isl.) - ptn. Subarea 6-13 (A2)

36,000 lb. (16.3 t) was landed from a 7 ha bed located in 1990. The recommended harvest based on sustainable yield was 17,273 lb. (7.8 t). The 1993 quota was set at 17,000 lb.. (Table 4.15)

Borrowman Bay (Aristazabal Isl.) - ptn. Subarea 6-13 (A3)

Small landings totalling 18,000 lb. (8.2 t) were taken from two beds in 1987 and 1990. The recommended quota based on sustained yield for 17 ha was 41,948 lb. (19 t). The 1993 quota was set at 42,000 lb.. (Table 4.16)

Kettle In (Aristazabal Isl.) - ptn. Subarea 6-13 (A4)

A total of 298,000 lb. (135.2 t) was landed from two beds with a combined area of 24 ha in 1990. The recommended quota based on sustainable yield was 59,220 lb. (26.9 t). The 1993 quota was set at 59,000 lb.. (Table 4.17)

Upper Clifford Bay (A5); Lower Clifford Bay (A6) - ptn. Subarea 6-13

A total of 876,000 lb. (397.5 t) has been harvested in Clifford Bay, primarily in 1990. Five beds have been identified with a total bed area of 110 ha. The ongrounds observer expressed concern that some beds fished repeatedly in 1990 were being overfished.

The recommended quota is 271,425 lb. (123.2 t) based on sustainable yield. Given the large quantities of geoduck that have been removed, the area should be monitored closely in future fisheries. The 1993 quota was split into Upper Clifford Bay, (171,000 lb.) and Lower Clifford Bay (100,000 lb.) (Table 4.18)

Weeteam Bay (Aristazabal Isl.) - ptn. Subarea 6-13 (A7)

A total of 374,000 lb. (169.7 t) has been landed during the years 1983, 1987, and 1990. Of five beds located, three were first fished in 1990. A total of 62 ha of beds were identified. The recommended quota based on sustainable yield was 152,985 lb. (69.4 t). The 1993 quota was set at 153,000 lb.. (Table 4.19)

Laredo Ch. East - ptns. Subareas 6-14 and 6-15 (A8)

An exploratory quota was set at 20,000 lb. in 1993.

1.2.2 AREA B: northern Area 6 (Otter P., Estevan Gp., Calamity Bay, Campania Is.) Fig. 21

The first substantial landings in Area 6 were made as recently as 1987. The area is remote from major landing ports and therefore has not been completely explored. In the most recent fishery held in 1990, an exploratory quota of 1.59 million lb. (721.4 t) was set for upper Area 6 (Aristazabal Isl. and north). For 1993, the quota has been apportioned to a number of smaller management areas to prevent displacement of quota to preferred locations.

Calamity Bay. - Subarea 6-9 north of Otter Point (B1)

Landings of 218,000 lb. (98.9 t) were first reported in Calamity B. in 1981, but the remaining beds in the vicinity of Sisters Isl. were not worked until 1990. A total of 580,000 lb. (263 t) has been landed from 66 ha bed area. The recommended quota based on sustainable yield was 162,855 lb. (73.9 t). The 1993 quota was set at 163,000 lb.. (Table 4.20)

Estevan Gp. - lower Subarea 6-9 (B2)

The Estevan Gp. is remote from all landing ports so has not been extensively fished. A total of 374,000 lb. (169.6 t) has been landed since 1987 from five beds with an area of 48 ha. The recommended quota based on sustainable yield was 118,400 lb. (53.7 t). The 1993 quota was set at 118,000 lb.. (Table 4.21)

Campania Is. area - portion of 6-10 north of Duckers Rk. (B3)

An exploratory quota was set at 14,000 lb. in 1993.

1.2.3 AREA C: Subarea 5-22 - lower ptn. west Banks Isl. Fig. 22

Harvest was first reported in this area, from Survey B., Foul B., Waller B., and Grief B., in 1990. A total of 174,000 lb. (78.9 t) was landed of which most was taken from Survey B.. Total identified bed area is 80 ha.

In 1993, subarea 5-22 has been arbitrarily divided at Waller Bay, in order to disperse effort. The total recommended quota based on sustainable yield was 197,400 lb. (89.6 t). The 1993 quota was set at 111,000 lb. (50.3 t) in the north (C1) and 86,000 lb. (39.0 t) in the south (C2). (Table 4.22)

1.2.4 AREA D: Area 5 North (Kitkatla and Northern Banks Isl)
Fig. 22

Area 5 contains areas of variable geoduck productivity. The northern portion adjacent to Porcher Isl. has few beds and the quota remained unfished in the most recent fishing year. Recommended quotas have been reduced in this portion. The upper portion of west Banks Isl. has substantial bed area and has produced large catches annually since 1984.

Area 5 has been further divided from the 2 areas fished in 1990, to protect those beds that have been heavily harvested.

Subarea 5-12 - Freeman Pass (D1)

117,000 lb. (53.1 t) has been harvested from Freeman P. in three years fishing, primarily on a bed inside Joachim Spit. An harvestable area of 41 ha has been reported. In 1990, one vessel surveyed the area but could not find enough geoducks to fill a 30,000 lb. quota. As a result, a lower quota of 25,000 lb. was set with recommendation that the fishery should be closely monitored. (Table 4.23)

Subarea 5-10 - Shakes Isl. (D2)

A small catch of 7,700 lb. (3.5 t) has been reported from an 8 ha bed near Shakes Isl.. A quota of 7,000 lb. (3 t) based on sustainable yield was recommended for 1993. (Table 4.24)

Subarea 5-13 to 5-16 - upper Principe Ch. (D3)

No beds have been identified but fishers are interested in exploring area. An exploratory quota of 10,000 was applied to this area.

Subarea 5-17 - lower Principe Ch. (D4)

There has been only one bed located north of Deer Pt., with 360 lb. landed from a 4 ha bed. The area has not been fully explored and there may be beds in the Anger Isl. area. The recommended quota based on the identified bed area is 9,870 lb. (4.5 t). The 1993 quota was set at 10,000 lb.. (Table 4.25)

Griffiths Hbr. area - upper ptn. Subarea 5-20 (D5)

This management area includes an almost continuous series of beds spread from Larson Hbr. in the north to Solander Pt. south of Griffiths Hbr.. The area has been a favoured fishing location and has produced over 1.4 million lb. (650.4 t) since 1984. During the most recent fishery in 1990, more than 600,000 lb. (272 t) were taken. The total documented bed area is 161 ha and removal rates have doubled sustainable levels. Reports from the ongrounds observer and logbooks indicate geoduck quality and production were still good in the 1990 fishery; however, divers were working at increasing depths. Geoduck beds are reported to extend to 30 m. depth and beyond.

This area has supported a significant portion of north coast landings, but there is now some evidence of overharvest. A harvest of 398,000 lb. (180.2 t) was recommended based on sustainable yield, with advice that the fishery should be managed to ensure no additional catch was taken, and that stock status should be monitored closely. (Table 4.26)

Sneath Isl. - ptn. Subarea 5-20 (D6)

The Sneath Is. have also been a productive geoduck area, with a total of 398,000 lb. (180.8 t) recorded landings since 1984 and 143,000 lb. (64.9 t) landed in 1990. Harvest logs show an almost continuous array of beds among the islands with a total bed area of 181 ha. There is concern that this area is disproportionately large, especially when compared to the adjacent Griffiths Hbr. area which has produced three times the landings. As a result, total bed area has been reduced proportionately to 60 ha., based on average removals from other beds in the area.

The recommended harvest based on sustainable yield for 60 ha is 148,050 lb. (67.2 t). The 1993 quota was set at 133,000 lb. (Table 4.27)

Kingkown Inlet - ptn. Subarea 5-21 (D7)

Total landings from Kingkown Inlet since 1984 have been 288,000 lb. from a bed area of 54 ha. The fact that landings have remained low relative to the northern portion of Banks Isl. may be because the area is slightly more remote. The recommended quota based on sustainable yield was 133,245 lb. (60.5 t). The 1993 quota was set at 133,000 lb.. (Table 4.28)

1.2.5 AREA E: Area 3 (Dundas Isl.) and Upper Area 4 Fig. 23

Subareas 3-1 to 3-5 - Dundas Isl. (E1);

Dundas Isl. has been fished for four years since 1986, with 714,000 lb. (324 t) landed from eight beds. The beds are generally small, ranging from 1 to 14 ha and three of the eight beds have been fished in only one year. In 1990, the recommended quota of

210,000 lb. (95.3 t) was not achieved in the fishery and fishers reported low geoduck densities in the known beds fished. Two beds at Boat Hbr. and Gnarled Isl. were not fished in 1990. Removal rates in most beds other than the two mentioned above are significantly greater than sustainable levels.

Dundas Isl. stocks appear to be unproductive, overfished, or both of the former, therefore a conservative management approach is required. Suggested options are either to not fish the area or to fish the small quota of 34,545 lb. (15.7 t) associated with the two beds with low removal rates. The area appears to have been fully explored, but further consultation with fishers is required to verify this. The 1993 quota was set at 35,000 lb.. (Table 4.29)

Subareas ptn 4-5 to 4-8 and 4-14 - Upper Area 4 (E2)

An exploratory quota was set in 1993 for this previously unfished area of 50,000 lb..

1.2.6 AREA F: Lower Area 4 (Stephens Isl. to Oval Bay) Fig. 23

Stephens Isl. area - ptn. Subarea 4-2 (plus 4-4 and 4-9) (F1)

The three beds in the Stephens Isl. area have each been fished a single year and have produced only a total of 33,412 lb. (15.2 t). A bed inside of Henry Isl. has been reduced in area from 50 to 1 ha because of low landings. The total fishable area identified is 9 ha.

The recommended quota of 22,000 lb. (10.1 t) was applied to the Stephens Isl. portion of Subarea 4-2, and to Subareas 4-4 and 4-9 as well as an additional 20,000 lb. to provide for exploration. (Table 4.30)

Subarea 4-3 - Oval Bay (F2)

Harvest logs reported harvest of 12,452 lb. (5.7 t) from a large bed measuring 194 ha in Oval B. in 1988. The bed size is large relative to landings, so bed area was reduced proportionately to 10 ha. There is some concern that this area may not support geoduck populations. The recommended harvest based on sustainable yield was 24,675 lb. (11.2 t). The 1993 quota was set at 25,000 lb.. (Table 4.31)

1.2.7 AREA G: Area 4 (Melville Isl. to Archibald Isls.) Fig. 23

In Area 4, landings were first made in the Tree Nob Gp. and Archibald Isls., but more recently have progressed to less exposed sites on the west side of Melville and Dunira Isls.. There have been only cursory surveys of exposed portions of Stephens and Prescott Isls. in Subarea 4-2.

Subareas 4-1, portion of 4-5 - Melville/Dunira Isls. (G1)

This area has only recently been explored and fished, and there is likely room for expansion. Four beds were fished in 1988 and a further six in 1990, with 649,000 lb. (294.5 t) landed in the two years. Most beds are small, ranging from 1 to 19 ha in area and totalling 76 ha. Even with the short duration of fishing in the area, selected beds have been fished excessively. In a survey made in 1991, average densities along transects varied from 0.02 to 5.3 /m².

The quota recommended, based on sustainable yield for 76 ha was 187,530 lb (85.1 t). The 1993 quota was set at 188,000 lb.. (Table 4.32)

Subarea 4-13 - Tree Nob Group. (G2)

A major portion of early exploratory quotas have been harvested from the Tree Nob Group. Three beds with a total area of 39 ha have yielded 430,000 lb. (195 t) in the period 1986 to 1990. The majority of the production has been reported from a bed on the west side of the island group so that removal rates from this bed have been excessive.

The Tree Nob Group should remain isolated from other fishing locations to prevent overharvest. A quota of 96,000 lb. (43.7 t) based on sustained yield was recommended for 1993. The area should be closely monitored for possible stock problems. (Table 4.33)

Archibald Isls. - in upper ptn. Subarea 4-2 (G3)

The Archibald Isls. have also been a preferred area of harvest in the Prince Rupert district, with 176,000 lb. (79.9 t) landed in four years fishing since 1986. Total fishable area is 8 ha and removals have greatly exceeded sustainable levels.

As with the Tree Nob Gp., the Archibald Isl. should be protected from overharvest and monitored closely in future fisheries. The recommended harvest for 1993 was 20,000 lb. (9 t) based on sustainable yield. (Table 4.34)

TABLE 4.1

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		14-D: HORNBY ISLAND (PTNS OF 14-7, -9, -10, -12)				
REPORTED HARVEST AREAS:	404 HA (1991)	# BED	4			
CUMULATIVE LANDINGS TO 1990:	364 TONNES 801,540 POUNDS					
STOCK DENSITIES (#/M.SQ.)		STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
			0.75%	1.0%	1.5%	2.0%
1		9487	71	95	142	190
2		18974	142	190	285	379
STOCK DENSITIES (MT/HA)		STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
			0.75%	1.0%	1.5%	2.0%
10.7		4303	32	43	65	86
21.3		8605	65	86	129	172

COMMENTS:

LANDINGS FROM HARVEST LOGS = 8.4 YEARS OF QUOTA TAKEN

THE CALCULATED QUOTA IS 3 X 95,000 = 285,000 LB.

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 253,000 LB. THERE IS UNCERTAINTY IN THE LARGE BED AREAS. THIS QUOTA WAS SET TO ACHIEVE THE INSIDE WATERS 3 YEAR ROTATION FOR 12 LICENCES.

TABLE 4.2

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		14-E: SOUTH - MAPLEGARD PT. TO NORTHWEST BAY (14-1, -4, -5)				
REPORTED HARVEST AREAS:	922 HA (1991)	# BEDS:	6			
CUMULATIVE LANDINGS TO 1990:	754 TONNES 1,663,620 POUNDS					
STOCK DENSITIES (#/M.SQ.)		STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
			0.75%	1.0%	1.5%	2.0%
1		21652	162	217	325	433
2		43303	325	433	650	866
STOCK DENSITIES (MT/HA)		STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
			0.75%	1.0%	1.5%	2.0%
10.7		9819	74	98	147	196
21.3		19639	147	196	295	393

COMMENTS:

LANDINGS FROM HARVEST LOGS = 7.7 YEARS OF QUOTA TAKEN

BEDS IN AREA 14-3 (WEST SIDE LASQUETI IS) ARE INCLUDED IN 1993 MANAGEMENT AREA 168

A CONSERVATIVE QUOTA IS RECOMMENDED DUE TO UNCERTAINTY IN LARGE BED AREAS

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 517,000 LB.

TABLE 4.3

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 16-A: WEST SHORE TEXADA IS. (16-21, -22)						
REPORTED HARVEST AREAS:		248 HA (1991)	# BEDS: 7			
CUMULATIVE LANDINGS TO 1990:		511 TONNES	1,125,969 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)				
		0.75%	1.0%	1.5%	2.0%	
1	5824	44	58	87	116	
2	11648	87	116	175	233	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	2641	20	26	40	53	
21.3	5282	40	53	79	106	

COMMENTS:

LANDINGS FROM HARVEST LOGS = 19.3 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 175,000 LB.

TABLE 4.4

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 16-B: LASQUETI IS. (16-19,-20, PTN 14-3)						
REPORTED HARVEST AREAS:		318 HA (1991)	# BEDS: 11			
CUMULATIVE LANDINGS TO 1990:		563 TONNES	1,241,173 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)				
		0.75%	1.0%	1.5%	2.0%	
1	7468	56	75	112	149	
2	14935	112	149	224	299	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	3387	25	34	51	68	
21.3	6773	51	68	102	135	

COMMENTS:

LANDINGS FROM HARVEST LOGS = 16.6 YEARS OF QUOTA TAKEN

QUOTA OPTION = 3 x 75,000 LB. = 225,000 LB.

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 125,000 LB.

TABLE 4.5

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	16-C: E. TEXADA IS./ NORTHEAST PT. TO PT. UPWARD (16-18)		
REPORTED HARVEST AREAS:	34 HA (1991)	# BEDS:	3
CUMULATIVE LANDINGS TO 1990:	208 TONNES 458,963 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
		0.75%	1.0%	1.5%	2.0%
1	798	6	8	12	16
2	1597	12	16	24	32

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	362	3	4	5	7
21.3	724	5	7	11	14

COMMENTS:

THERE HAS BEEN REMOVAL OF 1 GEODUCK/M² OVER A 19 HA. BED WITH 6 YEARS OF FISHING.

LANDINGS FROM HARVEST LOGS = 57.5 YEARS OF QUOTA TAKEN

BED 2101 ON THE SE SIDE OF TEXADA IS. SHOULD BE CLOSED.

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 50,000 LB.

TABLE 4.6

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:	16-D: ENTRANCE TO JERVIS IN., FRANCIS PENN; BJERRE SHOAL, THORMANBY IS (16-1,-2,-11 AND PTN -17)		
REPORTED HARVEST AREAS:	90 HA (1991)	# BEDS:	9
CUMULATIVE LANDINGS TO 1990:	65 TONNES 142,648 POUNDS		

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
		0.75%	1.0%	1.5%	2.0%
1	2113	16	21	32	42
2	4227	32	42	63	85

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	959	7	10	14	19
21.3	1917	14	19	29	38

COMMENTS:

N. THORMANBY IS - BUCANEER BAY SCALED TO 50 HA. FROM 179 BASED
ON AVERAGE REMOVALS FROM OTHER BEDS IN AREA 16.
A REVIEW OF LANDINGS REDUCED TOTAL AREA TO 90 HA. FROM 270 HA. FOR 16D.
THIS MAY STILL BE TOO LARGE

LANDINGS FROM HARVEST LOGS = 6.7 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 40,000 LB.

TABLE 4.7

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		16-E: SALMON/SECHELT (16-5 TO -9, 29-1)			
REPORTED HARVEST AREAS:	48 HA (1991)	# BEDS:		7	
CUMULATIVE LANDINGS TO 1990:	49 TONNES	108,872 POUND NOT INCL PORPOISE BAY BED			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB)			
		0.75%	1.0%	1.5%	2.0%
1	1127	8	11	17	23
2	2254	17	23	34	45
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	511	4	5	8	10
21.3	1022	8	10	15	20

COMMENTS:

THE MAJOR BED OF 28 HA. AT THE HEAD OF PORPOISE BAY IS UNDER
A CONTAMINATED CLOSURE
OTHER BEDS WERE SCALED DOWN IN SIZE ACCORDING TO LANDINGS OR REMOVAL RATES

LANDINGS FROM HARVEST LOGS = 9.7 YEARS OF QUOTA TAKEN

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 10,000 LB.

TABLE 4.8

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		26A: NORTH - NASPARTI, OJOUKINSH INLETS (PTNS OF 26-7, -8 AND 10)			
REPORTED HARVEST AREA	55 HA (1991)	# BEDS:		8	
CUMULATIVE LANDINGS TO 1990:	234.4 TONNES	516793 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1292	10	13	19	26
1.5	1937	15	19	29	39
2	2583	19	26	39	52
3	3875	29	39	58	77
3.5	4521	34	45	68	90
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.65	586	4	6	9	12
15.98	879	7	9	13	18
21.30	1172	9	12	18	23
31.95	1757	13	18	26	35
37.28	2050	15	21	31	41

COMMENTS:

LANDINGS FROM HARVEST LOGS = 20.0 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

THE CHECLESET BAY CLOSURE WAS RECOMMENDED TO BE CONTINUED FOR 1993.

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 100,000 LB.

TABLE 4.9

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 26-B1 (1991) MISSION GROUP - PTNS OF 26-1 AND -6					
REPORTED HARVEST AREAS: 208 HA (1990)		# BEDS: 1 BED 0301			
CUMULATIVE LANDINGS TO 1991:		2104.4 TONNES 4,640,218 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	4885	37	49	73	98
1.5	7327	55	73	110	147
2	9769	73	98	147	195
3	14654	110	147	220	293
3.5	17096	128	171	256	342

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.65	2215	17	22	33	44
15.98	3323	25	33	50	66
21.30	4430	33	44	66	89
31.95	6646	50	66	100	133
37.28	7753	58	78	116	155

COMMENTS:

LANDINGS FROM HARVEST LOGS = 47.5 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

RECOMMENDATIONS:

THREE YEAR QUOTA OPTION = 3 YR. X (ANNUAL SY @ 2 GEODUCKS @ 1%)
QUOTA OPTION @ 2 GDK/M² AND 1%
= 293,071 LB.

THE 1991 QUOTA WAS 200,000 LB. WITH 163,813 LB. LANDED.

THIS AREA WILL REMAIN CLOSED IN 1993 DUE TO OVER-HARVESTING CONCERNS.

TABLE 4.10

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 26-B2 (1991) MISSION GROUP - PTNS OF 26-1 AND -6					
REPORTED HARVEST AREA 48 HA (1990)		# BEDS: 2 BED 0302, 0303			
CUMULATIVE LANDINGS TO 1991:		65.4 TONNES 144,140 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1127	8	11	17	23
1.5	1691	13	17	25	34
2	2254	17	23	34	45
3	3382	25	34	51	68
3.5	3945	30	39	59	79

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.65	511	4	5	8	10
15.98	767	6	8	12	15
21.30	1022	8	10	15	20
31.95	1534	12	15	23	31
37.28	1789	13	18	27	36

COMMENTS:

LANDINGS FROM HARVEST LOGS = 6.4 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

THE BEDS IN THIS PORTION OF THE MISSION GROUP HAVE NOT BEEN FISHED
AS HEAVILY AS THOSE IN AREA 26-B2 SO MAY SUPPORT INCREASED HARVEST.

RECOMMENDATIONS:

THREE YEAR QUOTA OPTION = 3 YR. X (ANNUAL SY @ 2 GEODUCKS @ 1%)
QUOTA OPTION @ 2 GDK/M² AND 1%
= 67,632 LB.

1991 QUOTA 25,152 LB.

THE 1993 QUOTA WAS SET AT 135,000 LB.

TABLE 4.11

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 26-C (1991) CENTRAL KYUQUOT INLETS						
REPORTED HARVEST AREAS:		82 HA (1990)	# BEDS: 13			
			BEDS 0201,0202,0203,0204, 0205,0206,0207,0304,0701 0702,0703,0704,0705			
CUMULATIVE LANDINGS TO 1991:		472.5 TONNES				
		1,041,970 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	1926	14	19	29	39	
1.5	2888	22	29	43	58	
2	3851	29	39	58	77	
3	5777	43	58	87	116	
3.5	6740	51	67	101	135	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.65	873	7	9	13	17	
15.98	1310	10	13	20	26	
21.30	1747	13	17	26	35	
31.95	2620	20	26	39	52	
37.28	3057	23	31	46	61	

COMMENTS:

LANDINGS FROM HARVEST LOGS = 27.1 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

RECOMMENDATIONS:

THREE YEAR QUDTA OPTION = 3 YR. X (ANNUAL SY @ 2 GEODUCKS @ 1%)
QUOTA OPTION @ 2 GDK/M² AND 1%
= 115,538 LB.

THE 1991 QUOTA WAS 142,500 LB., SET TO BALANCE WEST COAST QUOTAS.

TABLE 4.12

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 26D: UNION IS., KYUQUOT BAY, CLEAR PASSAGE (PTNS OF 26-2 AND 26-6, 26-1)						
REPORTED HARVEST AREAS:		172 HA (1991)	# BEDS: 14			
CUMULATIVE LANDINGS TO 1990:		345.4 TONNES				
		761,690 POUNDS				
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	4039	30	40	61	81	
1.5	6059	45	61	91	121	
2	8078	61	81	121	162	
3	12117	91	121	182	242	
3.5	14137	106	141	212	283	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.65	1832	14	18	27	37	
15.98	2748	21	27	41	55	
21.30	3664	27	37	55	73	
31.95	5495	41	55	82	110	
37.28	6411	48	64	96	128	

COMMENTS:

LANDINGS FROM HARVEST LOGS = 9.4 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

QUOTA OPTION @ 2 GEODUCKS/M² AND 1% IS 3 X 81,000 = 243,000 LB.

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 250,000 LB.

TABLE 4.13

1992-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: 27 H - KLASKINO INLET, S/A 27-5						
REPORTED HARVEST AREAS: 226 HA (1991) # BEDS: 9						
CUMULATIVE LANDINGS TO 1992: 76 TONNES 1,381,744 POUNDS						
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	5307	40	53	80	106	
0.2	1061	8	11	16	21	
2	10614	80	106	159	212	
3	15922	119	159	239	318	
3.5	18575	139	186	279	372	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	2407	18	24	36	48	
2.1	481	4	5	7	10	
21.3	4814	36	48	72	96	
32.0	7221	54	72	108	144	
37.3	8424	63	84	126	168	

COMMENTS:

LANDINGS FROM HARVEST LOGS = 13.0 YEARS OF QUOTA TAKEN
@ 2 GEODUCKS/M²

SOME BEDS WERE SCALED WITH THE LANDING CRITERIA.

3 X 106,000 LB /YR = 318,000 LB.

RECOMMENDATIONS:

THE 1992 QUOTA WAS SET AT 340,000 LB. BUT DUE TO A PSP CLOSURE ONLY 66,378 LB
WERE LANDED.

A QUOTA WAS SET FOR THIS AREA AGAIN IN 1993, 275,000 LB.

TABLE 4.14

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: A1: SURF INLET: 6-10, -12						
REPORTED HARVEST AREAS: 41 HA (1992) # BEDS: 3						
CUMULATIVE LANDINGS TO 1990: 188 TONNES 414,201 POUNDS						
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	963	7	10	14	19	
1.5	1444	11	14	22	29	
2	1926	14	19	29	39	
3	2888	22	29	43	58	
3.5	3370	25	34	51	67	
5	4814	36	48	72	96	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	437	3	4	7	9	
16.0	655	5	7	10	13	
21.3	873	7	9	13	17	
32.0	1310	10	13	20	26	
37.3	1528	11	15	23	31	
53.3	2183	16	22	33	44	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 34,000 X 3 = 102,000 LB

LANDINGS FROM HARVEST LOGS = 12.3 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 WAS SET AT 101,000 LB.

TABLE 4.15

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: A2: ANDERSON ISLANDS, PTN 6-13						
REPORTED HARVEST AREAS:		7 HA (1992)	# BEDS:		1	
CUMULATIVE LANDINGS TO 1990:		16 TONNES	35,584 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	164	1	2	2	3	
1.5	247	2	2	4	5	
2	329	2	3	5	7	
3	493	4	5	7	10	
3.5	575	4	6	9	12	
5	822	6	8	12	16	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	75	1	1	1	1	
16.0	112	1	1	2	2	
21.3	149	1	1	2	3	
32.0	224	2	2	3	4	
37.3	261	2	3	4	5	
53.3	373	3	4	6	7	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 6,000 X 3 = 18,000 LB

LANDINGS FROM HARVEST LOGS = 6.2 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 17,000 LB.

TABLE 4.16

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: A3: BORROWMAN GROUP: 6-13 N. OF SWITZER CREEK						
REPORTED HARVEST AREAS:		17 HA (1992)	# BEDS:		2	
CUMULATIVE LANDINGS TO 1990:		3 TONNES	7,658 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	399	3	4	6	8	
1.5	599	4	6	9	12	
2	798	6	8	12	16	
3	1198	9	12	18	24	
3.5	1397	10	14	21	28	
5	1996	15	20	30	40	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	181	1	2	3	4	
16.0	272	2	3	4	5	
21.3	362	3	4	5	7	
32.0	543	4	5	8	11	
37.3	634	5	6	10	13	
53.3	905	7	9	14	18	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 14,000 X 3 = 42,000 LB

LANDINGS FROM HARVEST LOGS = 0.5 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 42,000 LB.

TABLE 4.17

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: A4: KETTLE INLET: 6-13 SWITZER CREEK TO TRENEMEN IS.

REPORTED HARVEST AREAS: 24 HA (1992) # BEDS: 2

CUMULATIVE LANDINGS TO 1990: 135 TONNES
298,296 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	564	4	6	8	11
1.5	845	6	8	13	17
2	1127	8	11	17	23
3	1691	13	17	25	34
3.5	1973	15	20	30	39
5	2818	21	28	42	56

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	256	2	3	4	5
16.0	383	3	4	6	8
21.3	511	4	5	8	10
32.0	767	6	8	12	15
37.3	895	7	9	13	18
53.3	1278	10	13	19	26

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 20,000 X 3 = 60,000 LB

LANDINGS FROM HARVEST LOGS = 15.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 59,000 LB.

TABLE 4.18

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: A5 - A6: CLIFFORD BAY: 6-13 (UPPER AND LOWER)

REPORTED HARVEST AREAS: 110 HA (1992) # BEDS: 5

CUMULATIVE LANDINGS TO 1990: 397 TONNES
875,802 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	2583	19	26	39	52
1.5	3875	29	39	58	77
2	5166	39	52	77	103
3	7749	58	77	116	155
3.5	9041	68	90	136	181
5	12916	97	129	194	258

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	1172	9	12	18	23
16.0	1757	13	18	26	35
21.3	2343	18	23	35	47
32.0	3515	26	35	53	70
37.3	4100	31	41	62	82
53.3	5858	44	59	88	117

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 90,000 X 3 = 270,000 LB

LANDINGS FROM HARVEST LOGS = 9.7 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS DIVIDED INTO UPPER CLIFFORD BAY (171,000 LB)
AND LOWER CLIFFORD BAY (100,000 LB.)

TABLE 4.19

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: A7: WEETEEAM BAY: 6-13 S. OF NORMANSELL IS.					
REPORTED HARVEST AREAS:		62 HA (1992)	# BEDS:		4
CUMULATIVE LANDINGS TO 1990:		170 TONNES	373,806 POUNDS		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1456	11	15	22	29
1.5	2184	16	22	33	44
2	2912	22	29	44	58
3	4368	33	44	66	87
3.5	5096	38	51	76	102
5	7280	55	73	109	146
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	660	5	7	10	13
16.0	990	7	10	15	20
21.3	1321	10	13	20	26
32.0	1981	15	20	30	40
37.3	2311	17	23	35	46
53.3	3302	25	33	50	66

COMMENTS:

QUOTA OPTION FROM ALL BEDS = = 51,000 X 3 = 153,000 LB

LANDINGS FROM HARVEST LOGS = 7.3 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 153,000 LB.

TABLE 4.20

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: B1: CALAMITY BAY: 6-9 N. OF BLOCK IS.					
REPORTED HARVEST AREAS:		66 HA (1992)	# BEDS:		3
CUMULATIVE LANDINGS TO 1990:		263 TONNES	579,652 POUNDS		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1550	12	15	23	31
1.5	2325	17	23	35	46
2	3100	23	31	46	62
3	4650	35	46	70	93
3.5	5425	41	54	81	108
5	7749	58	77	116	155
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	703	5	7	11	14
16.0	1054	8	11	16	21
21.3	1406	11	14	21	28
32.0	2109	16	21	32	42
37.3	2460	18	25	37	49
53.3	3515	26	35	53	70

COMMENTS:

QUOTA OPTION FROM ALL BEDS = = 54,000 X 3 = 162,000 LB

LANDINGS FROM HARVEST LOGS = 10.7 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 163,000 LB.

TABLE 4.21

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: B2: ESTEVAN GROUP: 6-9 S. OF BLOCK IS.
REPORTED HARVEST AREAS: 48 HA (1992) # BEDS: 5
CUMULATIVE LANDINGS TO 1990: 170 TONNES
373,794 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1127	8	11	17	23
1.5	1691	13	17	25	34
2	2254	17	23	34	45
3	3382	25	34	51	68
3.5	3945	30	39	59	79
5	5636	42	56	85	113

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	511	4	5	8	10
16.0	767	6	8	12	15
21.3	1022	8	10	15	20
32.0	1534	12	15	23	31
37.3	1789	13	18	27	36
53.3	2556	19	26	38	51

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 39,000 X 3 = 117,000 LB

LANDINGS FROM HARVEST LOGS = 9.5 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 118,000 LB.

TABLE 4.22

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: C1 - C2: S. BANKS ISLAND 5-22
REPORTED HARVEST AREAS: 80 HA (1992) # BEDS: 4
CUMULATIVE LANDINGS TO 1990: 79 TONNES
173,772 POUNDS

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	1879	14	19	28	38
1.5	2818	21	28	42	56
2	3757	28	38	56	75
3	5636	42	56	85	113
3.5	6575	49	66	99	132
5	9393	70	94	141	188

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	852	6	9	13	17
16.0	1278	10	13	19	26
21.3	1704	13	17	26	34
32.0	2556	19	26	38	51
37.3	2982	22	30	45	60
53.3	4260	32	43	64	85

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 66,000 X 3 = 198,000 LB

LANDINGS FROM HARVEST LOGS = 2.6 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THIS AREA WAS ARBITRARILY DIVIDED AT WALLER BAY. THE 1993 QUOTA WAS SET AT 111,000 LB
IN THE NORTH (C1) AND AT 86,000 LB. IN THE SOUTH (C2)

TABLE 4.23

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: D1: FREEMAN PASS 5-12					
REPORTED HARVEST AREAS:		41 HA (1992)	# BEDS: 1		
CUMULATIVE LANDINGS TO 1990:		53 TONNES	116,976 POUNDS		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	963	7	10	14	19
1.5	1444	11	14	22	29
2	1926	14	19	29	39
3	2888	22	29	43	58
3.5	3370	25	34	51	67
5	4814	36	48	72	96

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	437	3	4	7	9
16.0	655	5	7	10	13
21.3	873	7	9	13	17
32.0	1310	10	13	20	26
37.3	1528	11	15	23	31
53.3	2183	16	22	33	44

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 34,000 X 3 = 102,000 LB

LANDINGS FROM HARVEST LOGS = 3.5 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 25,000 LB.

TABLE 4.24

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: D2: SHAKES ISLAND (5-10)					
REPORTED HARVEST AREAS:		8 HA (1992)	# BEDS: 1		
CUMULATIVE LANDINGS TO 1990:		3 TONNES	7,711 POUNDS		
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	188	1	2	3	4
1.5	282	2	3	4	6
2	376	3	4	6	8
3	564	4	6	8	11
3.5	658	5	7	10	13
5	939	7	9	14	19

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	85	1	1	1	2
16.0	128	1	1	2	3
21.3	170	1	2	3	3
32.0	256	2	3	4	5
37.3	298	2	3	4	6
53.3	426	3	4	6	9

COMMENTS:

HUGE BED OF 194 HA WAS SCALED DOWN
QUOTA OPTION FROM ALL BEDS = - 7,000 X 3 = 21,000 LB

LANDINGS FROM HARVEST LOGS = 1.2 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 7,000 LB.

TABLE 4.25

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: D4: LOWER PRINCIPE CHANNEL (5-17)						
REPORTED HARVEST AREAS:		4 HA (1992)	# BEDS:		1	
CUMULATIVE LANDINGS TO 1990:		0 TONNES	360 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	94	1	1	1	2	
1.5	141	1	1	2	3	
2	188	1	2	3	4	
3	282	2	3	4	6	
3.5	329	2	3	5	7	
5	470	4	5	7	9	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	43	0	0	1	1	
16.0	64	0	1	1	1	
21.3	85	1	1	1	2	
32.0	128	1	1	2	3	
37.3	149	1	1	2	3	
53.3	213	2	2	3	4	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 3,000 X 3 = 9,000 LB

LANDINGS FROM HARVEST LOGS = 0.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS 10,000 LB.

TABLE 4.26

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: D5: GRIFFITHS HARBOUR 5-20 N. OF SOLANDER PT.						
REPORTED HARVEST AREAS:		161 HA (1992)	# BEDS:		2	
CUMULATIVE LANDINGS TO 1990:		650 TONNES	1,433,485 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	3781	28	38	57	76	
1.5	5671	43	57	85	113	
2	7562	57	76	113	151	
3	11342	85	113	170	227	
3.5	13233	99	132	198	265	
5	18904	142	189	284	378	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	1715	13	17	26	34	
16.0	2572	19	26	39	51	
21.3	3429	26	34	51	69	
32.0	5144	39	51	77	103	
37.3	6001	45	60	90	120	
53.3	8573	64	86	129	171	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 132,000 X 3 = 396,000 LB

LANDINGS FROM HARVEST LOGS = 10.8 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 398,000 LB.

TABLE 4.27

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: D6: SNEATH ISLAND 5-20 SOLANDER PT TO LAVEROCK IS.						
REPORTED HARVEST AREAS:		60 HA (1992)	# BEDS:		1	
CUMULATIVE LANDINGS TO 1990:		181 TONNES	398,108 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	1409	11	14	21	28	
1.5	2113	16	21	32	42	
2	2818	21	28	42	56	
3	4227	32	42	63	85	
3.5	4931	37	49	74	99	
5	7045	53	70	106	141	

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	639	5	6	10	13
16.0	959	7	10	14	19
21.3	1278	10	13	19	26
32.0	1917	14	19	29	38
37.3	2237	17	22	34	45
53.3	3195	24	32	48	64

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 49,000 X 3 = 147,000 LB

LANDINGS FROM HARVEST LOGS = 8.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 148,000 LB.

TABLE 4.28

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA: D7: KINGKOWN INLET 5-20 S. OF LAVEROCK PT, 5-21						
REPORTED HARVEST AREAS:		54 HA (1992)	# BEDS:		1	
CUMULATIVE LANDINGS TO 1990:		130 TONNES	287,510 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	1268	10	13	19	25	
1.5	1902	14	19	29	38	
2	2536	19	25	38	51	
3	3804	29	38	57	76	
3.5	4438	33	44	67	89	
5	6340	48	63	95	127	

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	575	4	6	9	12
16.0	863	6	9	13	17
21.3	1150	9	12	17	23
32.0	1725	13	17	26	35
37.3	2013	15	20	30	40
53.3	2876	22	29	43	58

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 44,000 X 3 = 132,000 LB

LANDINGS FROM HARVEST LOGS = 6.5 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS 133,000 LB.

TABLE 4.29

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		E1: DUNDAS ISLAND - 2 OPEN BEDS (0102, 0105)				
REPORTED HARVEST AREAS:	14 HA (1992)	# BEDS:	2			
	67 HA TOTAL		8 TOTAL			
CUMULATIVE LANDINGS TO 1990:	6 TONNES		12,419 POUNDS			

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	329	2	3	5	7
1.5	493	4	5	7	10
2	658	5	7	10	13
3	986	7	10	15	20
3.5	1151	9	12	17	23
5	1644	12	16	25	33

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	149	1	1	2	3
16.0	224	2	2	3	4
21.3	298	2	3	4	6
32.0	447	3	4	7	9
37.3	522	4	5	8	10
53.3	746	6	7	11	15

COMMENTS:

QUOTA OPTION FROM 2 OPEN BEDS = $12,000 \times 3 = 36,000$ LB

LANDINGS FROM HARVEST LOGS = 1.1 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

ALTHOUGH THE QUOTA AOPTION FROM ALL BEDS WAS 165,000 LB., FISHERS ADVISED THAT BEDS WERE SMALL AND UNPRODUCTIVE. A REDUCED QUOTA WAS SET BASED ON 2 BEDS WITH LANDINGS.

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 35,000 LB.

TABLE 4.30

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		F1: STEPHENS ISLAND 4-2,-4, -9				
REPORTED HARVEST AREAS:	9 HA (1992)	# BEDS:	3			
CUMULATIVE LANDINGS TO 1990:	15 TONNES		33,412 POUNDS			

STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)			
		0.75%	1.0%	1.5%	2.0%
1	211	2	2	3	4
1.5	317	2	3	5	6
2	423	3	4	6	8
3	634	5	6	10	13
3.5	740	6	7	11	15
5	1057	8	11	16	21

STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)			
		0.75%	1.0%	1.5%	2.0%
10.7	96	1	1	1	2
16.0	144	1	1	2	3
21.3	192	1	2	3	4
32.0	288	2	3	4	6
37.3	335	3	3	5	7
53.3	479	4	5	7	10

COMMENTS:

QUOTA OPTION FROM ALL BEDS = $7,000 \times 3 = 21,000$ LB

LANDINGS FROM HARVEST LOGS = 4.5 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 22,000 LB. PLUS 20,000 LB QUOTA TO PROVIDE FOR EXPLORATION OF NEW BEDS.

TABLE 4.31

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		F2: OVAL BAY 4-3				
REPORTED HARVEST AREAS:		10 HA (1992)	# BEDS:			1
CUMULATIVE LANDINGS TO 1990:		6 TONNES	12,452 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	235	2	2	4	5	
1.5	352	3	4	5	7	
2	470	4	5	7	9	
3	704	5	7	11	14	
3.5	822	6	8	12	16	
5	1174	9	12	18	23	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	107	1	1	2	2	
16.0	160	1	2	2	3	
21.3	213	2	2	3	4	
32.0	320	2	3	5	6	
37.3	373	3	4	6	7	
53.3	533	4	5	8	11	

COMMENTS:

HUGE BED OF 194 HA WAS SCALED DOWN

QUOTA OPTION FROM ALL BEDS = 8,000 X 3 = 24,000 LB

LANDINGS FROM HARVEST LOGS = 1.5 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 25,000 LB.

TABLE 4.32

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		G1: MELVILLE/DUNIRA ISLANDS - 4-1,-5				
REPORTED HARVEST AREAS:		76 HA (1992)	# BEDS:			10
CUMULATIVE LANDINGS TO 1990:		294 TONNES	649,214 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	1785	13	18	27	36	
1.5	2677	20	27	40	54	
2	3569	27	36	54	71	
3	5354	40	54	80	107	
3.5	6247	47	62	94	125	
5	8924	67	89	134	178	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	809	6	8	12	16	
16.0	1214	9	12	18	24	
21.3	1619	12	16	24	32	
32.0	2428	18	24	36	49	
37.3	2833	21	28	42	57	
53.3	4047	30	40	61	81	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = 62,000 X 3 = 186,000 LB

LANDINGS FROM HARVEST LOGS = 10.4 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 188,000 LB.

TABLE 4.33

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		G2: TREE NOB GROUP 4-13				
REPORTED HARVEST AREAS:	39 HA (1992)	# BEDS:	3			
CUMULATIVE LANDINGS TO 1990:	195 TONNES		430,149 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	916	7	9	14	18	
1.5	1374	10	14	21	27	
2	1832	14	18	27	37	
3	2748	21	27	41	55	
3.5	3205	24	32	48	64	
5	4579	34	46	69	92	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	415	3	4	6	8	
16.0	623	5	6	9	12	
21.3	831	6	8	12	17	
32.0	1246	9	12	19	25	
37.3	1454	11	15	22	29	
53.3	2077	16	21	31	42	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 32,000 X 3 = 96,000 LB

LANDINGS FROM HARVEST LOGS = 13.4 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 96,000 LB.

TABLE 4.34

1993-RANGE OF STOCK ESTIMATES BASED ON HARVEST LOG DATA AND SURVEYS
AND POSSIBLE ANNUAL SUSTAINABLE YIELDS

STATISTICAL AREA:		G3: ARCHIBALD ISLAND - PTN 4-2				
REPORTED HARVEST AREAS:	8 HA (1992)	# BEDS:	1			
CUMULATIVE LANDINGS TO 1990:	80 TONNES		176,377 POUNDS			
STOCK DENSITIES (#/M.SQ.)	STANDING STOCK (1000 LB.)	ANNUAL SUSTAINABLE YIELD (1000 LB.)				
		0.75%	1.0%	1.5%	2.0%	
1	188	1	2	3	4	
1.5	282	2	3	4	6	
2	376	3	4	6	8	
3	564	4	6	8	11	
3.5	658	5	7	10	13	
5	939	7	9	14	19	
STOCK DENSITIES (MT/HA)	STANDING STOCK (MT)	ANNUAL SUSTAINABLE YIELD (MT)				
		0.75%	1.0%	1.5%	2.0%	
10.7	85	1	1	1	2	
16.0	128	1	1	2	3	
21.3	170	1	2	3	3	
32.0	256	2	3	4	5	
37.3	298	2	3	4	6	
53.3	426	3	4	6	9	

COMMENTS:

QUOTA OPTION FROM ALL BEDS = - 7,000 X 3 = 21,000 LB

LANDINGS FROM HARVEST LOGS = 26.8 YEARS OF QUOTA TAKEN
@ 3.5 GEODUCKS/M²

RECOMMENDATIONS:

THE 1993 QUOTA WAS SET AT 20,000 LB.

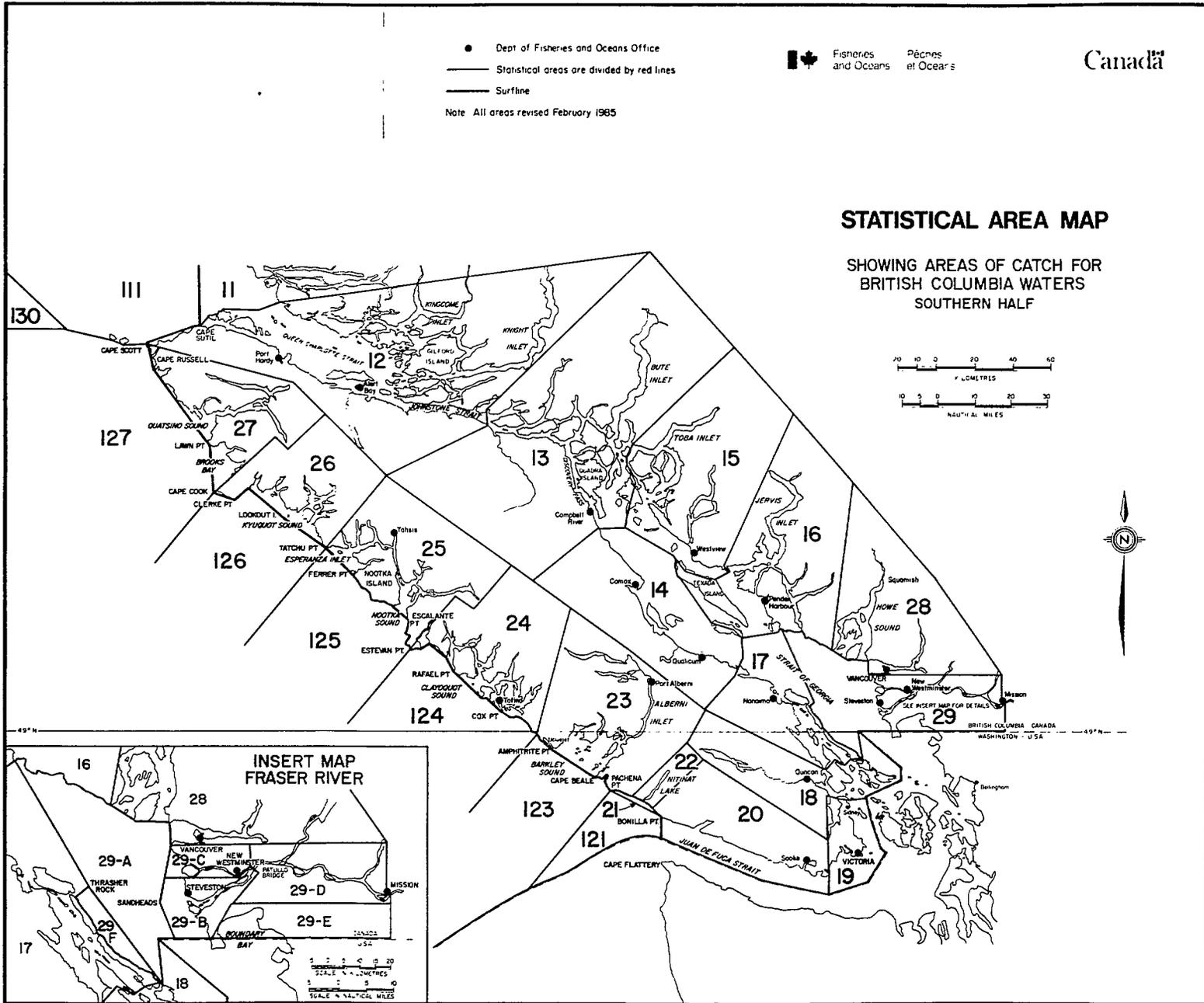
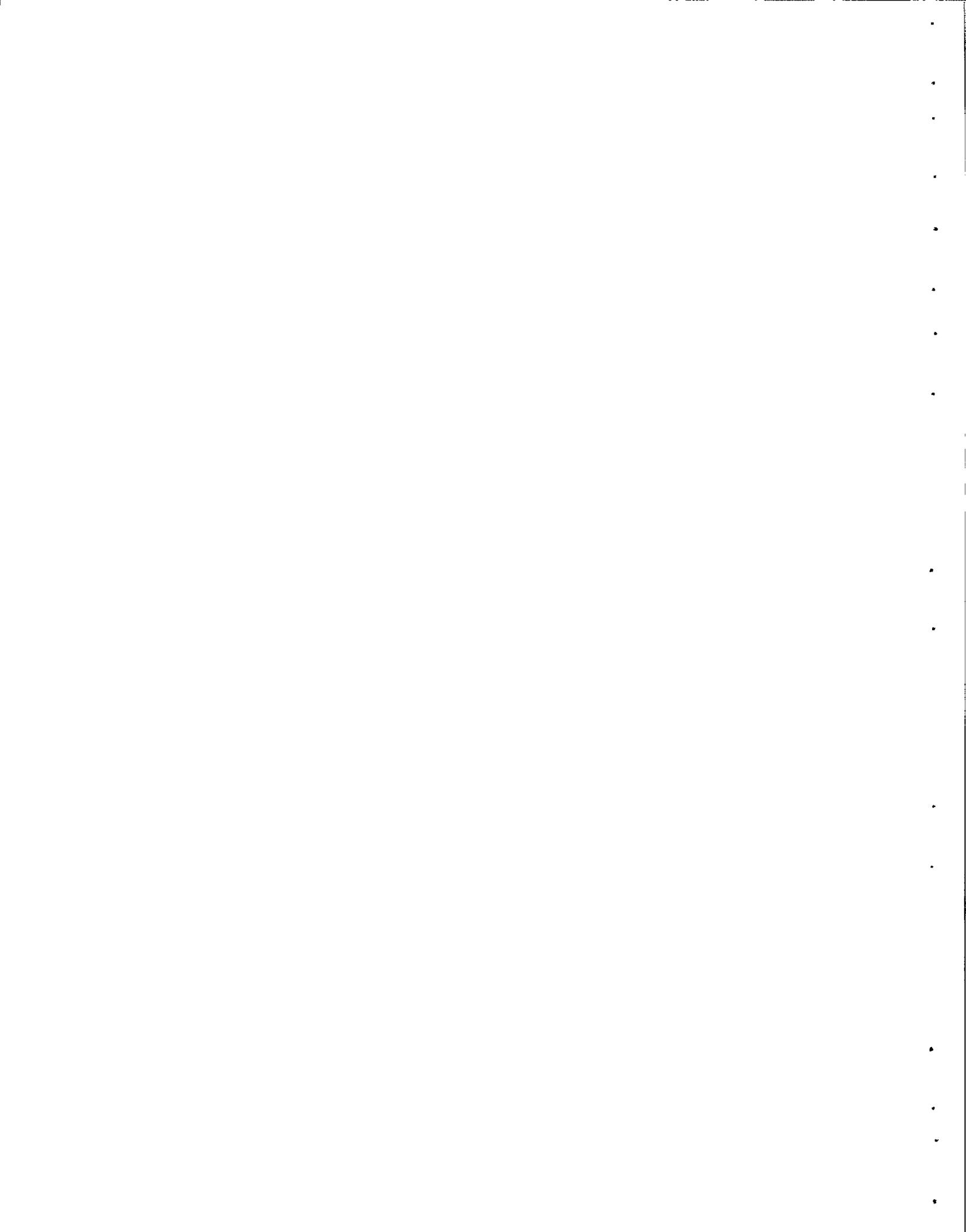


Figure 1. Pacific Fishery Management Areas, southern coast of British Columbia



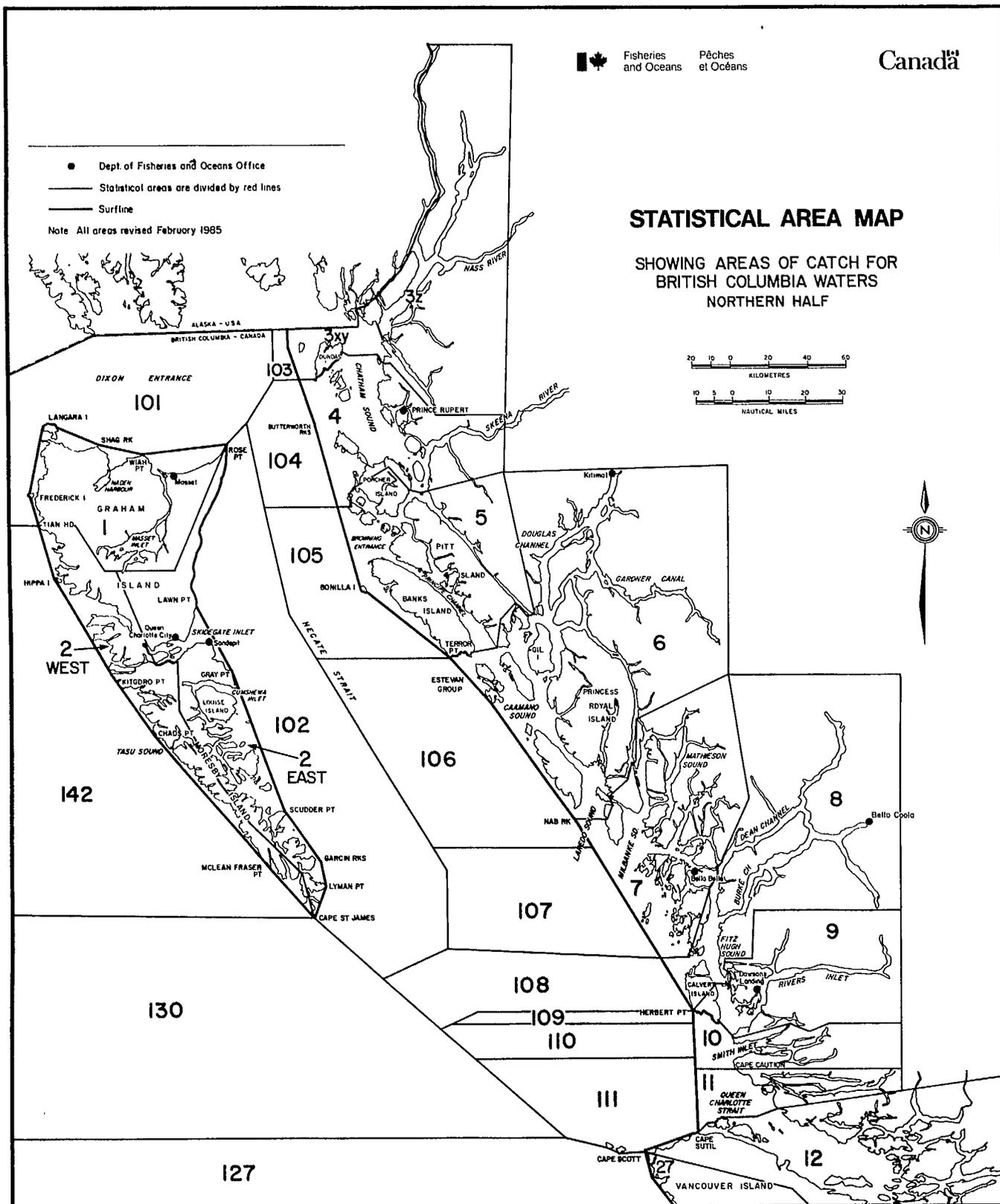
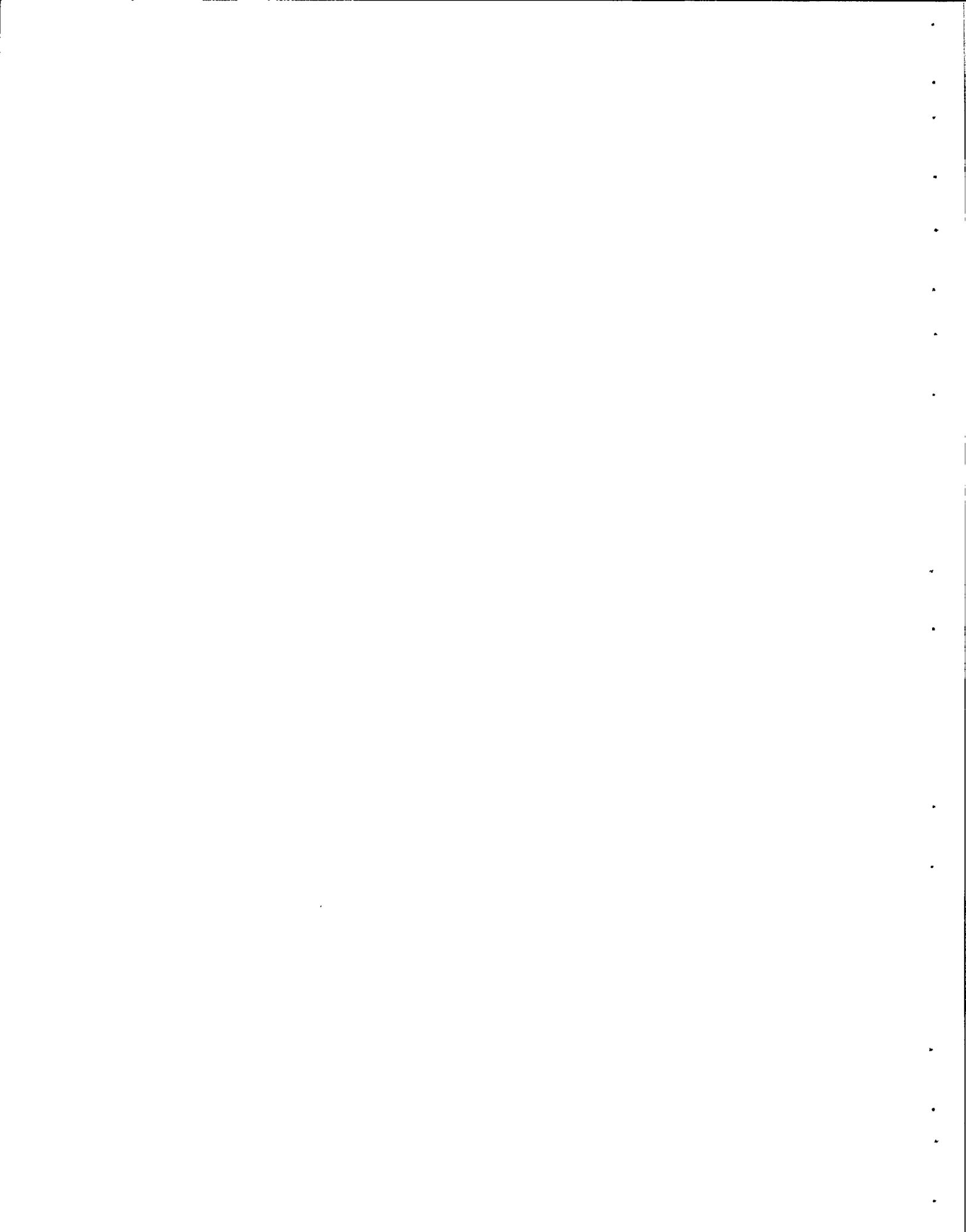


Figure 2. Pacific Fishery Management Areas, northern coast of British Columbia .



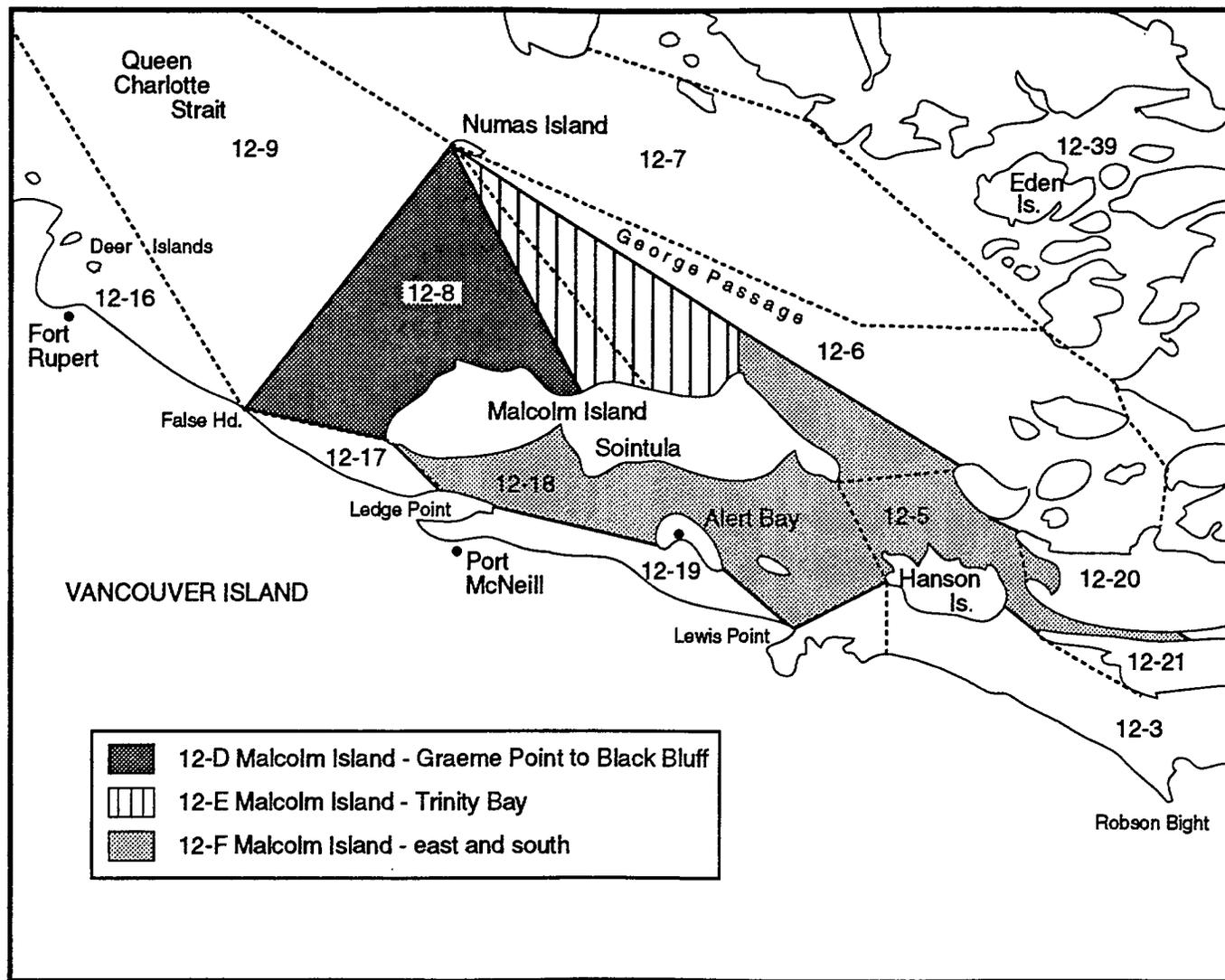
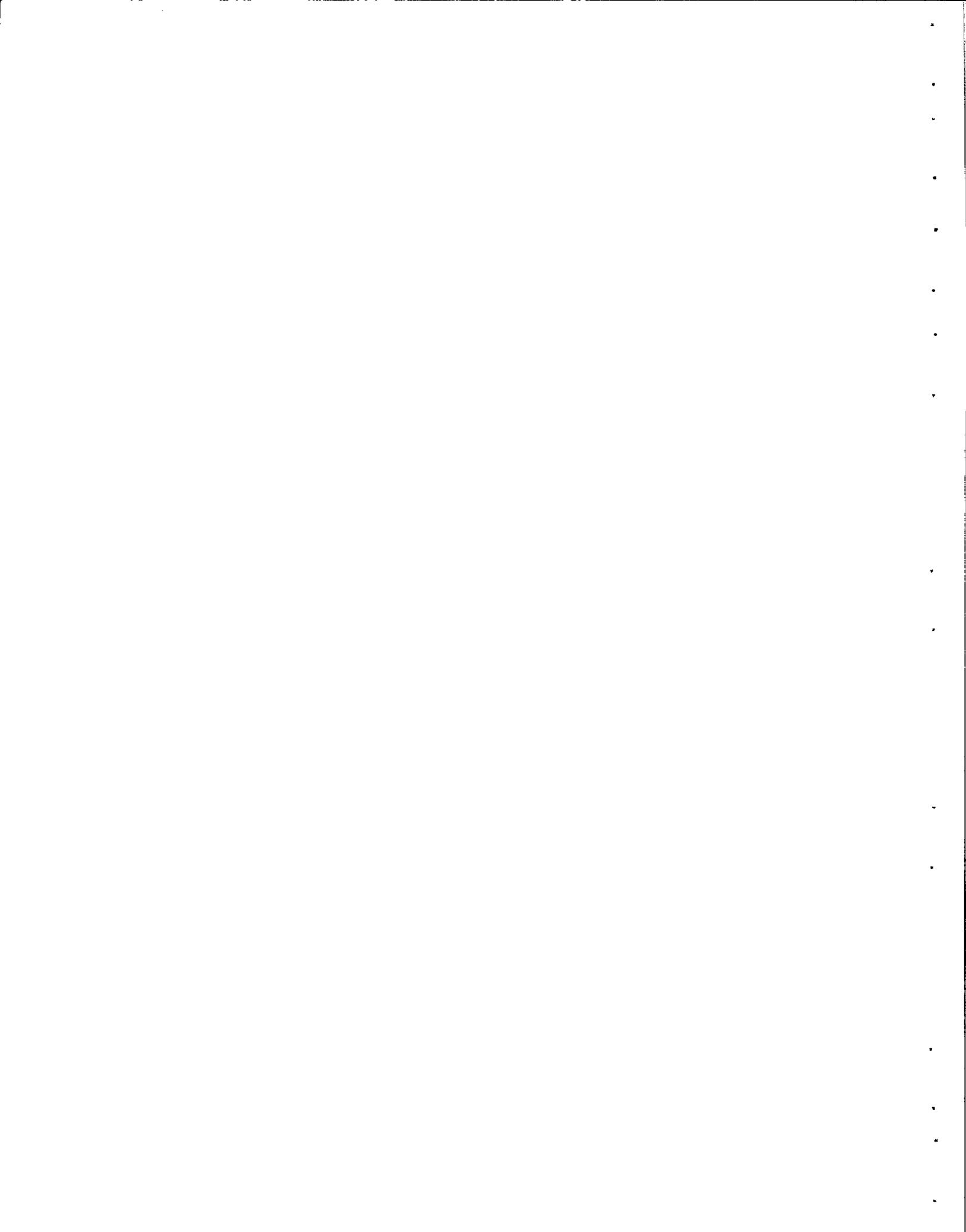


Figure 4. 1992 geoduck management areas: Areas 12-D, 12-E and 12-F: Malcolm Island area



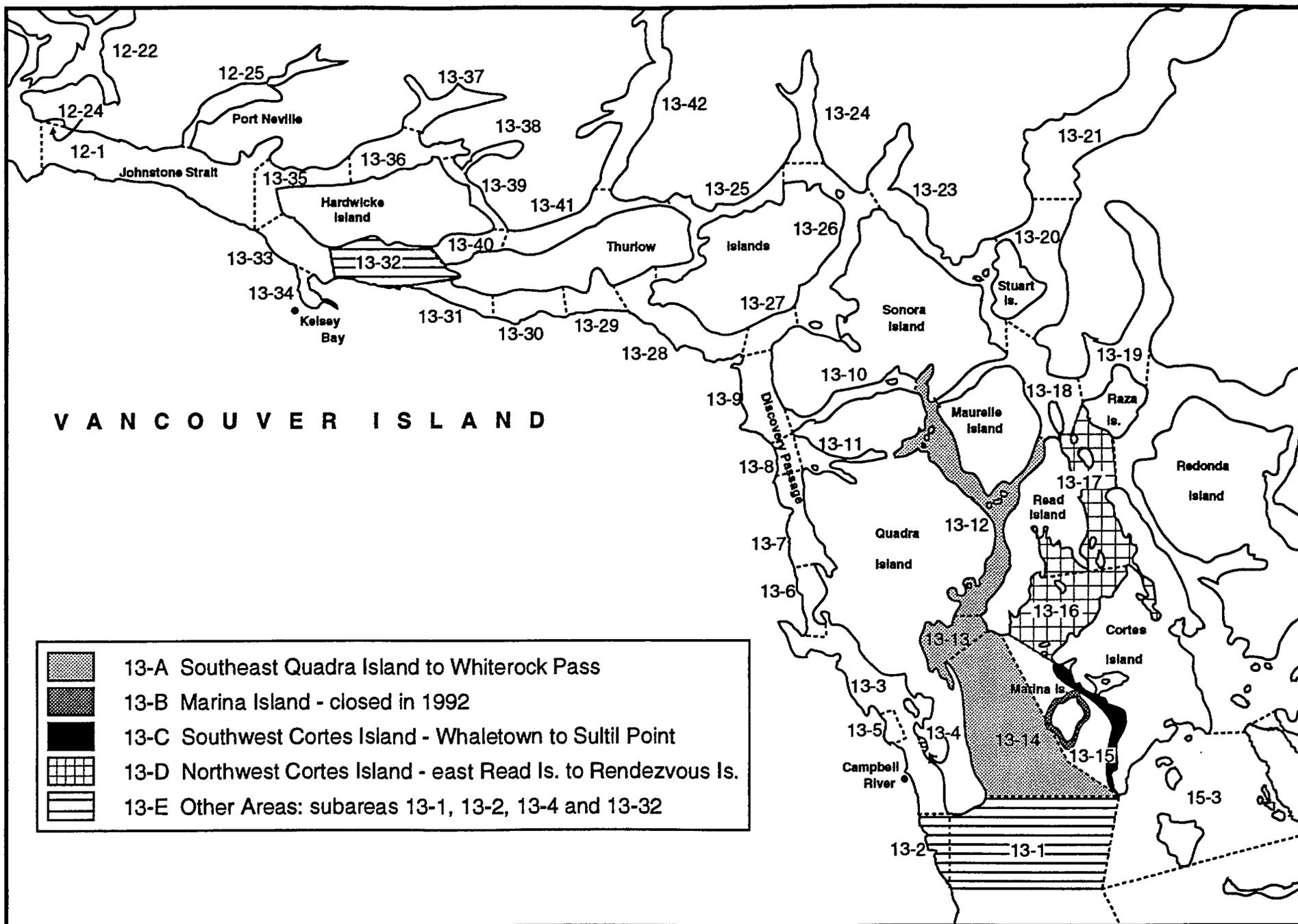
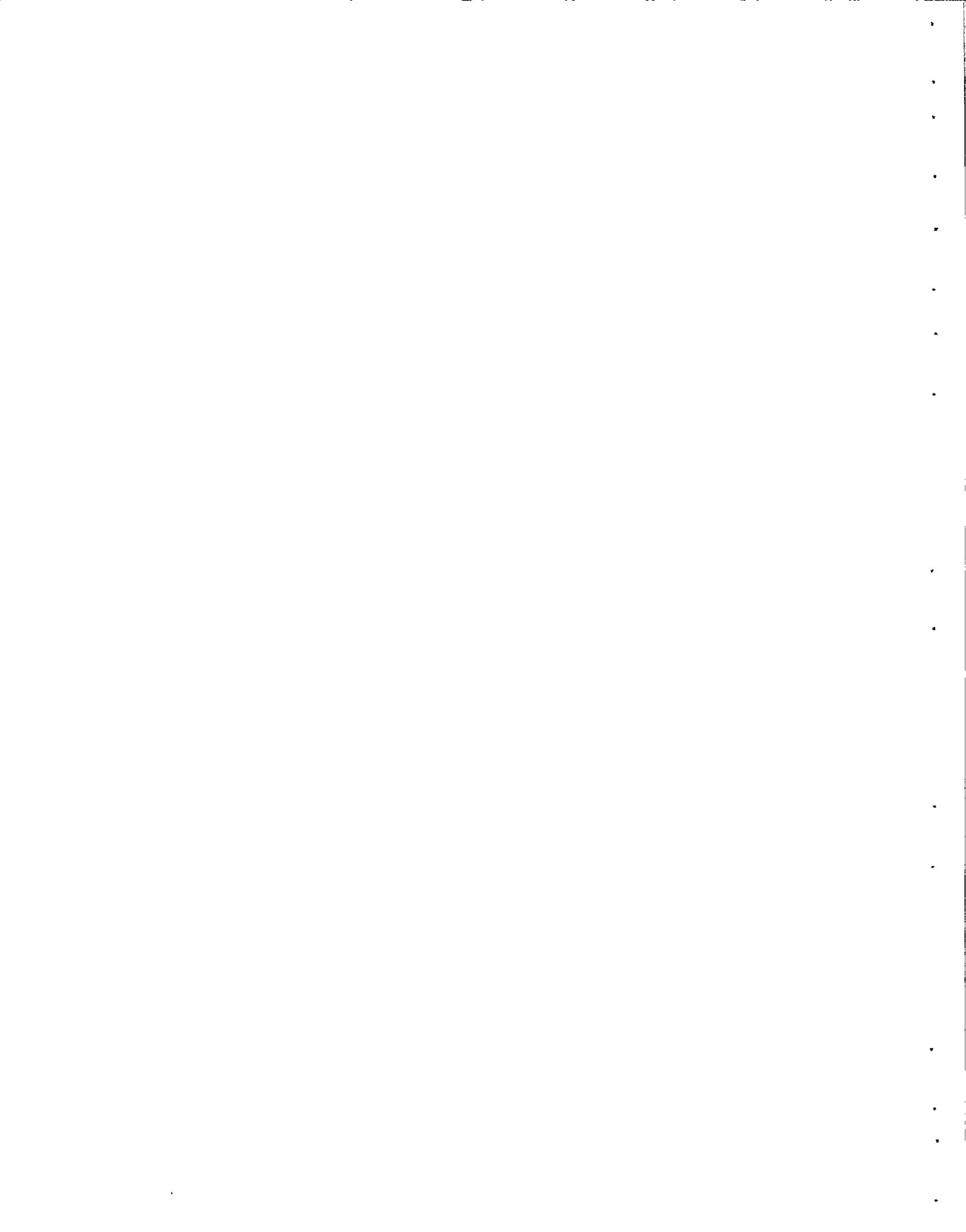


Figure 5. 1992 geoduck management areas 13-A, B, C, D, E: southeast Quadra Island to Whiterock Pass, Marina Island (closed in 1992), southwest Cortes Island - Whaletown to Sutil Point, northwest Cortes Island, east Read Island to Rendezvous Island, and other areas.



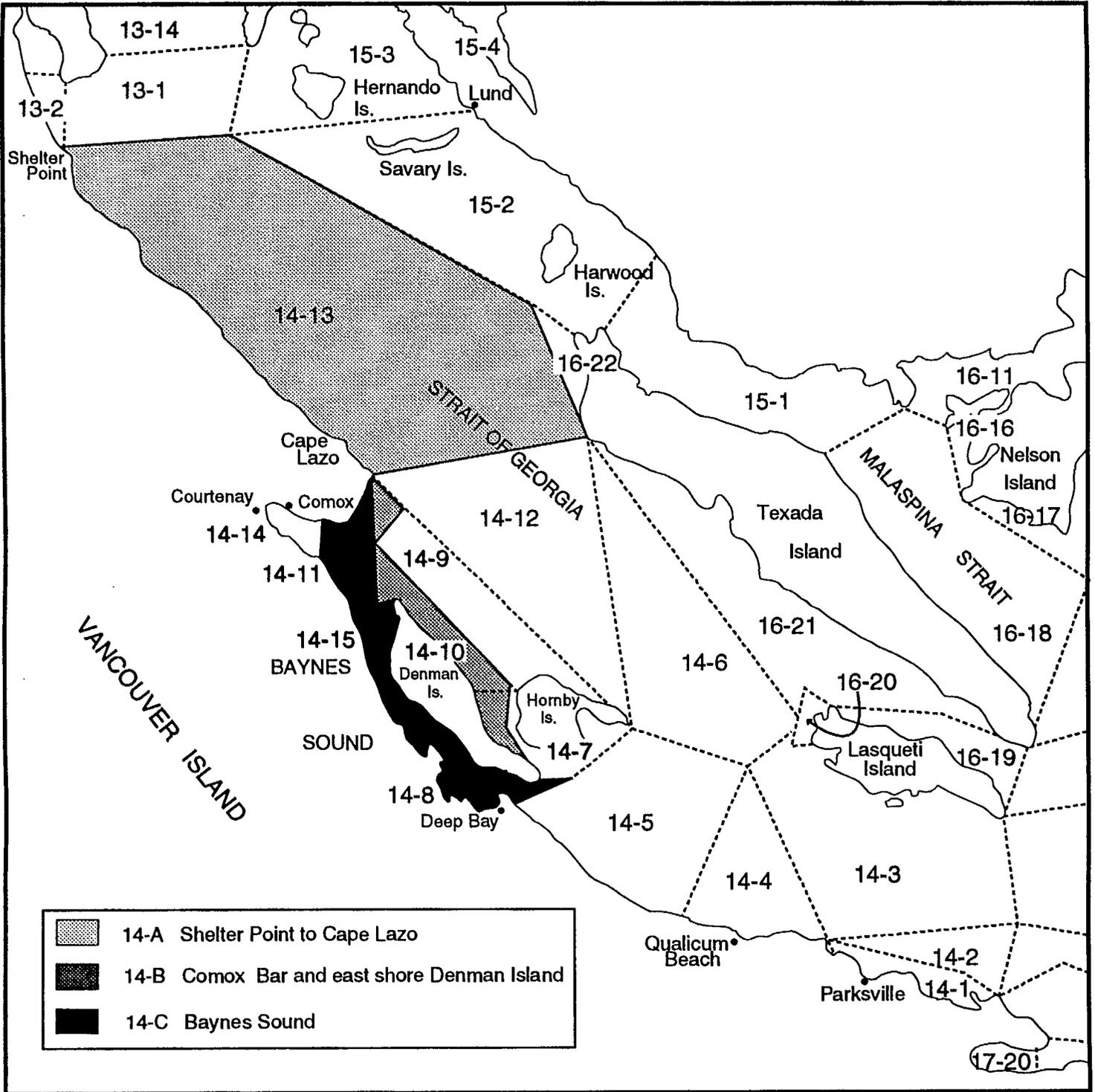
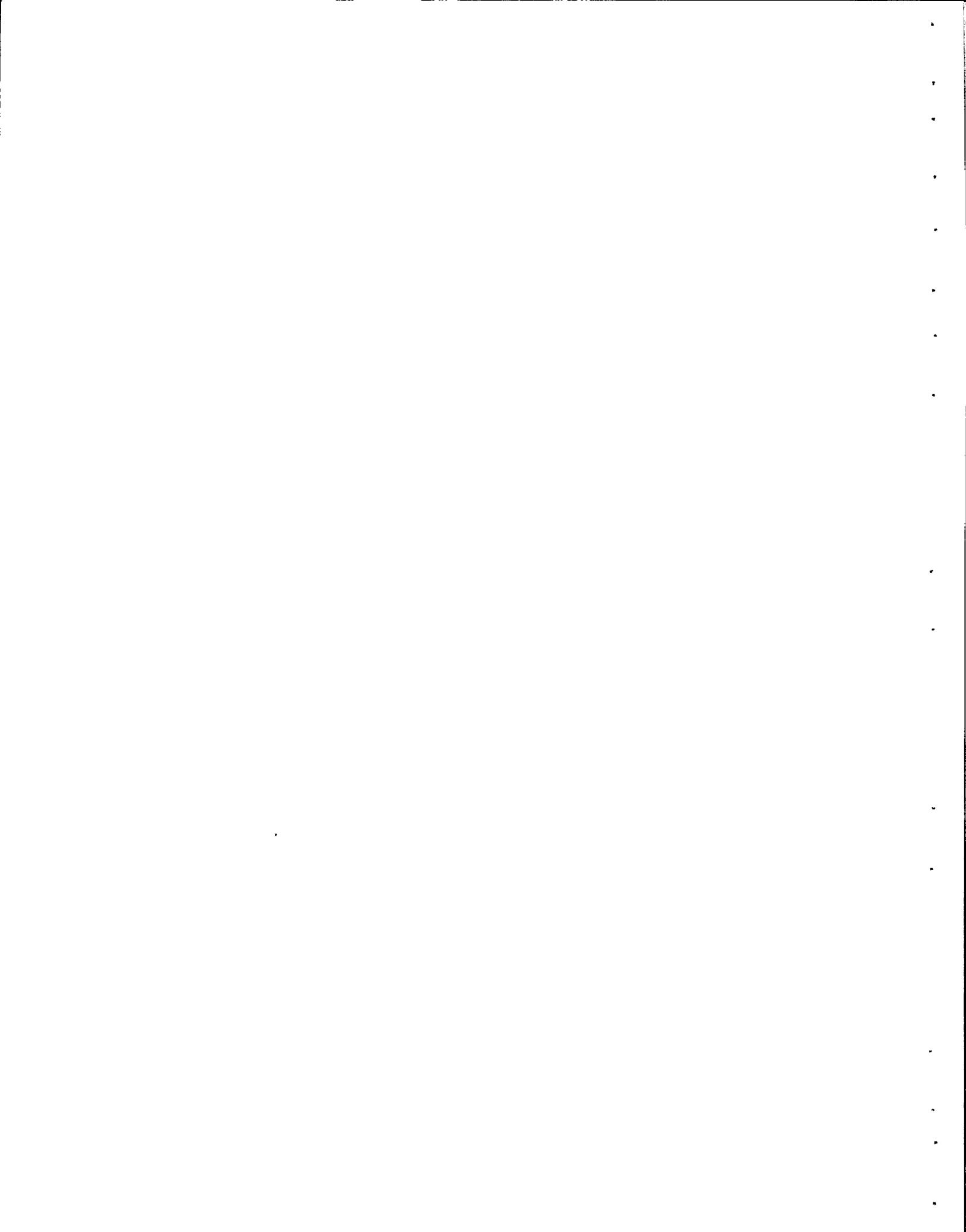


Figure 6 .1992 geoduck management areas: 14-A, B, C: Shelter Point to Cape Lazo, Comox Bar and east Denman Island, and Baynes Sound.



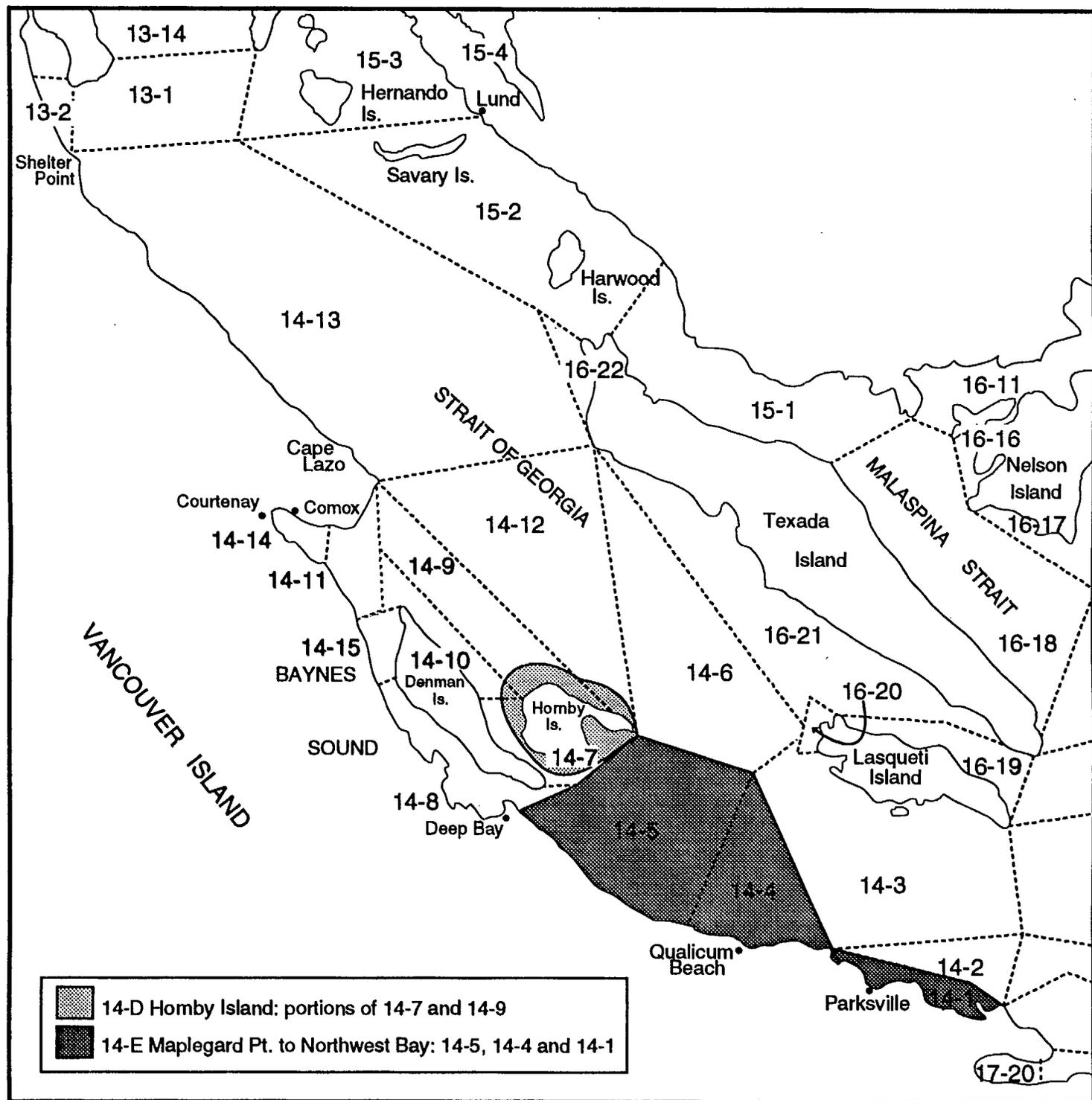
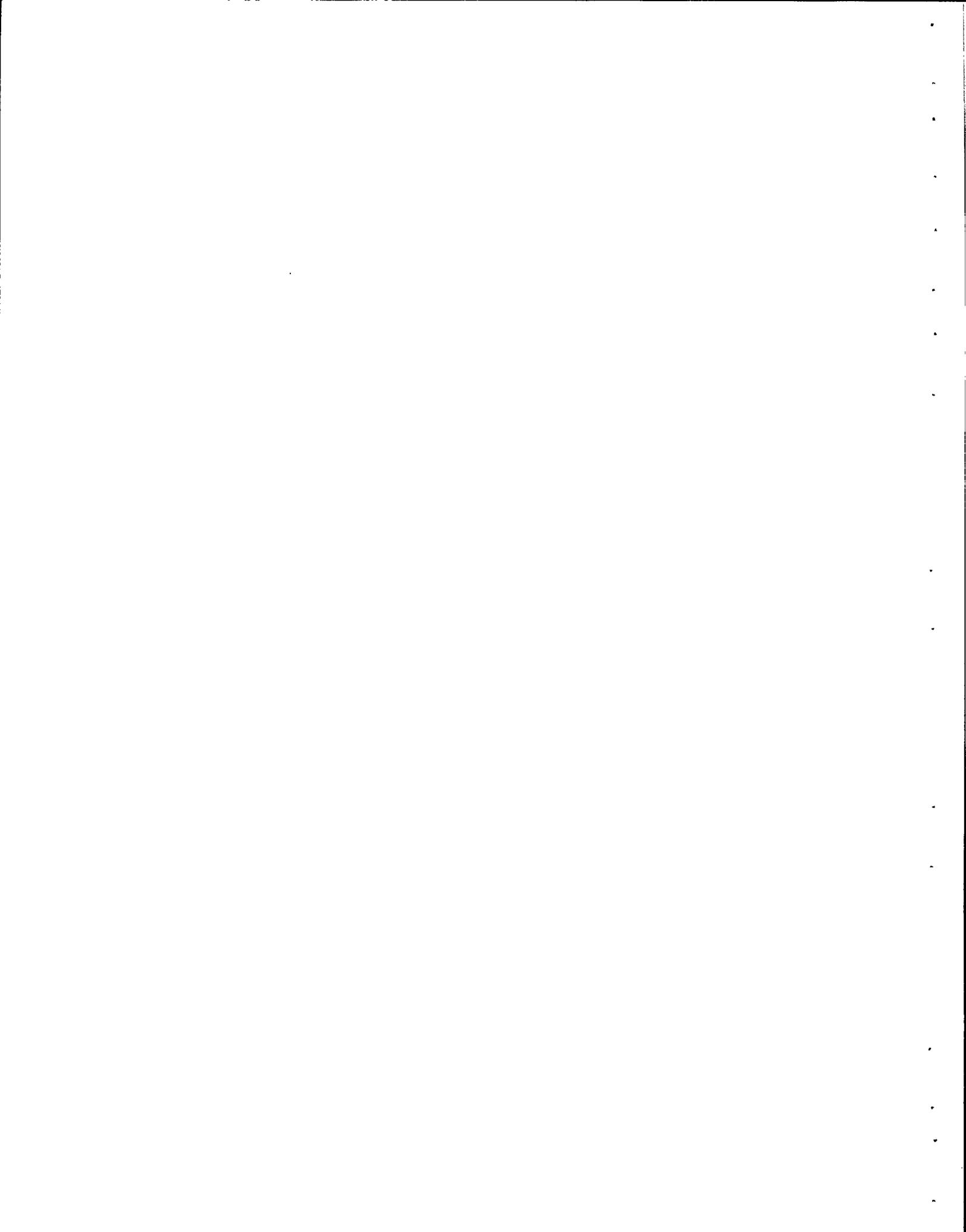


Figure 7 . 1993 geoduck management areas: 14-D and E: Hornby Island, Maplegard Point to Northwest Bay .



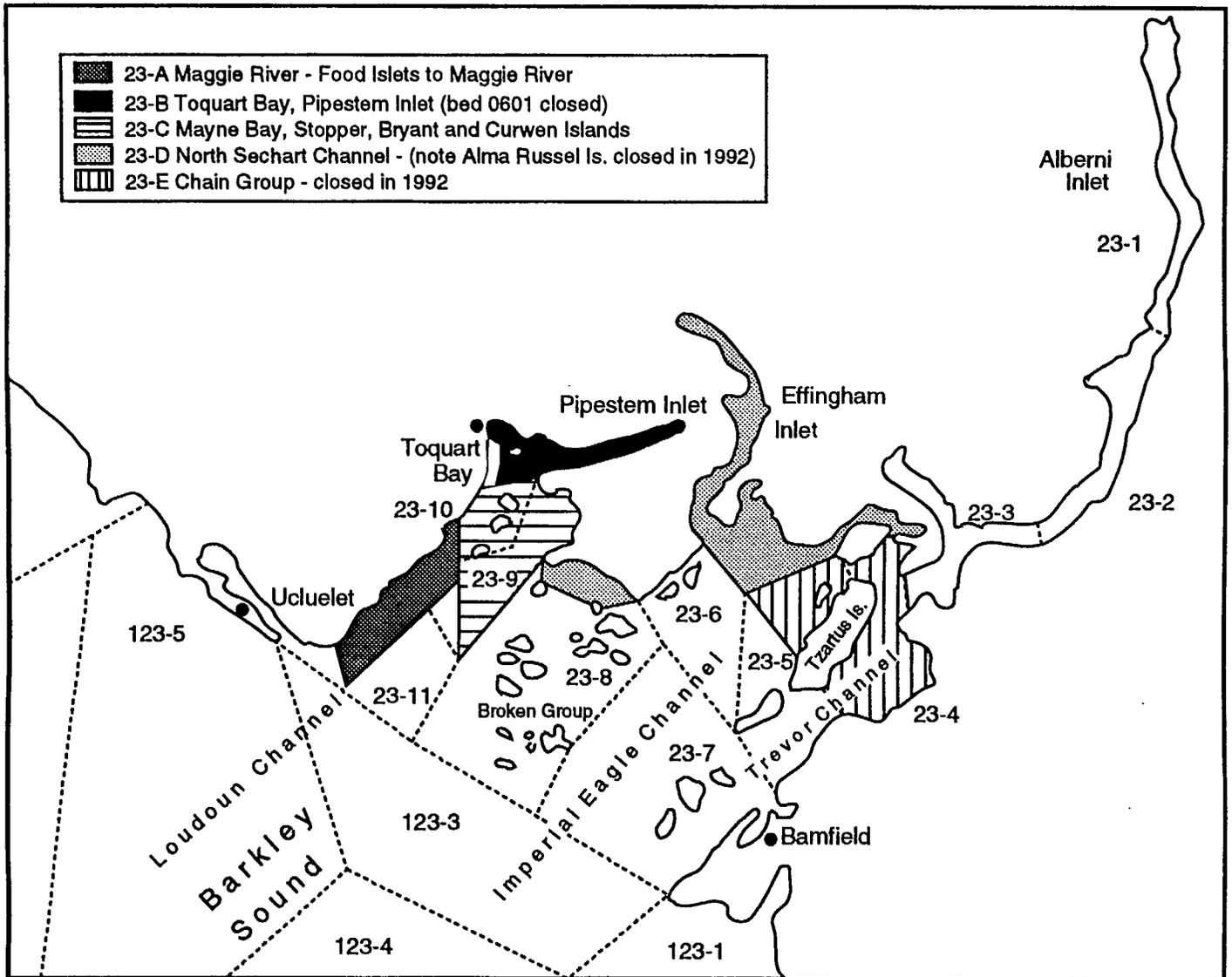
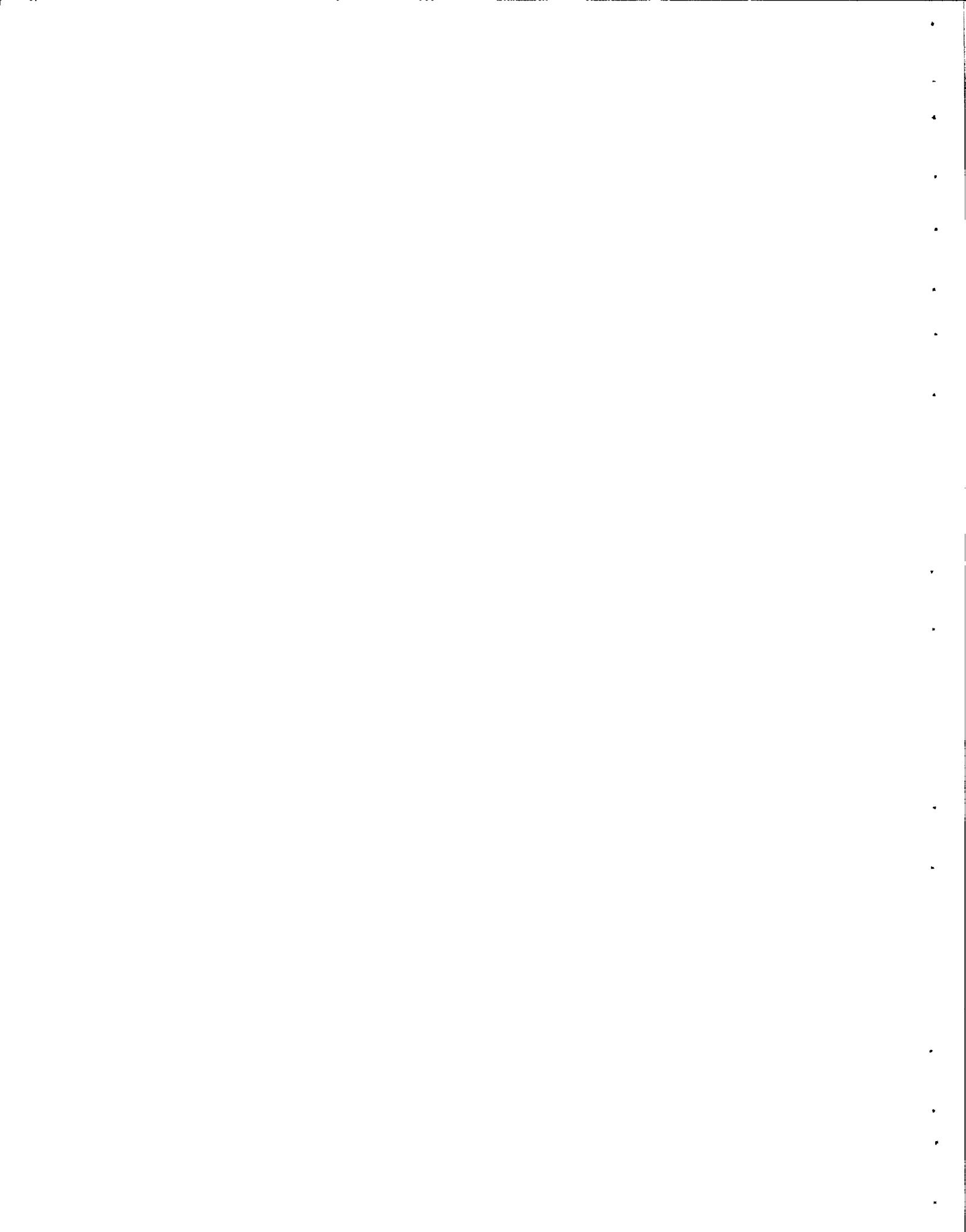


Figure 8. 1992 geoduck management areas: Area 23-A,B,C,D,E: Maggie River, Toquart Bay, Mayne Bay, North Sechart Channel and the Chain Group.



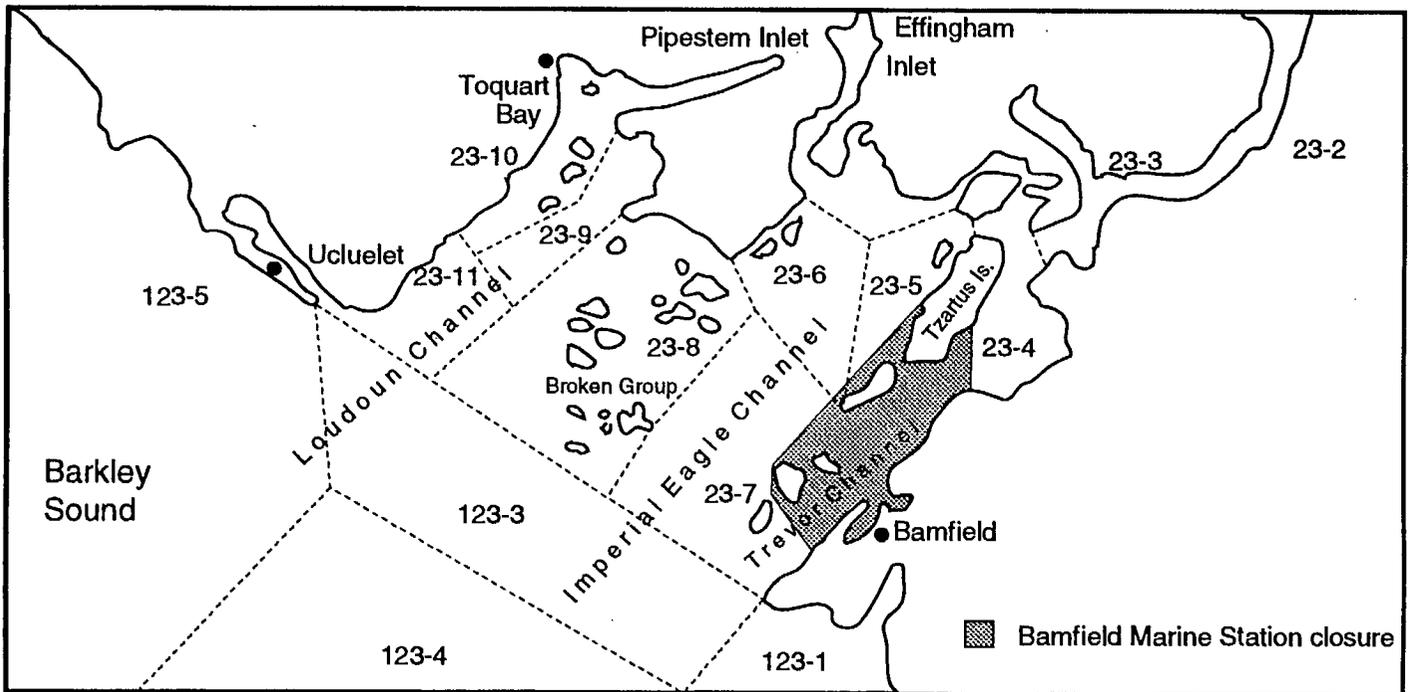


Figure 9. Area 23: Bamfield Marine study area closure: All of the waters of Pacific fishery Management area 23 bounded by a line commencing at the light at Whittlestone Point and running directly to the southern tip of Haines Island; from the northwestern tip of Haines Island to the southern tip of Seppings Island; from the northwestern tip of Seppings Island to Kirby Point on Diana Island; from Kirby Point directly to the northwest tip of Fry Island; thence to the nearest adjacent point on Tsartus Island; from Foucault Bluff on Tsartus Island to the northwest tip of Nanat Island; from the eastern tip of Nanat Island to the nearest adjacent point on Vancouver Island and thence along the coastline of Vancouver Island to the point of commencement.

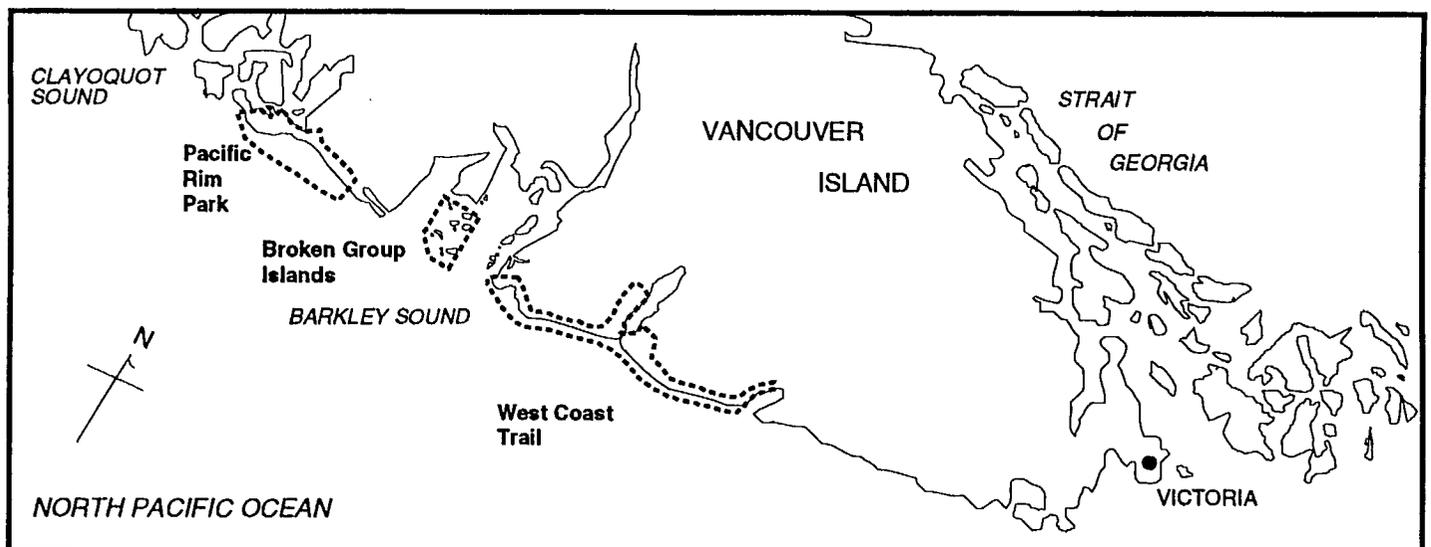
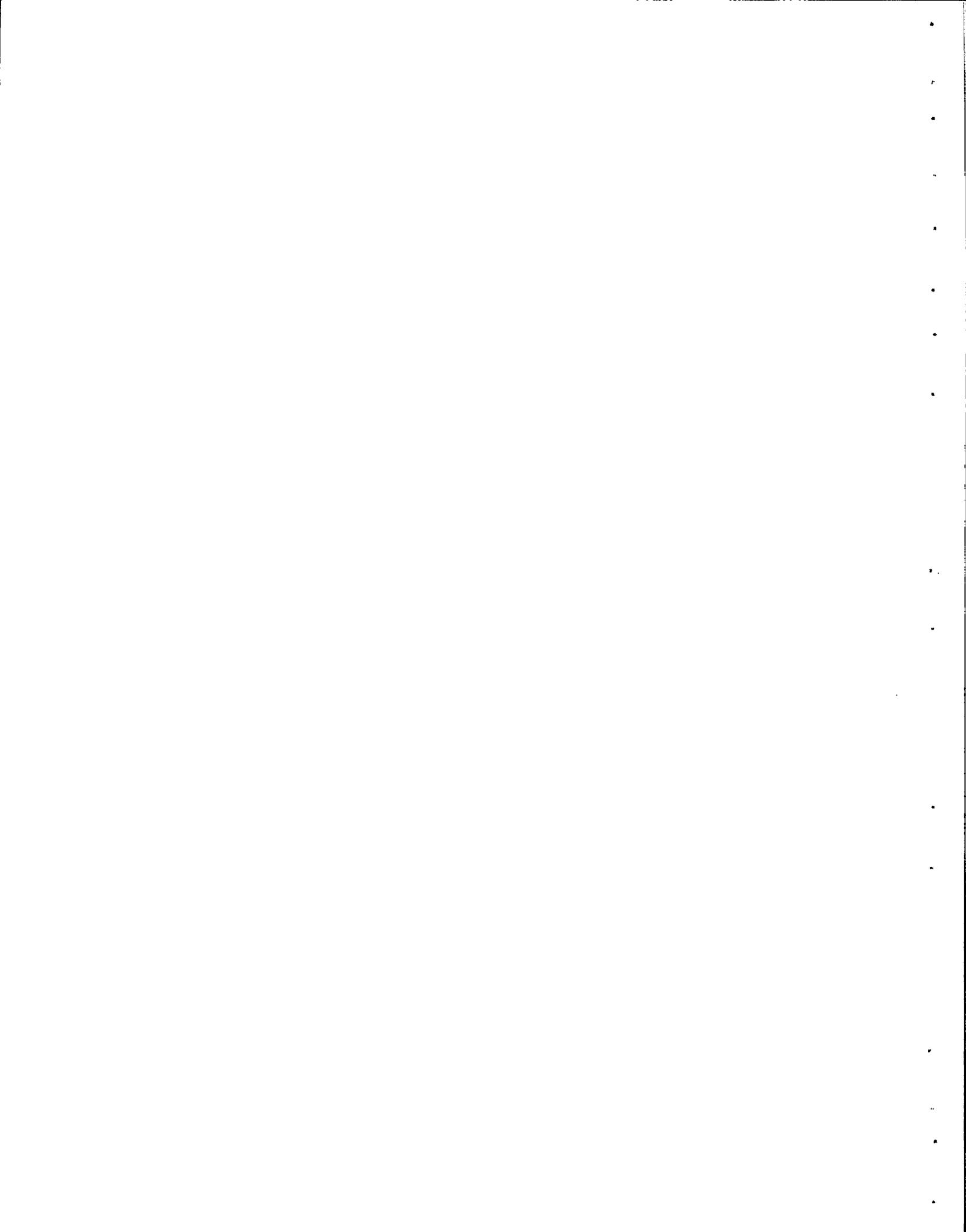


Figure 10. Area 23: Pacific Rim Park closure. No geoduck stocks have been found in the Long Beach or West Coast Trail sections of the park.



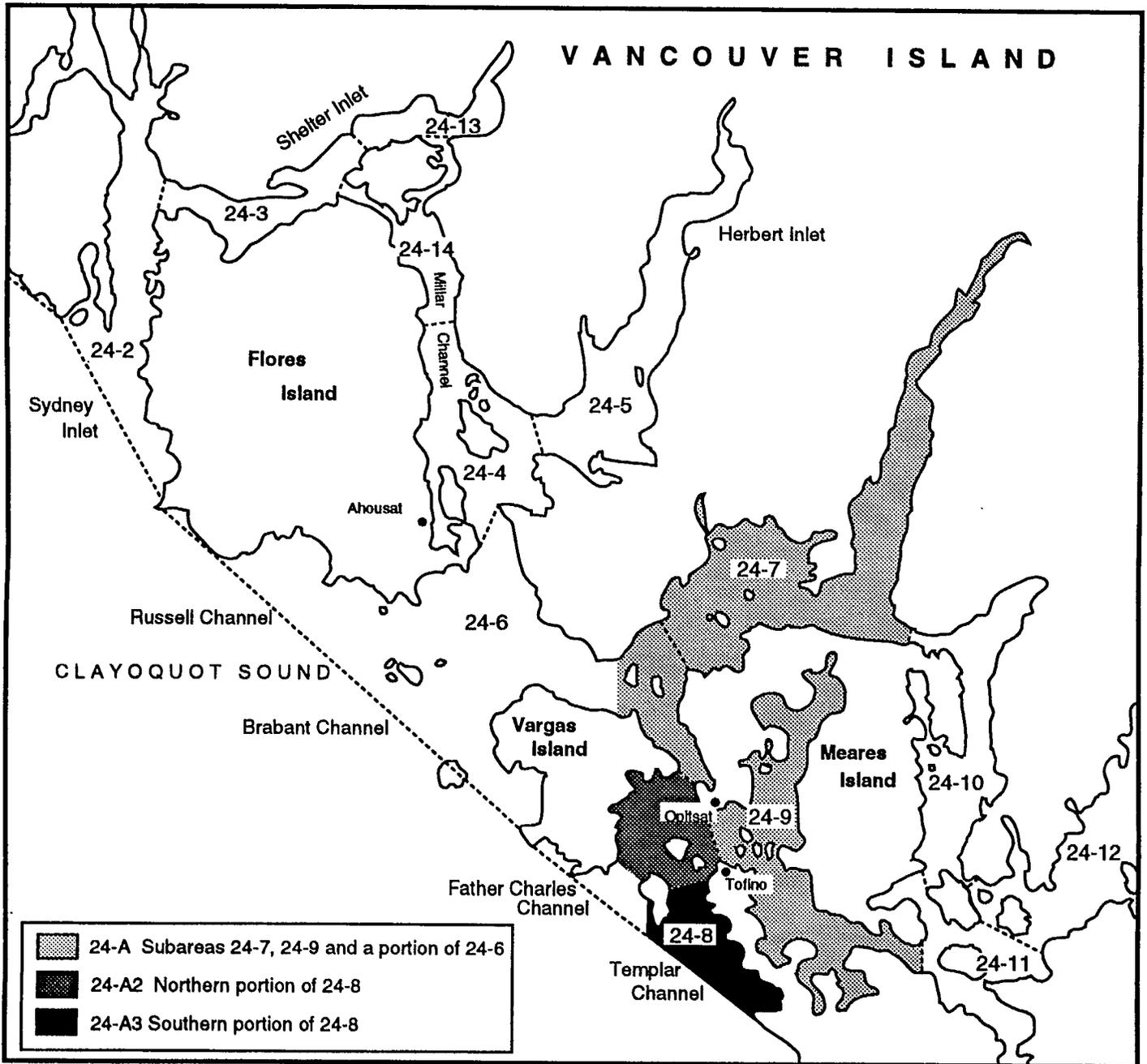
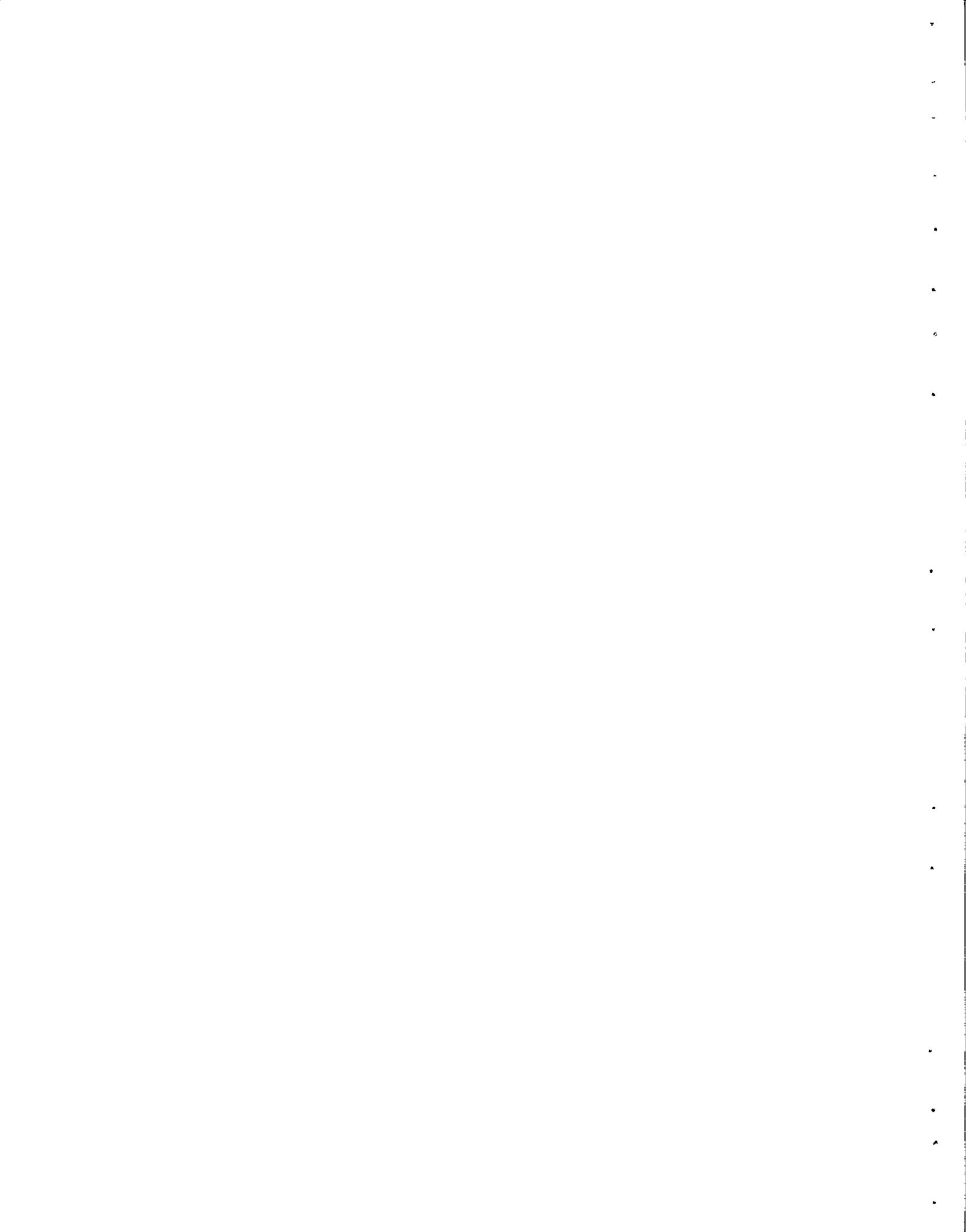


Figure 11. 1992 -1993 geoduck management areas: Area 24 Inside : 24-A, 24-A2 and 24-A3



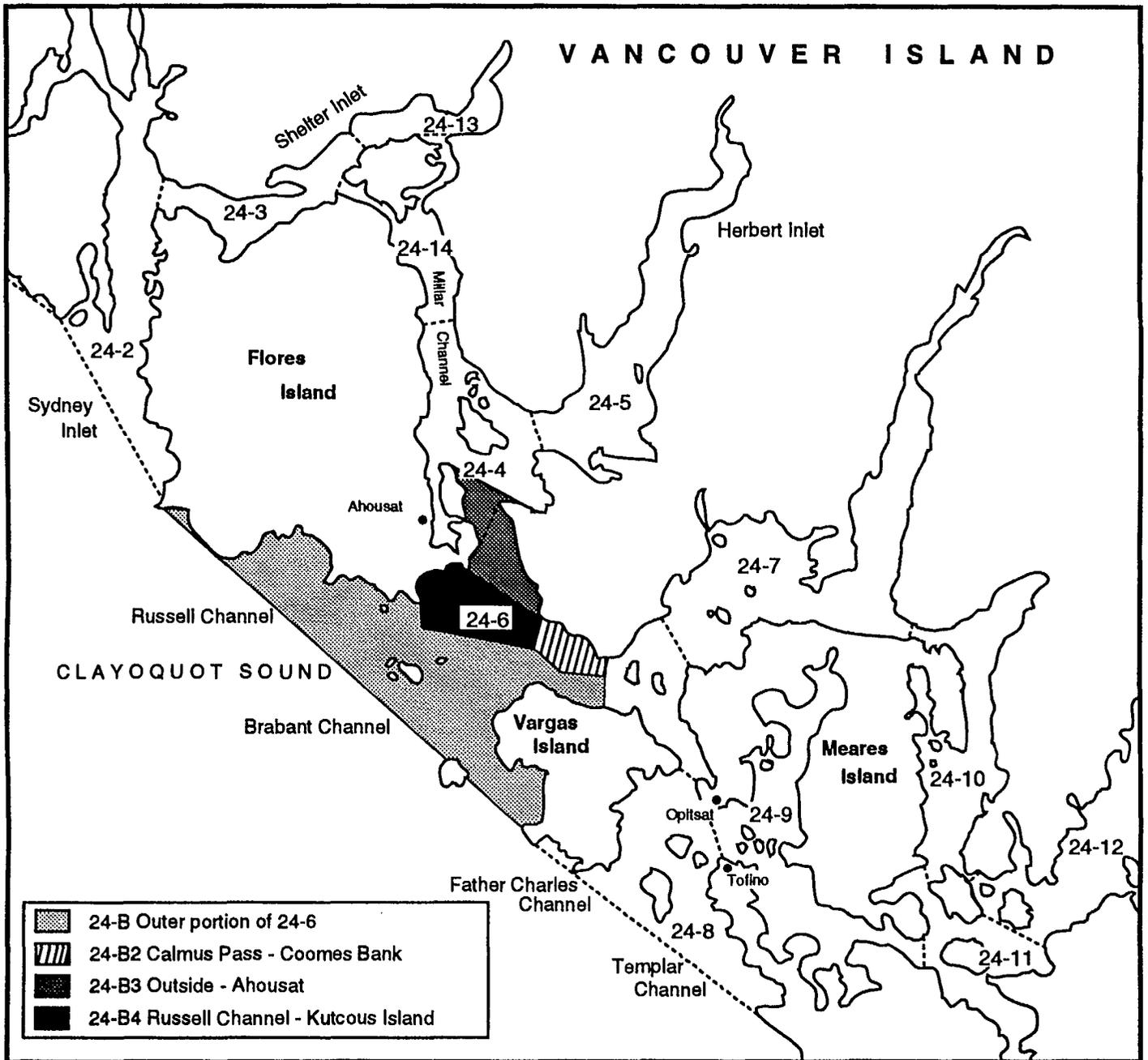
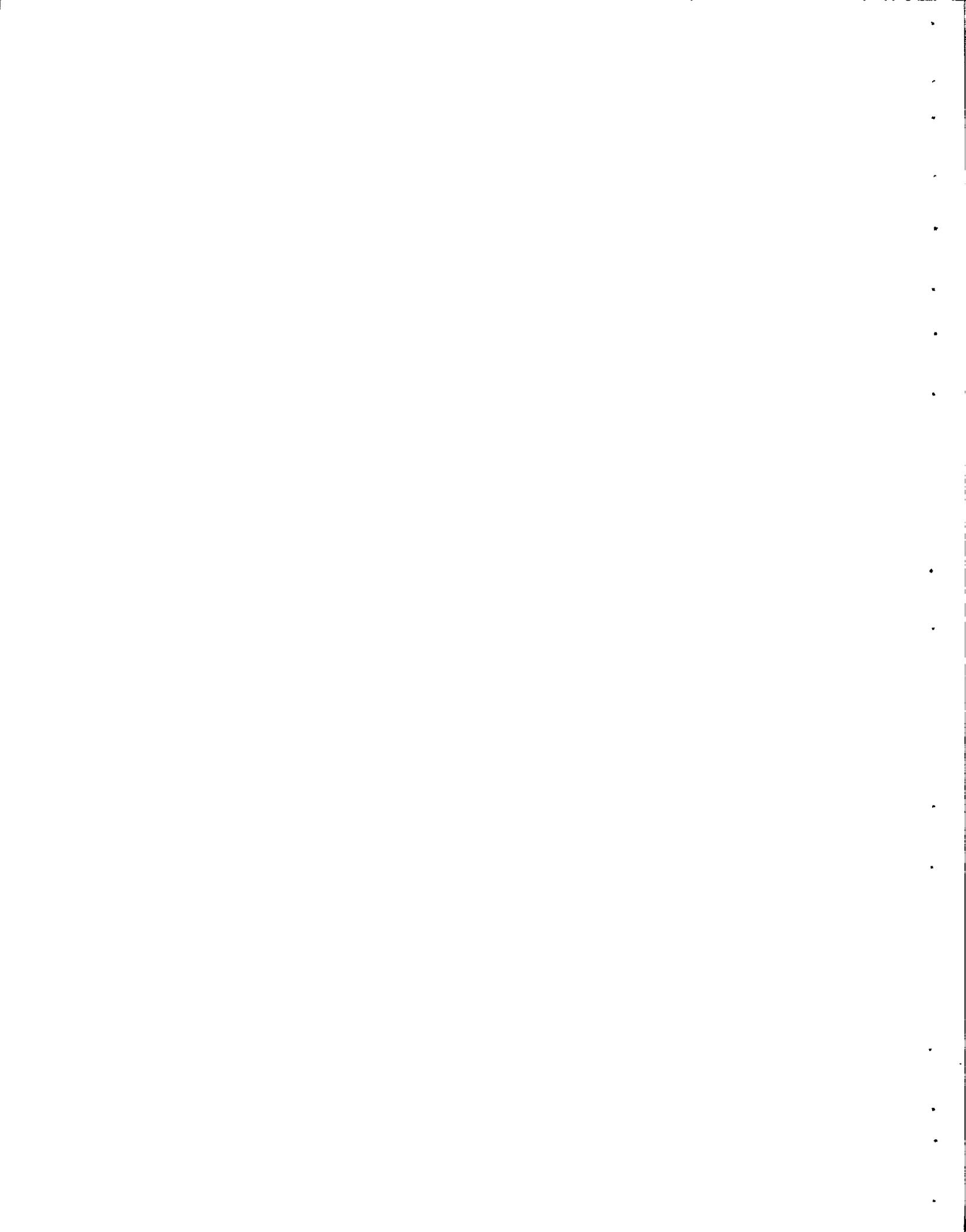


Figure 12. 1992-1993 geoduck management areas: Area 24 Outside; 24-B, 24-B2, 24-B3 and 24-B4.



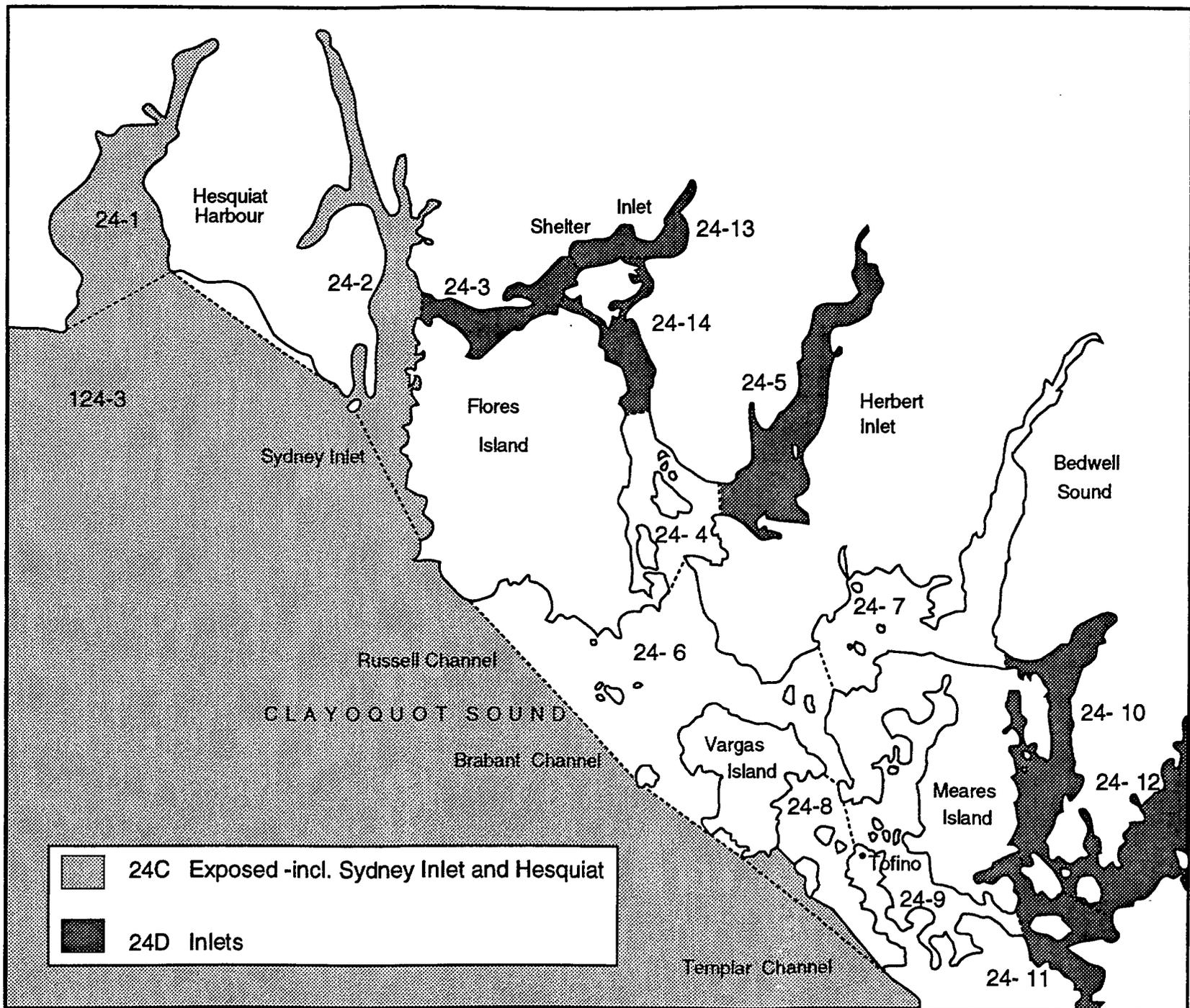
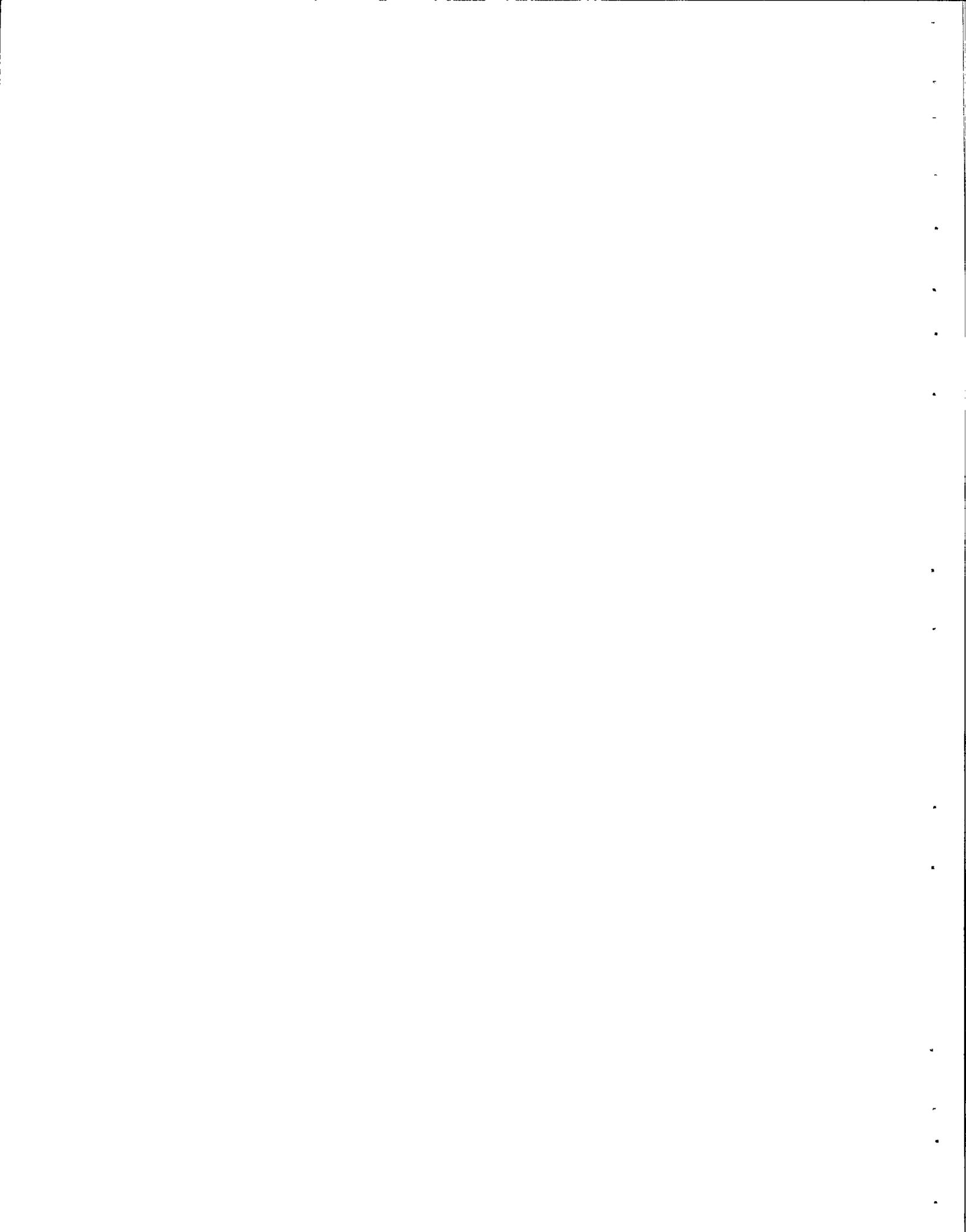


Figure 13. 1992 -1993 geoduck management areas: Area 24-C - Exposed and 24-D - Inlets (both closed in 1992-93).



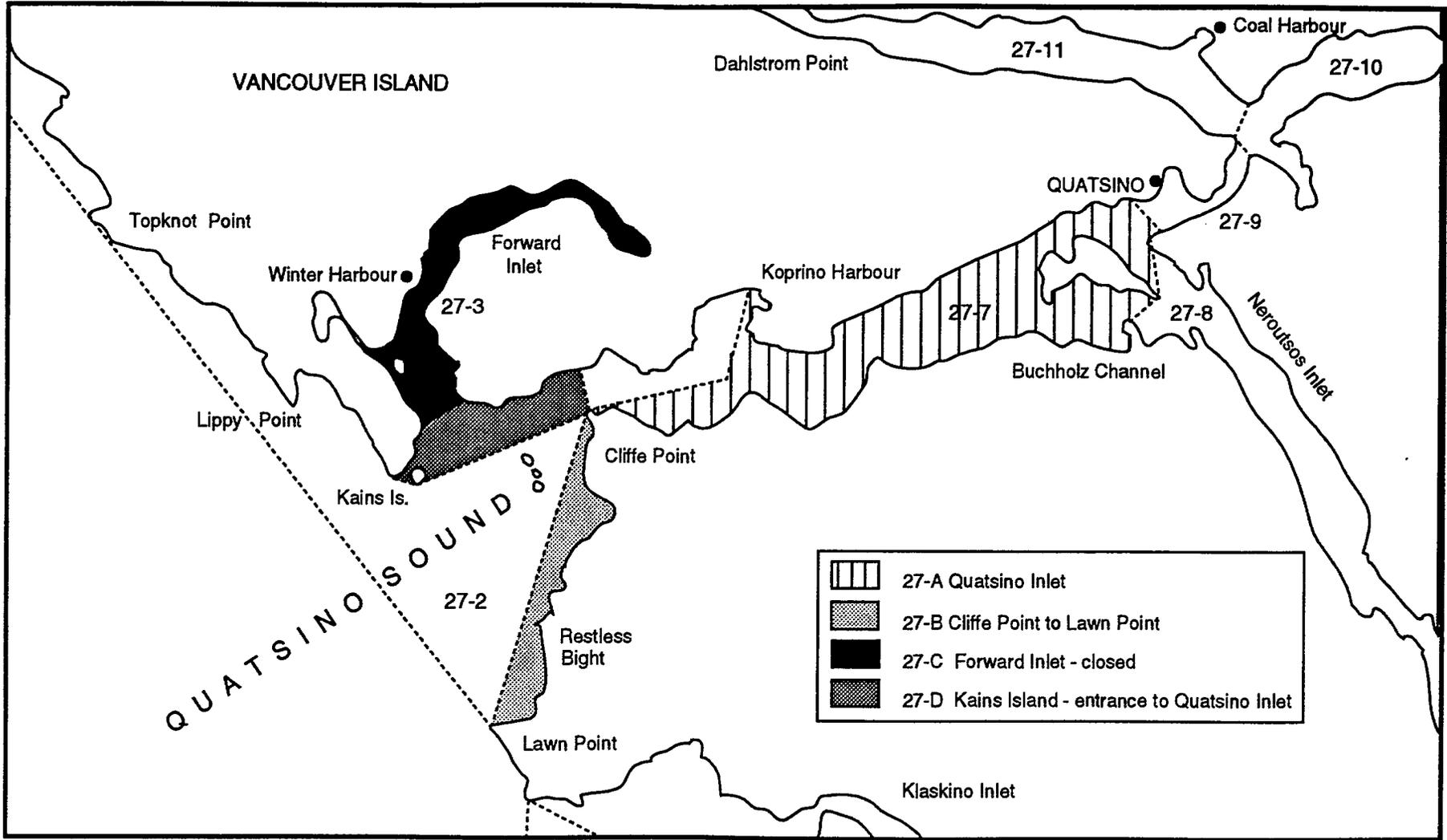
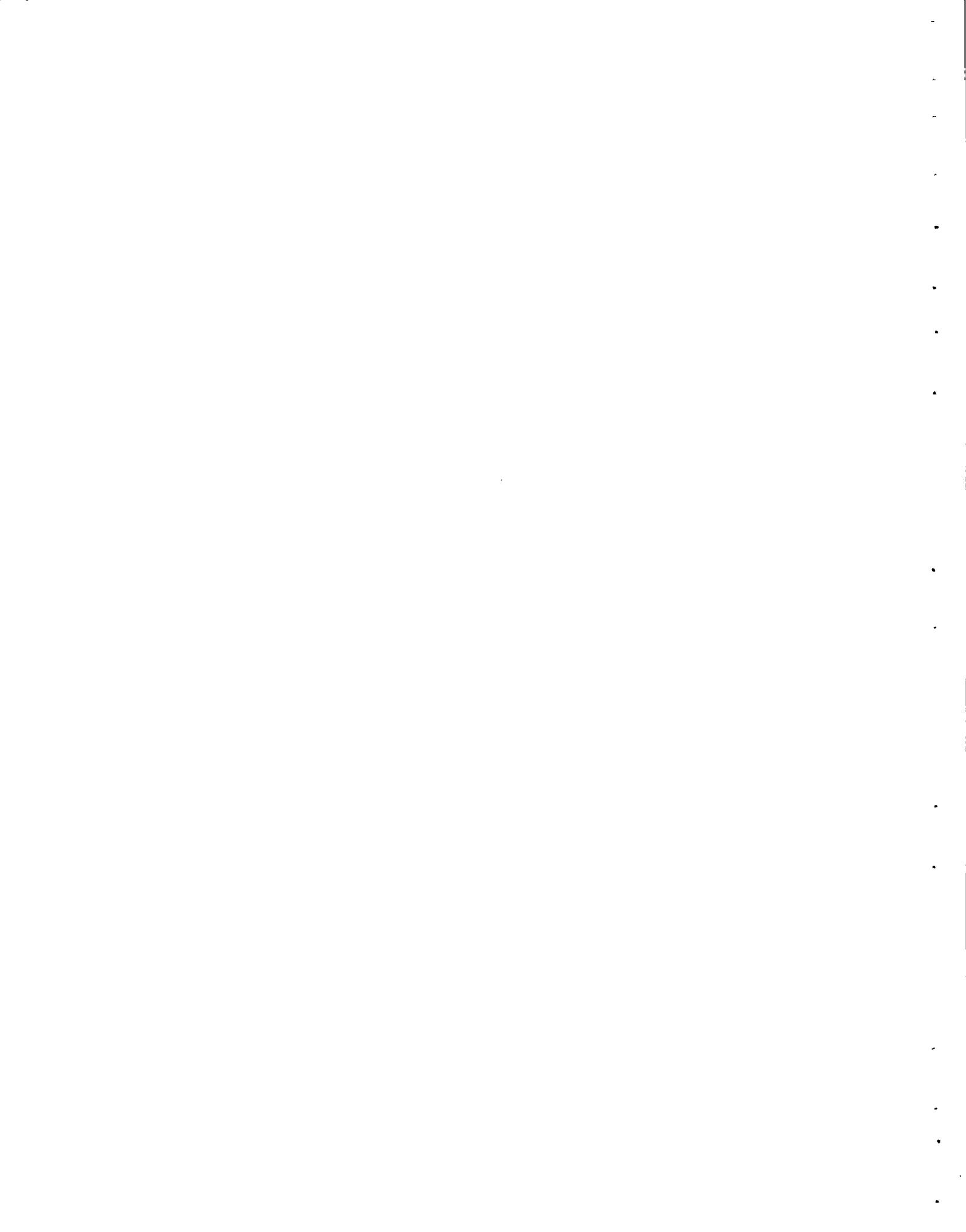


Figure 14. 1992 geoduck management areas: Areas 27-A,B,C,D: Quatsino Inlet, Forward Inlet, Cliffe Point to Lawn Point, and Kains Island.



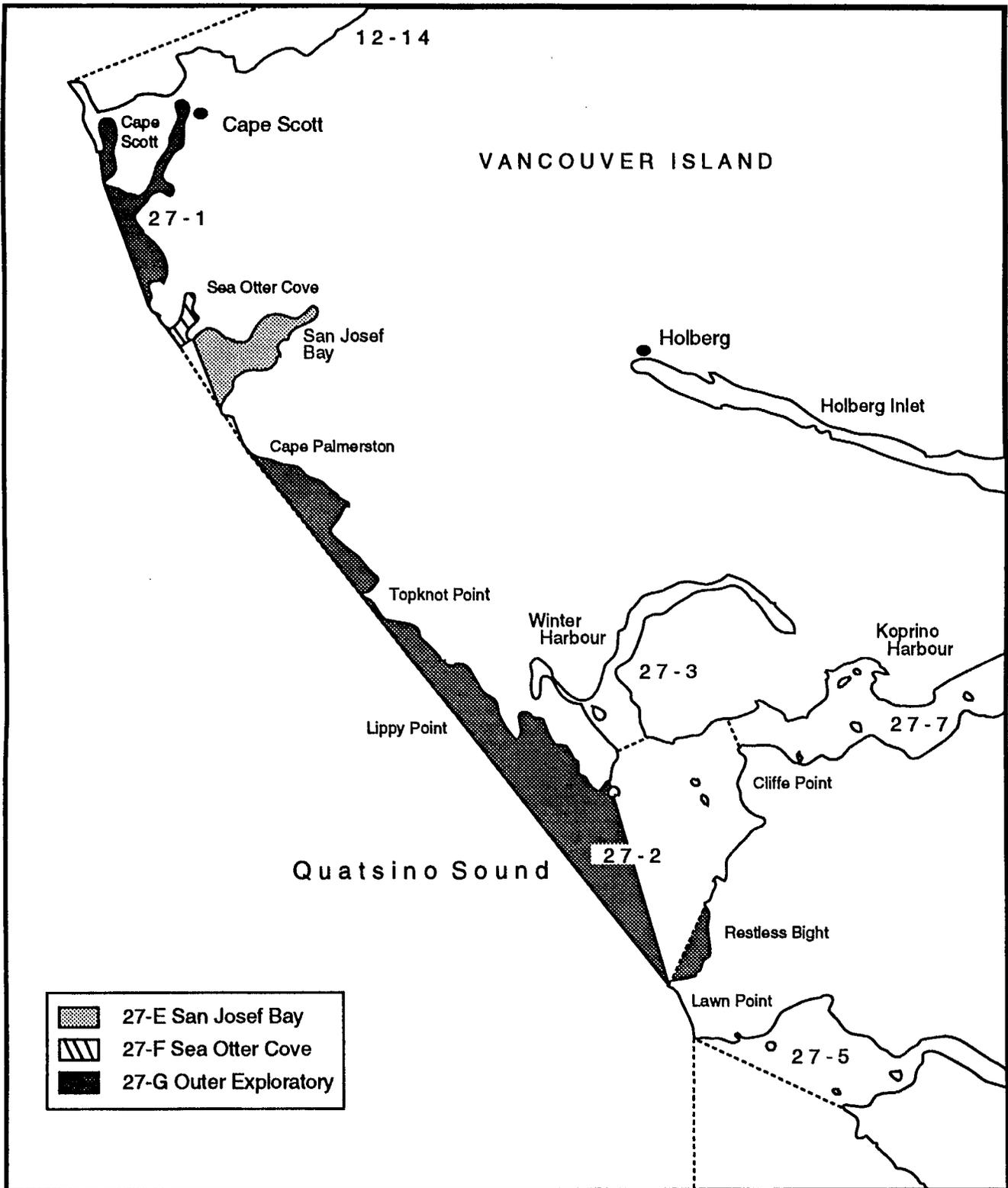
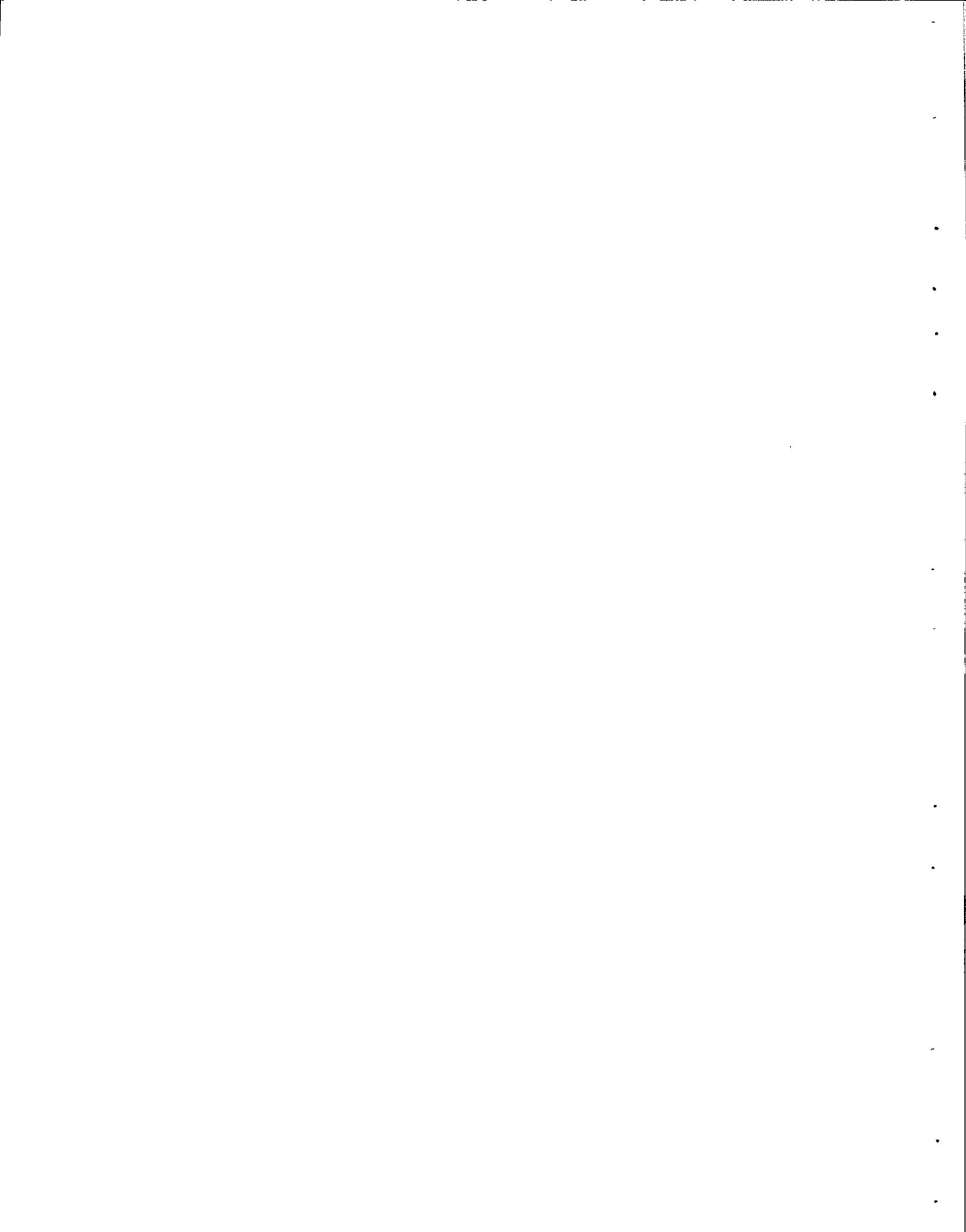


Figure 15. 1992 geoduck management areas: Areas 27-E,F,G: San Josef Bay, Sea Otter Cove and outer exploratory area.



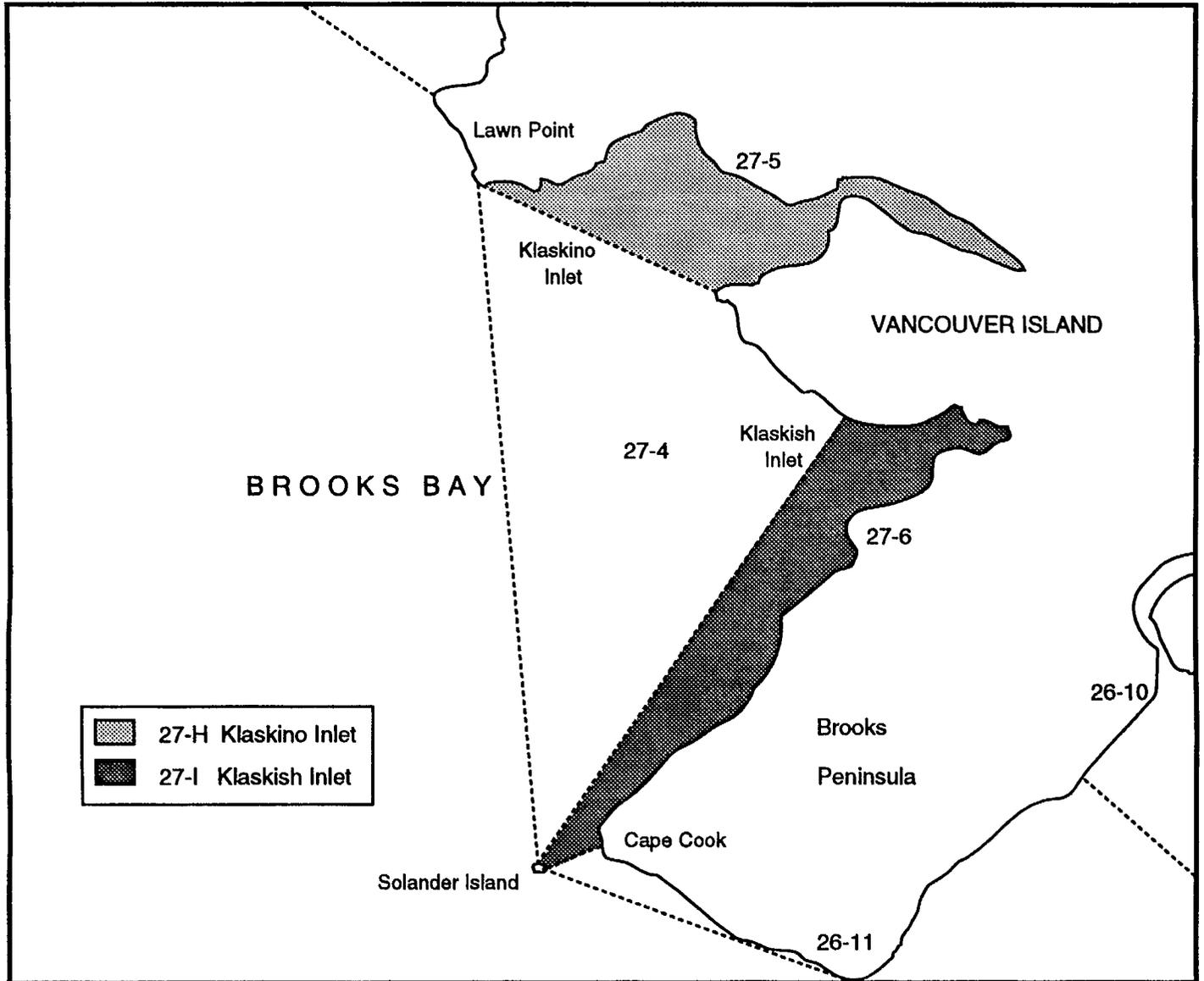
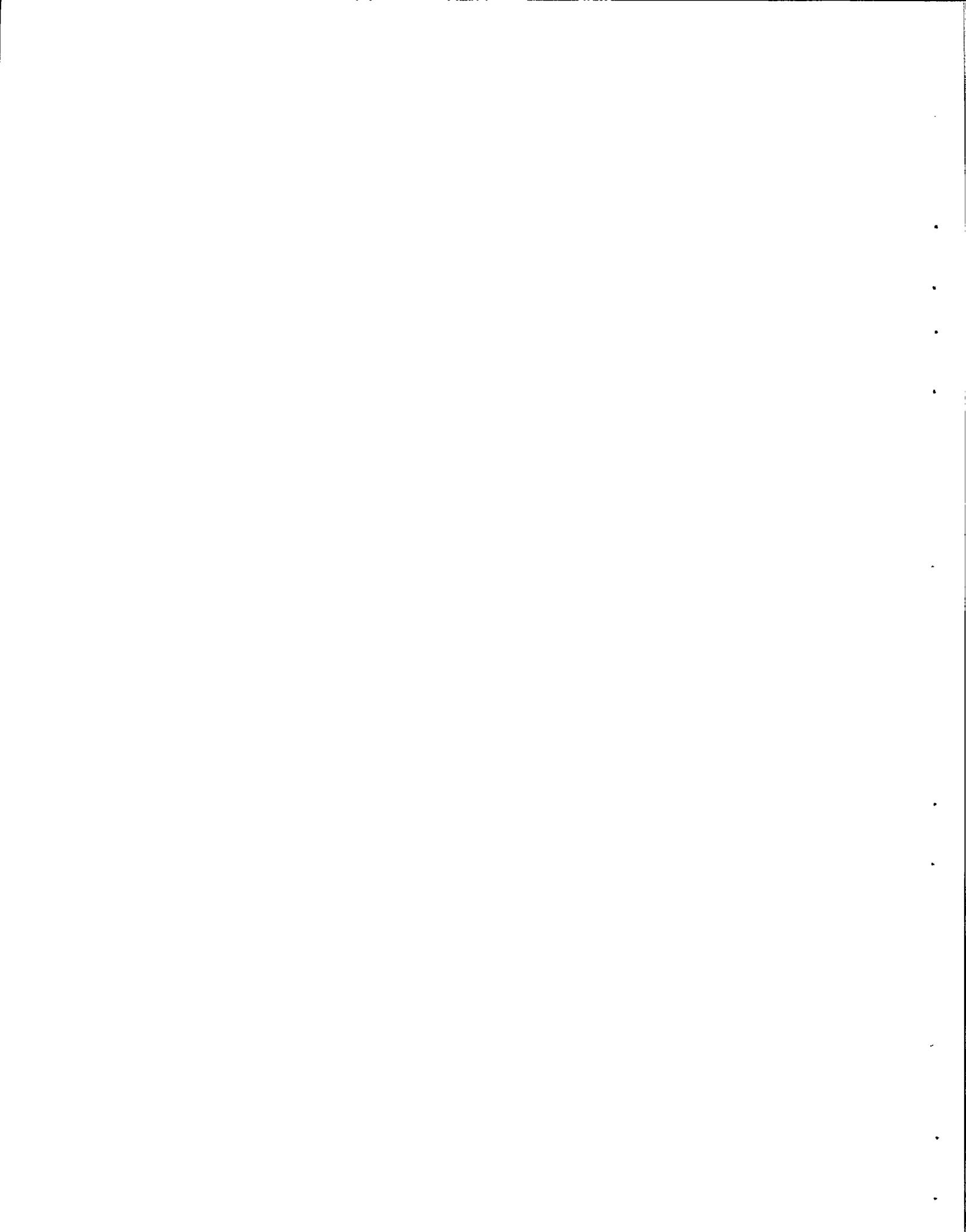


Figure 16. 1992 geoduck management areas: Areas 27-H and 27-I; Klaskino and Klaskish Inlets.



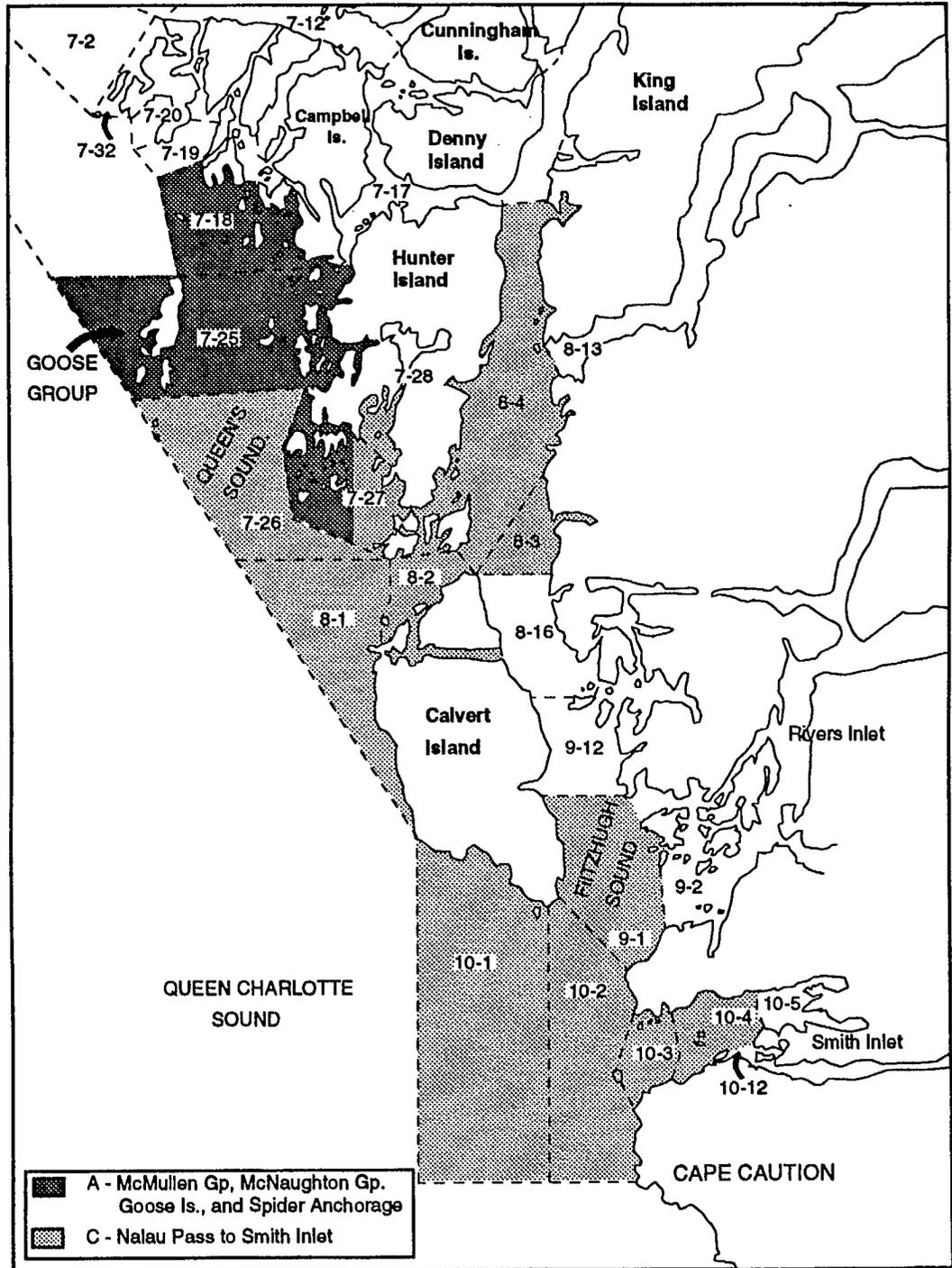


Figure 17. 1992 geoduck management areas: North Coast A and C.

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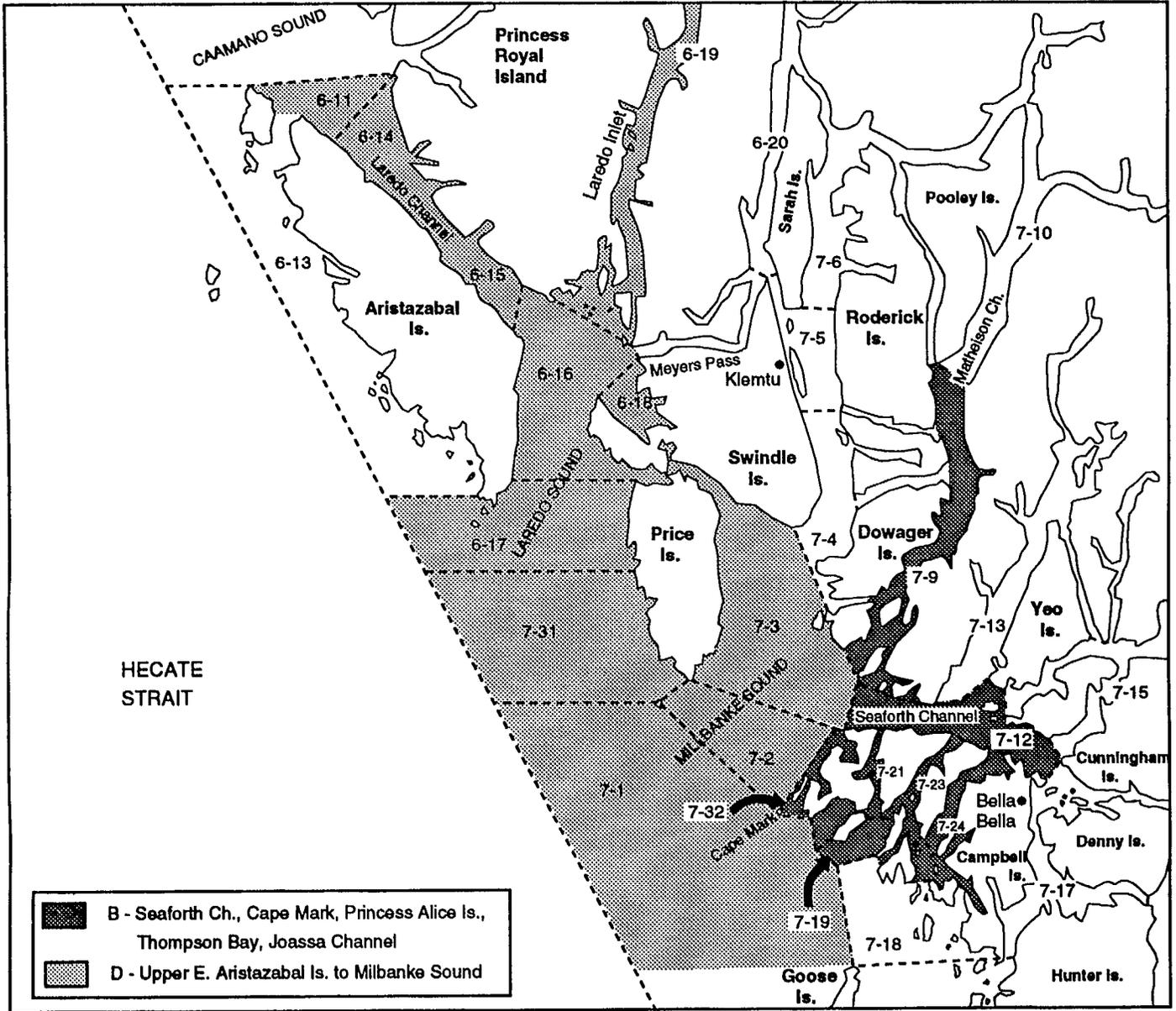
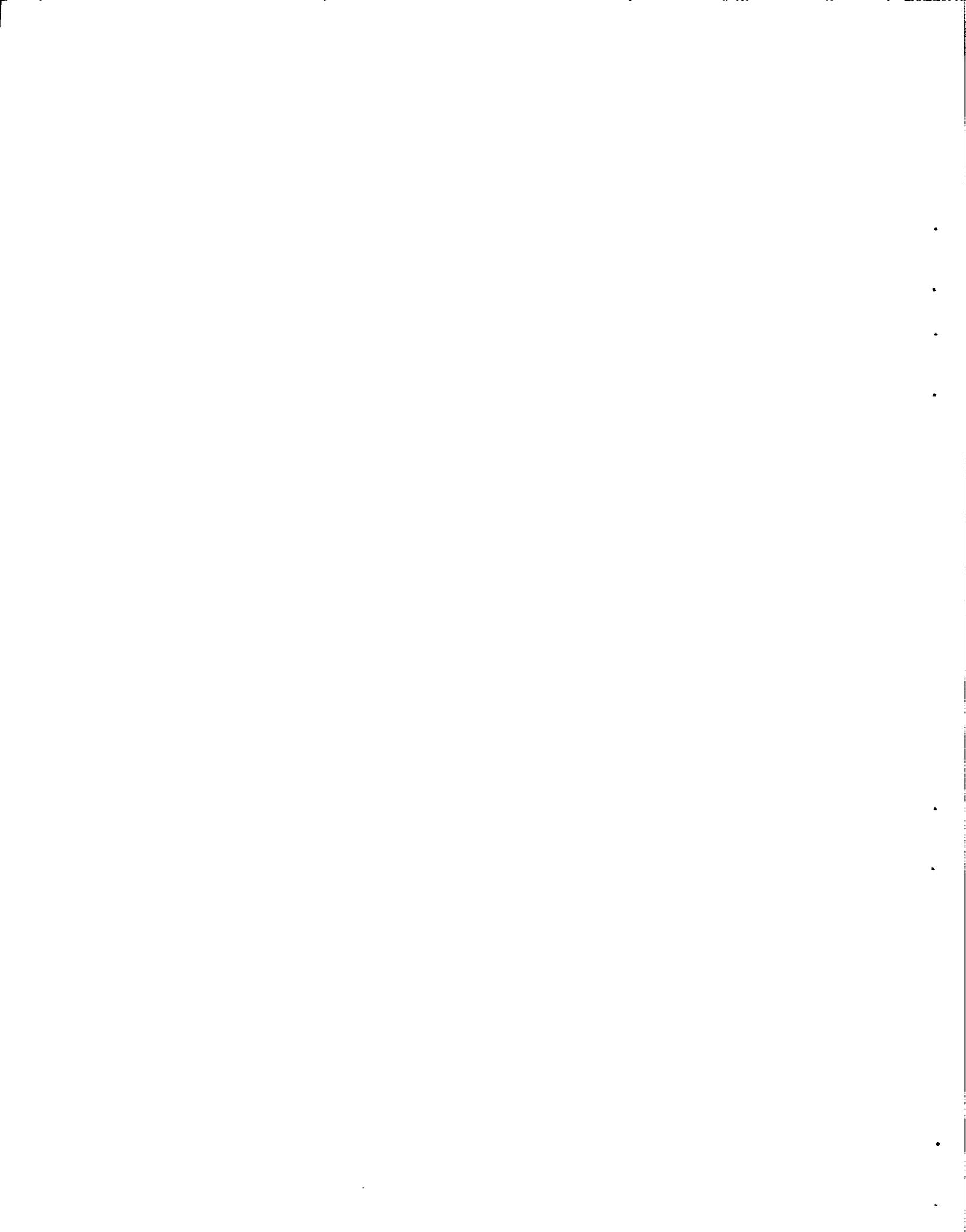


Figure 18. 1992 geoduck management areas: North Coast areas B and D

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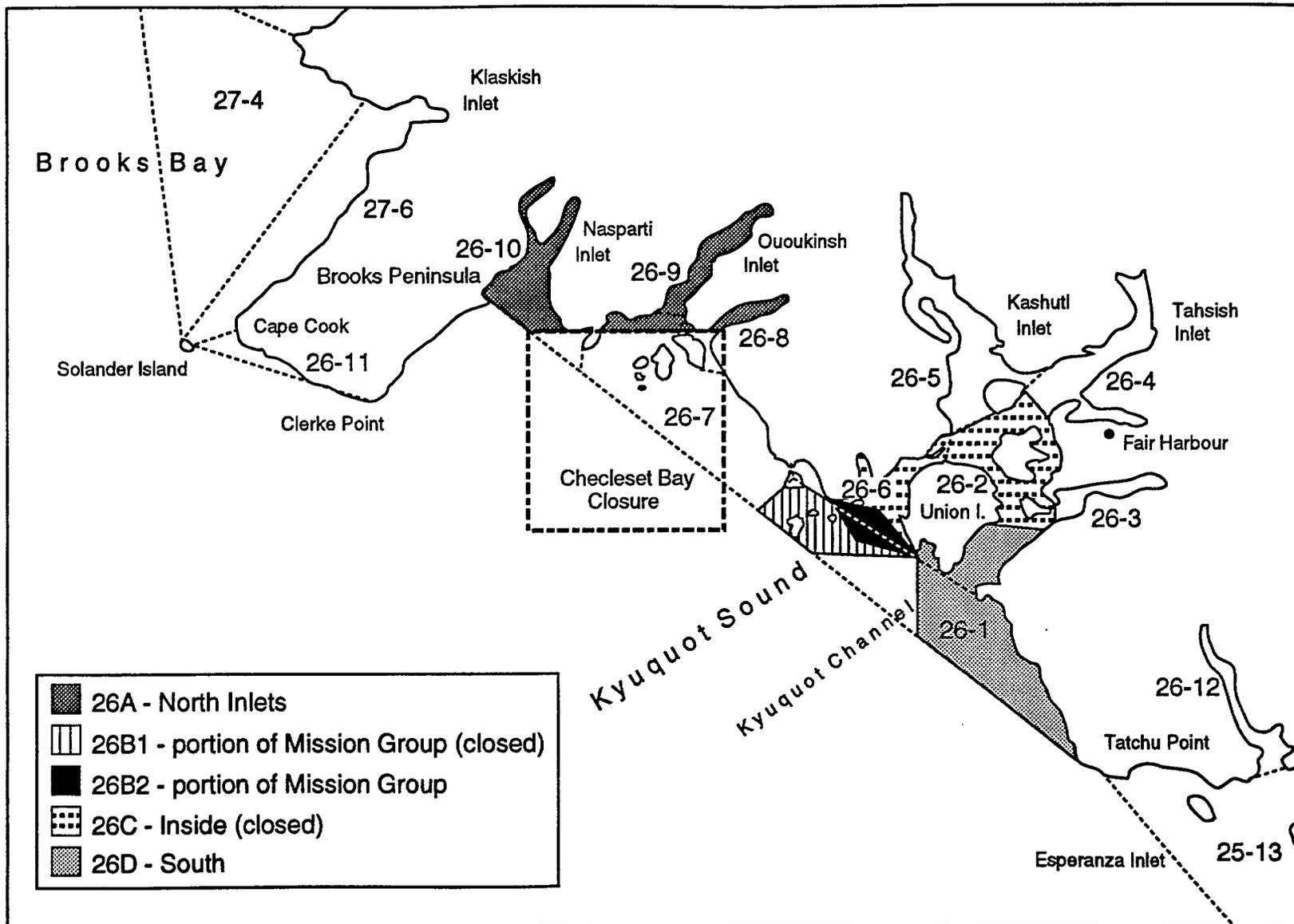
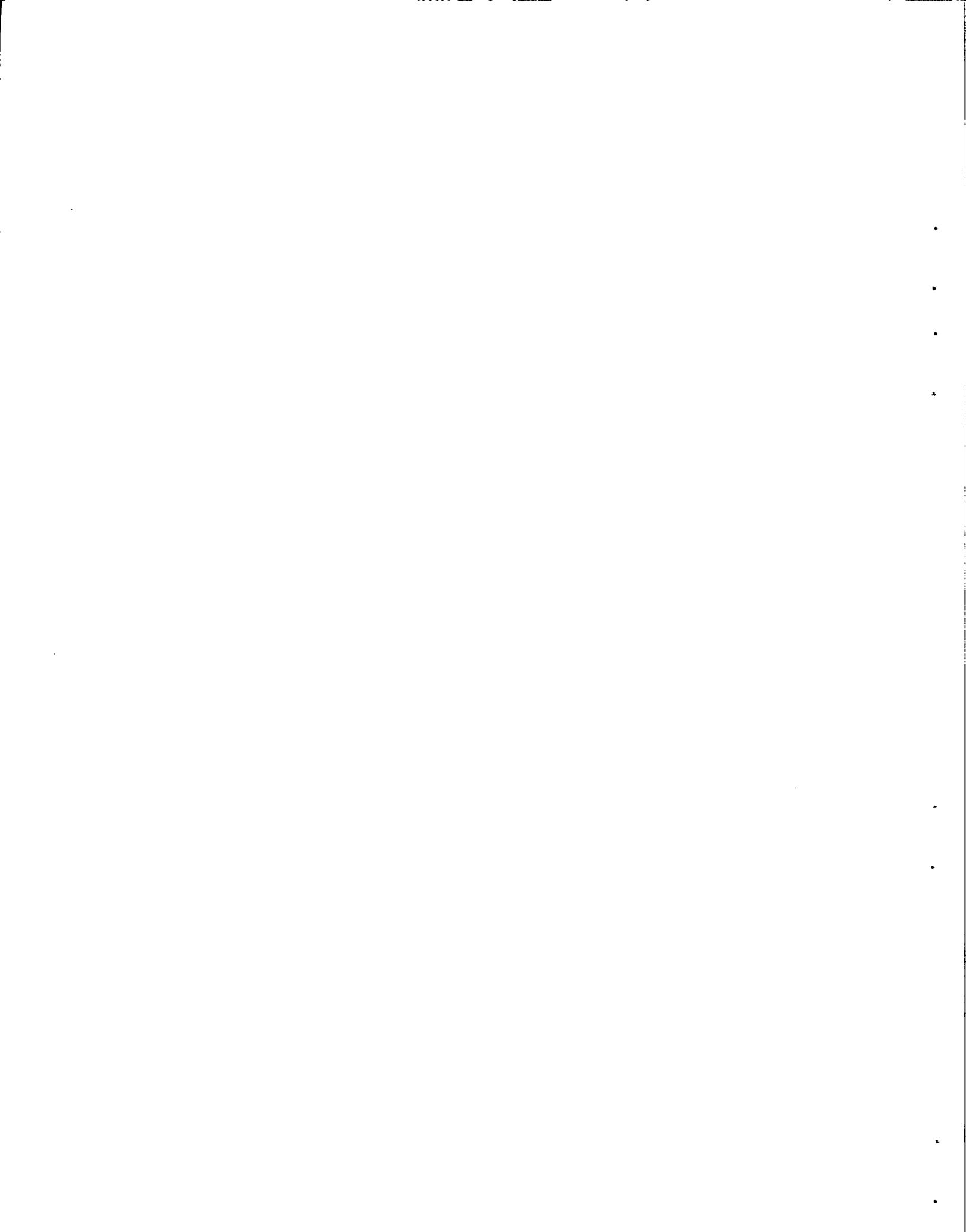


Figure 20. 1993 geoduck management areas 26-A, 26-B, 26-C and 26-D, including the Checleset Bay closure.



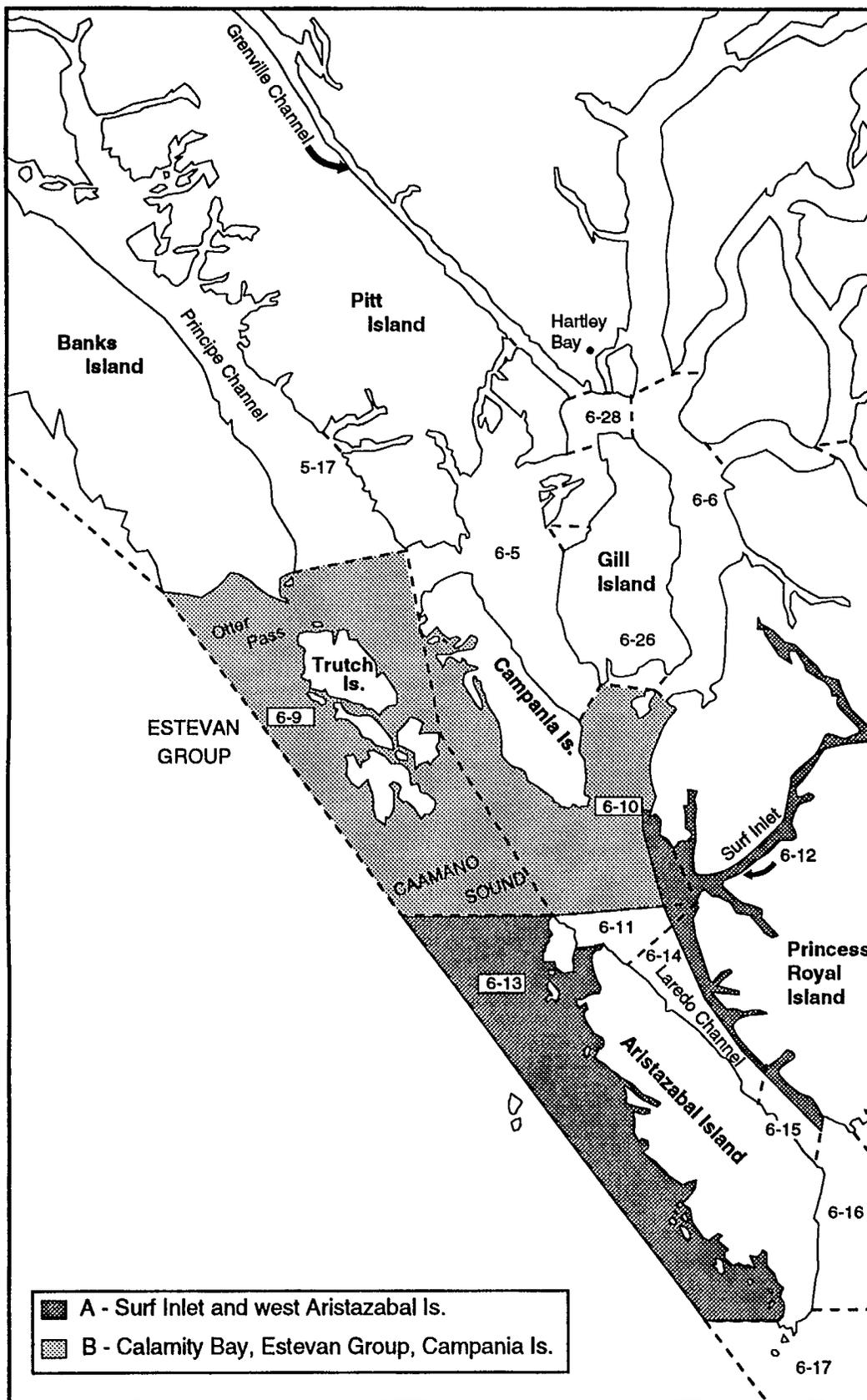


Figure 21. 1993 geoduck management areas: North Coast areas A and B.

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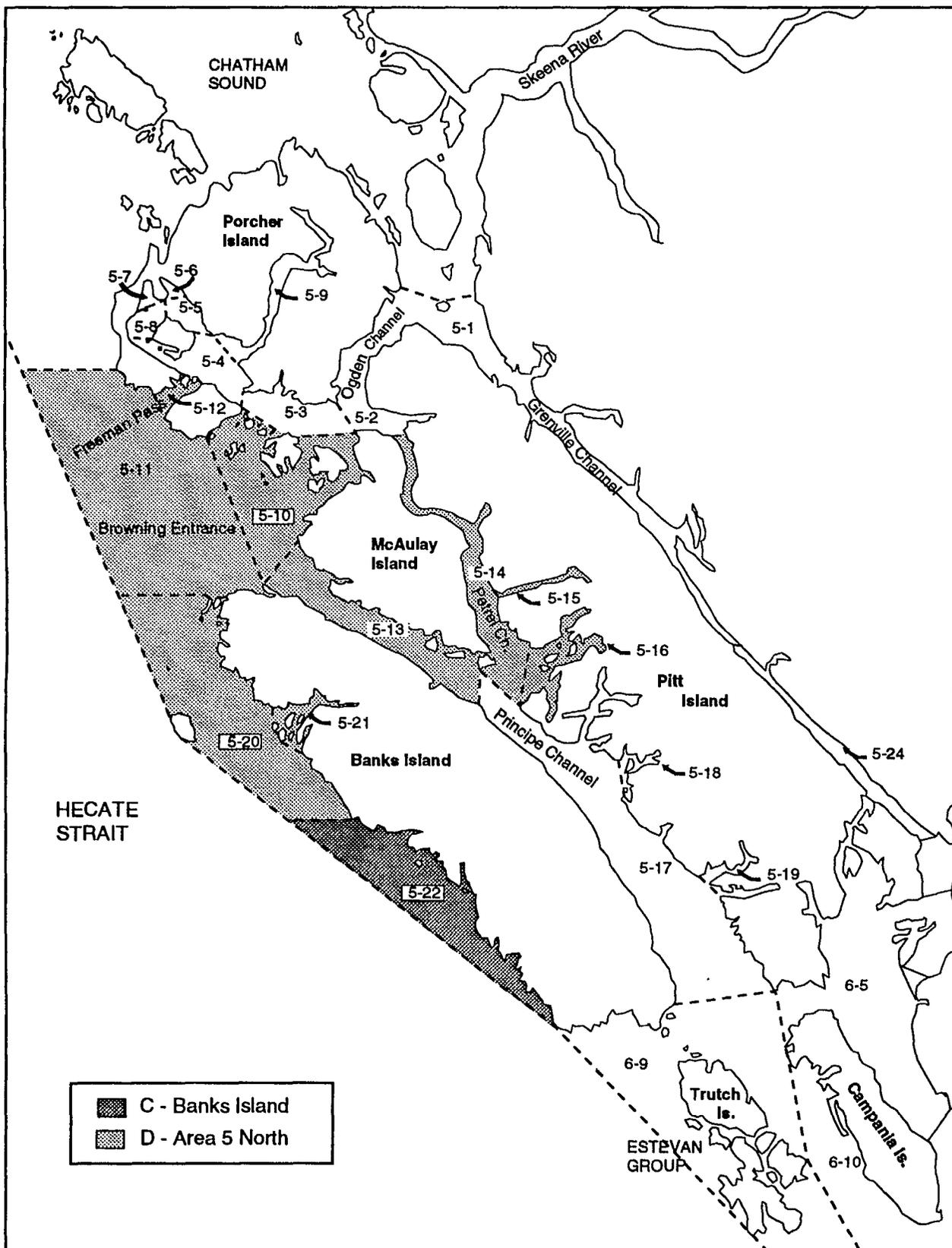
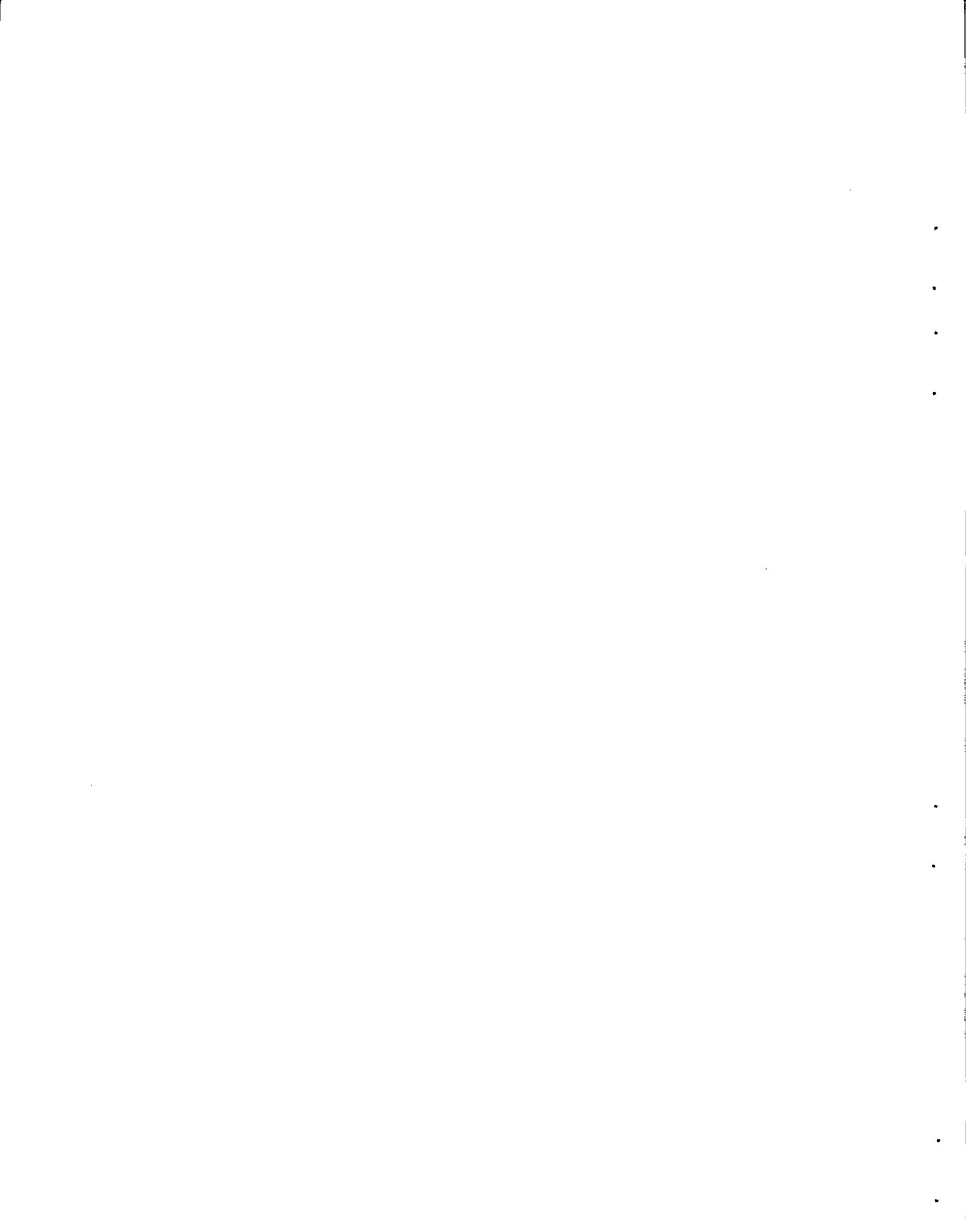


Figure 22 . 1993 geoduck management areas: North Coast areas C and D.



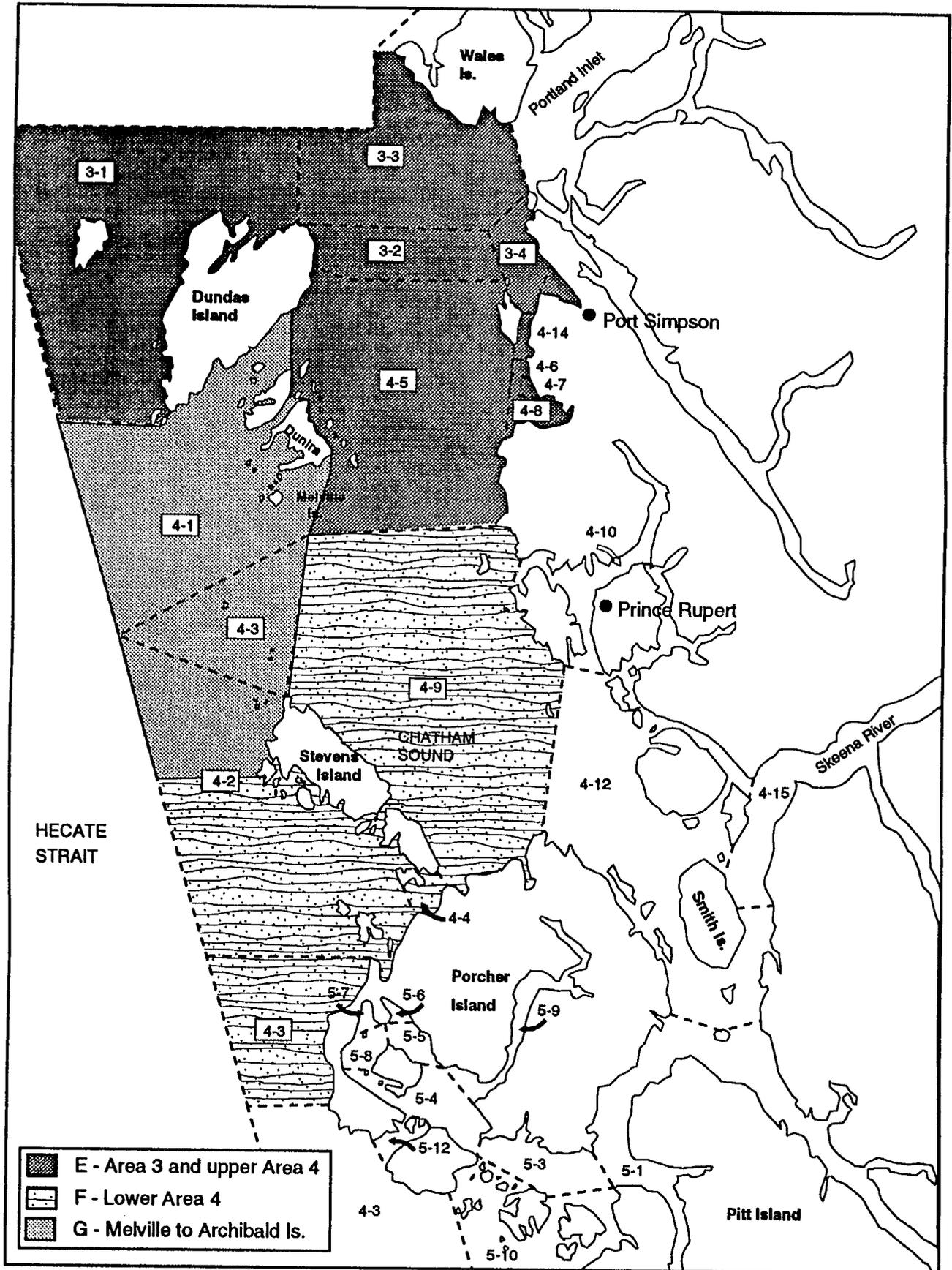


Figure 23. 1993 geoduck management areas : North Coast E, F, and G.

