Queen Charlotte Sound Shrimp Survey And Resulting Management Actions, July 1998

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QUEEN CHARLOTTE SOUND SHRIMP SURVEY AND RESULTING MANAGEMENT ACTIONS

JULY 1998

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ABSTRACT

Boutillier, J.A., J.A. Bond, H. Nguyen, and R.M. Harbo. 1998. Queen Charlotte Sound shrimp survey and resulting management actions, July 1998. Can. Manuscr. Rep. Fish. Aquat. Sci. 2462: 47 p.

This report forms part of a series that details the assessment and management actions undertaken in the shrimp trawl fisheries off the pacific coast of Canada in 1998.

An area-swept shrimp trawl survey was undertaken in Queen Charlotte Sound in July 1998. Five volunteer commercial shrimp vessels were used to complete the survey, which covered portions of Pacific Fisheries Management Areas 7, 9, 10, 107, 108, 109, and 110. The fisheries in this area are primarily for the smooth pink shrimp, *Pandalus jordani*, however the sidestripe shrimp, *Pandalopsis dispar* is also caught in some areas.

Biomass indices of shrimp by species were determined in select trawlable areas of Queen Charlotte Sound and Fitz Hugh Sound. While the collection of shrimp data and the bycatch of halibut and eulachon were priorities over detailed information on bycatch, catch information on all species was generally collected. Landings of prawns and halibut were minor, however, because of concerns with respect to eulachon populations estimates of eulachon stocks on the shrimp grounds were also calculated.

A fixed exploitation rate of 33% was applied to the biomass estimates of shrimp by species. Catch ceilings, quotas, and other management actions as results of the survey are discussed.

These survey data are part of a long-term database of survey indices to be combined with logbook data, biological sampling and other fishery data. Until a long-term database is available, the initial biomass indices will be used as an absolute estimate for the purpose of setting quotas. The assessment and management process will require a collaborative effort on the part of DFO and stakeholders.

RÉSUMÉ

Boutillier, J.A., J.A. Bond, H. Nguyen, and R.M. Harbo. 1998. Queen Charlotte Sound shrimp survey and resulting management actions, July 1998. Can. Manuscr. Rep. Fish. Aquat. Sci. 2462: 47 p.

Ce rapport entre dans une série de travaux décrivant les évaluations et les mesures de gestion prises dans les pêches de la crevette sur la côte pacifique du Canada en 1998.

Une campagne de chalutage scientifique par la méthode des aires balayées a été entreprise en juillet 1998 dans le détroit de la Reine-Charlotte. Les relevés ont été effectués par cinq crevettiers commerciaux volontaires, qui ont couvert certaines portions des zones de gestion des pêches du Pacifique 7, 9, 10, 107, 108, 109 et 110. Dans cette région, les pêches visent principalement la crevette océanique, *Pandalus jordani*, mais la crevette à flancs rayés, *Pandalopsis dispar*, est aussi capturée dans certaines zones.

Les indices de la biomasse de crevette, par espèce, ont été déterminés dans certains secteurs chalutables des détroits de la Reine-Charlotte et de Fitz Hugh. Les priorités de la campagne étaient la collecte de données sur les crevettes et les prises accessoires de flétan et d'eulakane plutôt que l'étude détaillée des prises accessoires, mais des données sur les captures ont en général été recueillies pour toutes les espèces. Les débarquements de crevette tachetée et de flétan étaient minimes, mais les populations d'eulakane suscitant des préoccupations, nous avons aussi établi des estimations des stocks de ce poisson sur les bancs de pêche des crevettes.

Un taux fixe d'exploitation de 33 % a été appliqué aux estimations de la biomasse, pour chaque espèce. Nous analysons les plafonds de capture, les quotas et les autres mesures de gestion prises à la suite des relevés.

Les données obtenues grâce aux relevés entrent dans une base de données à long terme qui rassemble des indices scientifiques en vue de les combiner aux informations des journaux de pêche, aux résultats des échantillonnages biologiques et à d'autres données sur les pêches. En attendant que la base soit suffisamment enrichie, les indices initiaux de la biomasse serviront d'estimations absolues pour l'établissement des quotas. Le processus d'évaluation et de gestion nécessitera un effort de collaboration de la part du MPO et des intervenants.

ASSESSMENT AND MANAGEMENT FRAMEWORK

This report forms part of a series of documents that outline the assessment data and management processes that were used in 1998 in the shrimp trawl fishery for specific areas along the British Columbia coastline. The shrimp trawl fishery takes place in a variety of areas ranging from large offshore grounds to small isolated inshore waters. These fisheries also vary with respect to the target species. There are seven species of shrimp that are harvested commercially in British Columbia and fisheries vary in complexity from single to multiple species fisheries. Many of these shrimp trawl fisheries are new or developing and there is little or no information available from which to assess the stocks.

A suite of management principles were developed for these fisheries, as a result of discussions and concerns outlined in PSARC assessments of inshore (Boutillier et al 1996) and offshore (Boutillier et al 1997) shrimp fisheries. The management systems adopted in 1998 varied depending on the nature and complexity of the fishery.

For the offshore fisheries in the southern and central regions off the West Coast of Vancouver Island (WCVI), time and area closures were implemented. The recruitment process for these offshore fisheries appears to be strongly influenced by environmental factors which affect the strength and direction of surface currents. There also appears to be a strong south to north recruitment interdependence between grounds (Boutillier et al 1997).

For inshore fisheries and the remaining offshore areas, fixed arbitrary, historically based, or forecasted[1] catch ceilings were assigned to each shrimp management area. These catch ceilings can be adjusted inseason, if information from fishery independent biomass indices and catches indicate that the area can sustain fishing pressure either less than or greater than the initial levels. The biological reference point for sustainable fishing pressure that is used at this time is the biomass of the area multiplied by an exploitation rate of 33%.

The use of biological reference points discussed above is based on precautionary principles discussed in Boutillier et al (1996) and are designed to meet conservation and sustainable utilization goals in data limited situations. Over the long term, the management and assessment systems for these fisheries will undergo a number of changes that reflect a better understanding of these initial and hopefully conservative thresholds. These changes will result from a management and assessment system which will be designed to collect information on a number of key issues including: the biotic and abiotic factors that affect the population, quantifying biological compensatory mechanisms, calculating depensatory mortality thresholds, evaluating factors affecting availability, developing survey designs which quantify shrimp abundances in untrawlable areas, and accounting for variations in availability to trawl surveys due to vertical migrations.

One of the key tools used in collection of the data that will address these issues is the use of fishery independent area swept trawl surveys. Area swept trawl surveys are used to calculate

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[1] Forecasting only took place in Pacific Fisheries Management Area 12 for *P. borealis eous* where there was information from fishery independent trawl surveys conducted the previous year (both in April and November 1997).

biomass indices for these fisheries which provide trends in abundance. These trends when modelled with the catch history from the area will provide estimates of absolute abundance. However, until a reliable long-term database of survey indices and catches are available, the survey biomass indices will be used as an absolute estimate for the purpose of setting the biological reference point catch ceilings.

The management and assessment process is an iterative process which demands a constant building and learning. It will take years of careful assessment and testing of critical basic biological parameters such as: growth, mortality, recruitment, appropriate levels of exploitation by area and species etc., to address the issues as stated above. This will take a collaborative effort on the part of department and stakeholders to achieve meaningful results while adhering to precautionary principles.

INTRODUCTION

This report summarizes the data collection process, analysis, interpretation and resulting management actions of fishery independent shrimp surveys that were conducted July 14-15, 1998 in portions of two shrimp management areas off the Pacific Coast of Canada: Area 9-Inside (9-IN) and Queen Charlotte Sound (QCSND). The survey areas are shown in Figure 1.

The Area 9 fishery is a combined near shore and inshore fishery which in its entirety includes a number of small isolated fisheries that target on a variety of species complexes. This partial survey however was restricted to the near shore waters, in the "Fitz Hugh Sound" portion of the area and targeted on two commercial shrimp species: *P. jordani* (smooth pink); and *Pandalopsis dispar* (sidestripe). The QCSND fishery is a large offshore fishery which targets principally on smooth pinks, however, there are pockets of sidestripes that are also targeted at times. Catch in these areas has increased since 1996, although both areas have had various levels of commercial fishing. See Figure 2 for the catch history in Queen Charlotte Sound.

OBJECTIVE

These areas opened on April 16, 1998 with quotas based on arbitrary limits for Area 9; and historical catches in QCSND. The preliminary quotas for the areas were taken by the fishery and the areas were closed: for Area 9 on July 2, 1998 and for QCSND on July 12, 1998. This multi-vessel area swept trawl survey using industry vessels was conducted to provide inseason fishery biomass indices of shrimp by species, eulachon, and halibut in select trawlable areas of Area 9 and QCSND, and develop inseason quotas for the various areas by shrimp species.

METHODS

The survey in July 1998 provided inseason fishery biomass indices of shrimp abundance for Pacific Fisheries Management Areas (PFMA) 9-1 and 9-12 (for the Shrimp Area 9 fishery) and PFMAs 10-1; 110; 109; 108-1; 107; 7-26; and 7-1 in the QCSND shrimp management area. A portion of PFMA 7-25 in the 7-IN Shrimp Management Area was also surveyed, as it was contiguous with the grounds in QCSND.

The survey was conducted using five volunteer commercial fishing vessels, ranging in size from 12.8 to 18.3 metres in length : Parr Four (Capt. Vance Whyte), Ocean Dancer (Capt. Jim Wallace), Westerly Gail (Capt. Gordon Plensky), Pacific Rancher (Capt. Bud Schuler) and Western Clipper (Capt. John Adams) Each vessel carried a biological technician, who was funded by DFO science using industry stock assessment and fisheries management funds. The trawl vessels that volunteered provided trawl gear in good working order as well as accommodation for

the technicians. The vessels were permitted to retain their catch for disposal to defray the costs of fuel and food. The catches would be accounted for in any additional quotas assigned to the area.

MAPPING

Locations of shrimp trawl activity were identified through examination of the 1996 and 1997 logbook records as well as through consultation with industry sectoral representatives. Locations were incorporated into CompuGrid, the proprietary raster-based geographic information system (GIS) utilized by DFO, Shellfish StAD, and displayed in relation to land mass, Pacific Fishery Management Areas and depth contours. Masks were initially drawn around the areas of most concentrated effort (clusters of location points), using the 50 m and 200 m contour lines as rough guides, these were subsequently modified slightly as a result of the survey results. The masks were captured digitally and incorporated into the GIS. Within each mask, a sampling grid was established which broke the masked area into blocks of 0.25 square nautical miles (ie each block had sides of length 0.5 nautical miles).

FIELD DATA

All data was collected in a standard format which included details on the: sequential tow number[2], time and date, duration, Pacific Fisheries Management Area (PMFA), latitude and longitude of the start and finish of the tow, direction of the tow, distance travelled, depth, remarks on usability, and detailed catch information on total catch weight and weight by species (for commercial shrimp species #/kg information was also collected). Biological samples of 100 (if available) shrimp by species were collected from each tow for later processing by size and sex. Biological samples were taken of any eulachon and halibut caught in the survey as by-catch.

EFFORT STANDARDIZATION

Between Vessel Differences

Prior to the July survey, logbook records of the fishermen participating in the survey were examined and compared to see if there were significant differences between the effective fishing power of each vessel. When two vessels fished the same area on the same day, pair wise comparisons were made between the catch per unit effort (CPUE) distributions for the area to determine if they were significantly different.

Between Trawl Differences

From the gear information, the effective mouth opening of each trawl was estimated to be 50% of the footrope length (Hannah 1995). The vessels participating in the survey had all taken the initiative to use separator gear in their nets in their commercial operations to reduce the by-

[2] each vessel started its tows with a different series e.g. the Pacific Rancher's tows were limited to 100-199 while the Parr Four's tows were limited to 400-499.

catch. It was felt that even though this equipment might reduce the catch of shrimp, it would reduce the by-catch and thus the time required for the biological technician to process the catch, therefore allowing more tows to be completed in the time permitted.

AREA SWEPT TRAWL SURVEY

Trawl tows were spaced systematically on a 0.5 nautical mile by 0.5 nautical mile grid over the masked survey area by major fishing area (see Table 1).

Tows were to be 30 minutes duration, however, they were shortened if they encountered snags or bad bottom. The start and stop latitude and longitude co-ordinates were used to calculate the distance towed. The density of animals by species per square meter was then calculated using the following equation:

$$\text{Density } (kg/m^2) = \text{Catch}(kg)/(\text{Distance towed} * \text{Net opening})$$

This density per square meter was then used in the calculations of the biomass indices.

TRAPPING

Both vertical and horizontal trapping are often used in the assessment of an area to determine the distribution of shrimp off the bottom which would affect their availability to the trawl and the distribution of shrimp on untrawlable grounds, respectively. The shortness of time available for the survey and the vastness of the area precluded carrying out this work.

AGE CLASS ESTIMATES

To estimate year class abundance and their size range, samples of approximately 100 (if available) shrimp for each species were collected from each tow set. Each sample was then processed to determine the number of shrimp per kilogram, and the size and sex of each individual animal. The histogram and length frequency distributions for all samples were analyzed to proportion out the size and number at age using Schnute and Fournier's (1980) length frequency modal analysis (a minimal desirable total sample size is 1000 animals). Using the resulting mean sizes of each year class plus and minus a proportionally calculated standard deviation, the minimum and maximum size of animals assigned to an age class was calculated. These minimum and maximum sizes for each age class allow us to estimate the proportion of the catch from each sample by age class, and subsequently to calculate the density of shrimp by number for each age in the area sampled.

CALCULATION OF BIOMASS INDICES

To estimate indices of biomass and year class abundance, the total survey area for each Subarea was mapped and divided into grid cells representing areas of 90,000 square meters (i.e. squares with sides of length 300 meters). The centre point of each tow was assigned to the appropriate grid cell with weight and age class density information (calculated using the above methods).

A bicubic spline interpolation was then used to calculate values for empty grid cells within the total sampling area. Once blank grid cells were filled in with interpolated values, indices of biomass and year class abundance were calculated by adding the values in each grid cell within the entire survey area. The calculations of the indices were done within the CompuGrid GIS software package.

RESULTS

EFFORT STANDARDIZATION

When the historic catch rates of the vessels were compared to one another, consistent differences were found between vessels. One vessel had no catch history, and it was assumed that this vessel was as efficient as the most efficient vessel that did have a catch history. These two vessels were similar in terms of their gear. As a result of these comparisons, the catch rates (Kg/m^2 towed) for the three vessels with historically lower catch rates were adjusted upwards by factors of 1.02 to 1.36.

TRAWL SURVEY

A total of 92 successful tows were completed in all areas combined. This varied from 17 to 21 per vessel with an average of 9.2 per day. The tows sampled from 0.11 to 0.28% of the total area surveyed (see Table 2).

AGE CLASS ESTIMATES

The size of the animals by age class and species for the survey varied between Pacific Fisheries Management Subarea (see Table 3).

SURVEY INDICES AND BIOMASS ESTIMATES

Biomass estimates of shrimp are shown in Table 4. Smooth pink and sidestripe shrimp together accounted for over 80% of the total catch (all invertebrate and fish species combined).

While no halibut were caught in the survey, eulachon were found in 63 of the 92 tows, and accounted for 7.43% of the total catch. The biomass of eulachon was calculated using the same method as that for shrimp. The results are shown in Table 5.

DISCUSSION

A small portion of Shrimp Management Area (SMA) 7IN was included in the survey of QC Sound because the grounds were contiguous with the shrimp area within the rest of the Sound and there was no evidence of separate stocks in the area. Table 4 provides separate estimates of this 7IN area and the QCSND grounds. The survey did not include all known shrimp producing areas in the region such as Goose Island Gully and the Stump Ranch areas. The industry vessels instead opted to carry out a partial survey of SMA 9IN. The biomass for each area was calculated from survey indices for the surveyed area only and were not expanded over the total area of the SMA.

The vessels all used their fish grids and no correction has been made for the loss of shrimp associated with the use of these grids at this time. If loss of shrimp did occur, this would tend to bias the estimates downward. As we develop indices using standardized vessels and equipment it will be possible to improve on absolute abundance estimates. At the same time, we will be able to handle the catch more efficiently and sample at a greater rate.

FISHERY MANAGEMENT ACTIONS - QCSND, AREA 7IN AND AREA 9IN, 1998.

An initial fishery opened on April 15 in SMA QCSND with the requirement of amended licence conditions and partial observer coverage for a bycatch monitoring program. The area was allocated a precautionary level of 1,322,750 lb. (600 t) based on historical landings. The QCSND catch ceiling was attained and the area closed July 12, 1998.

The initial fisheries in SMA 7IN and 9IN were conservatively allocated 10 tonnes each as no historical landings were recorded from these areas. The 9IN catch ceiling was attained and the area closed July 2, 1998.

Following the survey July 14-15, 1998, the preliminary results were forwarded to managers. *Annual quotas (Table 4) were calculated based on a fixed exploitation rate of 0.33 of the total biomass (calculated as a sum of the July survey data + the fishery landings from April 16 to July 21, 1998).*

On recommendation from industry representatives, a minimum 72 hrs. advance notice was given for a reopening and a notice to industry was issued August 4 for a second fishery in SMA QCSND. The area reopened at 0001 hrs August 8 for 600,000 lb (272 t) for all species combined.

SMA 7IN was to reopen with SMA's 5IN and 8IN based on remaining quota. The area reopened at 0001 hrs August 5 for an additional 26,000 lb (11.8 t) based on the survey results.

The quota for SMA 9IN was set at 35 tonnes as the area is acknowledged to have a directed fishery towards sidestripes. The area reopened with QCSND on August 8 for 78,000 lb (35.4 t) for all species combined. Selective fisheries for sidestripes in SMA 9IN should be considered in the development of next season's fishing plan.

Survey landings will be deducted from the announced remaining quotas for the SMA's.

ACKNOWLEDGEMENTS

We would like to thank the captains and crews of the commercial vessels Ocean Dancer, Pacific Rancher, Parr 4, Westerly Gail, and Western Clipper for their co-operation. Biological technicians for the survey included Laurie Convey, Steve Head, Peter Mattson, Jeff Olsson, and Debbie Tufnail. Leslie Barton handled all the GIS mapping issues for the project, and Georg Jorgensen wrote the report generator for the Appendix tables in this report.

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Table 1. The Pacific Fishery Management Areas and Subareas surveyed and the size of their respective sampling areas.

Subarea	Location	Area surveyed (km^2)
9-1 and 12	Fitz Hugh Sound	107.28
10-1	Pearl Rocks	86.94
108-1, 107-3, 7-25, 7-26, 109, 110	Calvert Island/Queen Sound	928.35
107-2,7-1	Goose Island	598.59

Table 2. The subareas surveyed in the July survey, the total number of tows made, and area sampled as a percentage of the total survey area.

Subareas	Number of Tows	% Area Swept
9-1 and 9-12	10	0.22%
10-1	8	0.28%
108-1, 107-3, 7-25, 7-26, 109, 110	45	0.11%
107-2, 7-1	29	0.17%

Table 3. The size and weight of shrimp by cohort, by species, by subarea for the July 1998 survey.

Species	Subarea	Age1 prop	Age2 prop	Age3 prop	Age4 prop	Age1 length	Age2 length	Age3 length	Age4 length	Age-1 Wt	Age-2 Wt	Age-3 Wt	Age-4 Wt
Smooth Pink	9-1 and 12	34.9	44.1	21.0		13.6	18.6	21.7		1.66	4.49	7.32	
Smooth Pink	10-1					13.2	17.8	20.8		1.51	3.91	6.40	
Smooth Pink	108-1, 107-3, 7-25, 7-26, 109, 110					13.3	17.7	20.3		1.55	3.84	5.98	
Smooth Pink	107-2,7-1					14.1	18	20.6		1.86	4.05	6.21	
Smooth Pink[1]		29.0	50.7	20.3									
Sidestripe	9-1 and 12	27.8	27.1	45.0		19.1	24.3	30.3		4.49	9.27	18.00	
Sidestripe	10-1					19.8	25.3	31.3		5.01	10.46	19.84	
Sidestripe	108-1, 107-3, 7-25, 7-26, 109, 110					18.8	24.3	28.9	31.7	4.28	9.27	15.61	20.62
Sidestripe	107-2,7-1					17.8	23	28.6		3.63	7.85	15.13	
Sidestripe[2]		18.4	30.8	47.0	3.7								

[1] The proportions are calculated for all subareas for Smooth pink
[2] The proportions are calculated for all subareas for Sidestripe

Table 4. Survey estimates, AMR validated and missing landings to July 21, 1998, quota estimates and remaining quotas. Survey landings are also shown. *The survey of Queen Charlotte Sound included a small portion of Shrimp Management Area 7IN as the grounds were contiguous.

Species	Area	Survey Index (t)	Catch to July 21/98(t)	Total Biomass (t)	Total Quota (t)	Remaining Quota (t)	Survey Landings (t)
Smooth Pinks	9IN	147.574	5.296	152.870	50.447	45.151	0.296
	7IN*	46.862	5.611	52.473	17.316	11.705	0.095
	QCSND	2182.644	687.915	2870.559	947.285	259.369	3.724
	Total Survey	2377.080	698.822	3075.902	1015.048	316.225	4.115
Side stripes	9IN	103.515	8.183	111.698	36.860	28.677	0.247
	7IN*	10.197	0.363	10.560	3.485	3.122	0.026
	QCSND	230.910	3.030	233.940	77.200	74.170	0.334
	Total Survey	344.622	14.968	356.198	117.545	105.969	0.607

Table 5. Survey estimates of eulachon. *The survey of Queen Charlotte Sound included a small portion of Shrimp Management Area 7IN as the grounds were contiguous.

Species	Area	Survey Index (t)
Eulachon	9IN	1.015
	7IN*	0.217
	QCSND	432.242
	Total Survey	433.474

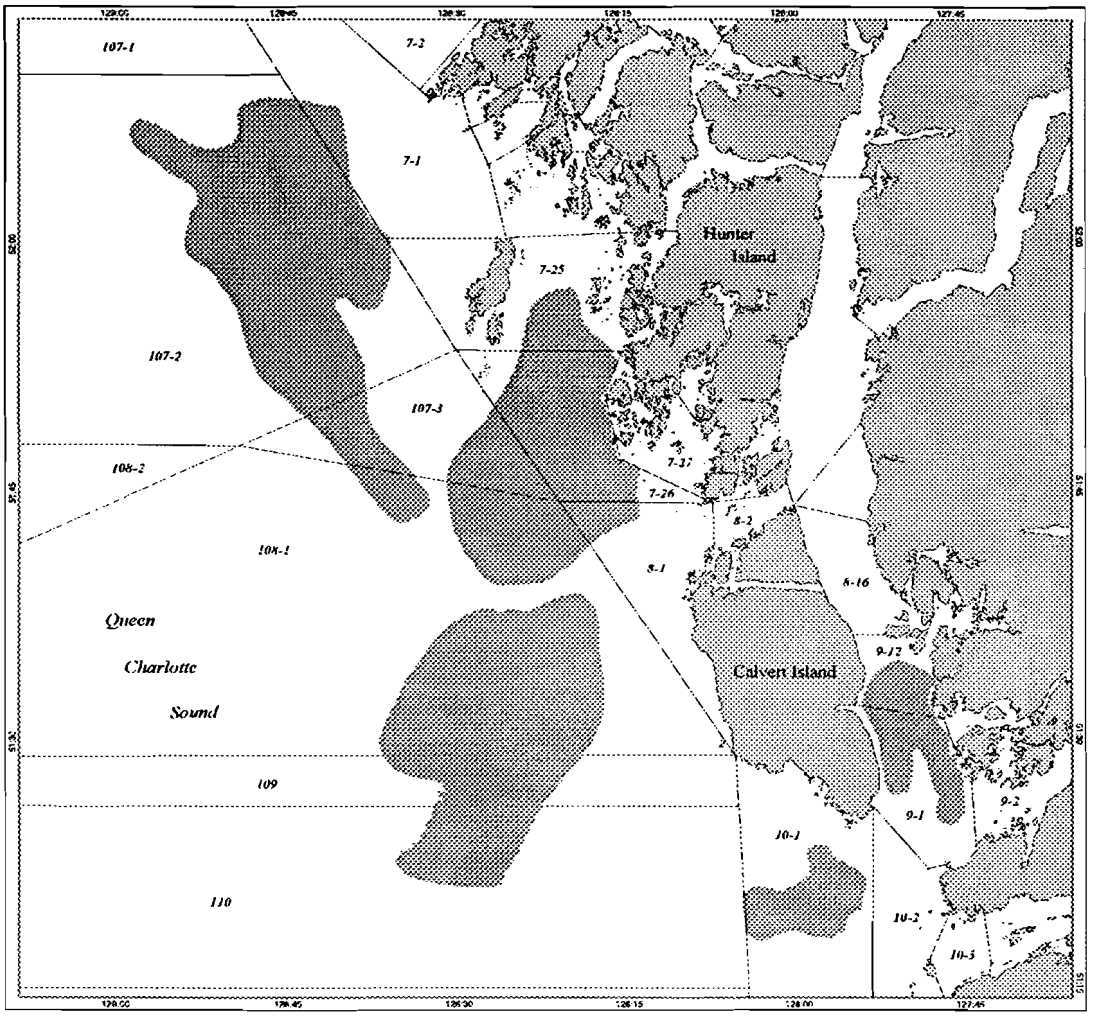

Figure 1. Areas surveyed in July 1998 in Shrimp Management Areas 9-IN and QCSND.

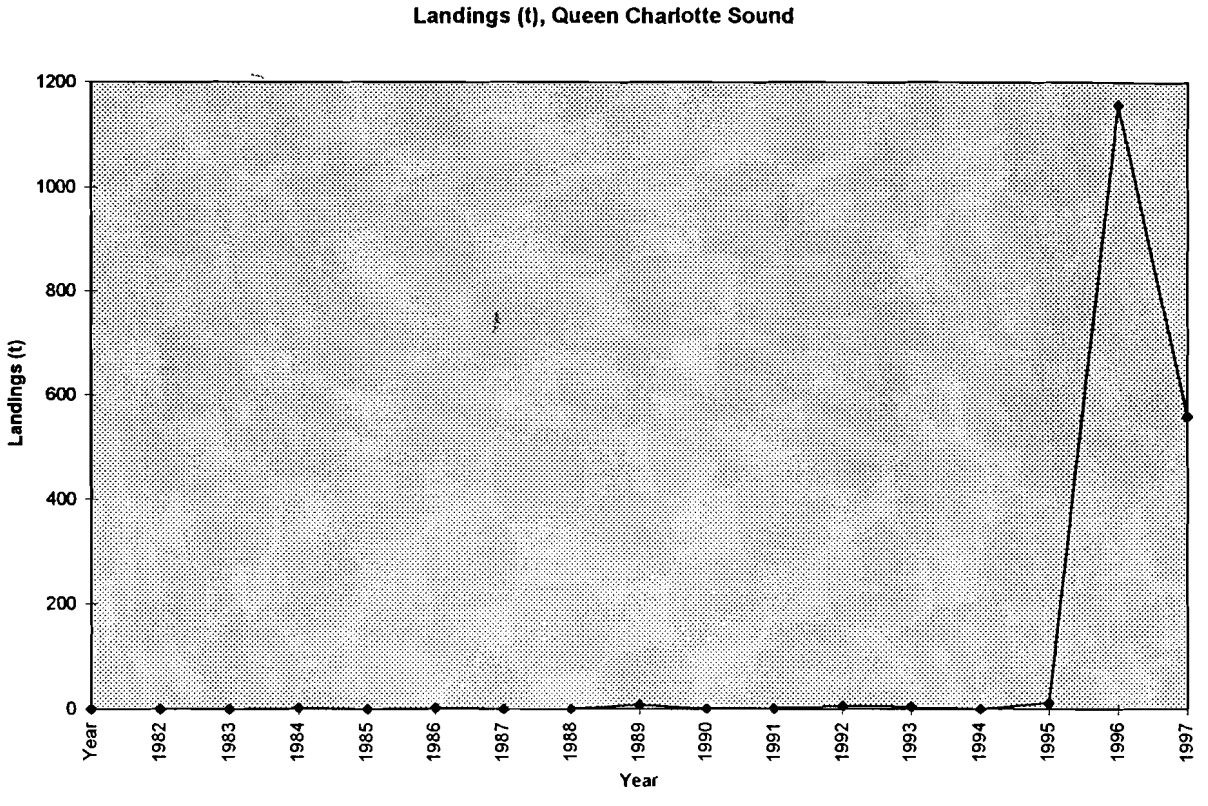

Figure 2. Catch history of Queen Charlotte Sound.

Appendix 1

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

There were 92 Tows. Total Weight for all tows, 5,815 Kg.

		Weight in Kg	Percent of Total	Number of Tows
Shrimp Species				
Smooth Pink	Pandalus jordani	4,115.50	70.7739	92
Prawn	Pandalus platyceros	2.90	0.0499	19
Humpback	Pandalus hypsinotus	0.10	0.0017	1
Sidestripe	Pandalopsis dispar	606.60	10.4316	74
Pinks (Flexed)	Pandalus goniurus	0.10	0.0017	1
Crangons	Crangon spp	19.30	0.3319	49
Eualus	Eualus spp	2.00	0.0344	20
Glass Shrimp	Pasiphaea pacifica	9.90	0.1702	8
Other Invertebrates				
Brittle Stars	Ophiurae (Order)	0.10	0.0017	1
Urchins	Echinacea (Superorder)	0.20	0.0034	2
Heart Urchin	Atelostomata (Superorder)	0.10	0.0017	1
Jellyfish	Scyphozoa (Class)	34.70	0.5967	12
Octopus	Octopoda (Order)	0.10	0.0017	1
Squat Squid	Rossia pacifica	14.10	0.2425	55
Squid	Teuthoidea (Order)	0.30	0.0052	2
Starfish	Asteroidea (Class)	0.10	0.0017	1
Squat Lobster	Munida quadrispina	0.10	0.0017	1
Sea Lilies & Feather Stars	Crinodea (Class)	0.10	0.0017	1
Flatfish				
Dab (Pacific)	Citharichthys sordidus	0.30	0.0052	1
Dover Sole	Microstomus pacificus	12.80	0.2201	10
English Sole	Pleuronectes vetulus	2.40	0.0413	9
Flathead Sole	Hippoglossoides elassodon	32.60	0.5606	44
Petrale Sole	Eopsetta jordani	0.50	0.0086	1
Rex Sole	Errex zachirus	45.40	0.7807	46
Turbot	Atheresthes stomias	94.60	1.6268	42
Rock Sole	Pleuronectes bilineatus	0.10	0.0017	1
Slender Sole	Eopsetta exilis	53.50	0.9200	45
Rockfish				
Yellowtail	Sebastes flavidus	2.40	0.0413	1
Rougheye	Sebastes aleutianus	0.90	0.0155	4
Redbanded	Sebastes babcocki	0.20	0.0034	2
Silvergray	Sebastes brevispinis	3.00	0.0516	1
Darkblotched	Sebastes crameri	7.20	0.1238	14
Splitnose	Sebastes diploproa	0.10	0.0017	1
Redstripe	Sebastes proriger	5.30	0.0911	7
Shortspine Thornyhead	Sebastolobus alascanus	0.20	0.0034	2
Roundfish				
Eulachon	Thaleichthys pacificus	431.90	7.4273	63
Pacific Herring	Clupea pallasi	0.40	0.0069	1
Walleye Pollock	Theragra chalcogramma	14.20	0.2442	13

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

There were 92 Tows. Total Weight for all tows, 5,815 Kg.

		Weight in Kg	Percent of Total	Number of Tows
Eelpouts	Zoarcidae (Family)	96.00	1.6509	55
Pacific Hake	Merluccius productus	6.60	0.1135	17
Poachers	Agonidae (Family)	2.70	0.0464	20
Sculpins	Cottidae (Family)	0.10	0.0017	1
Dwarf Wrymouths	Cryptacanthodes aleutensis	0.40	0.0069	4
Selachii				
Spotted Ratfish	Hydrolagus colliei	16.60	0.2855	29

Appendix 2

Shrimp Biomass Survey, Area 9-IN, July, 1998

Date Jul 14 1998 **Time** 18:40 **Duration (min)** 30 **Area** 9 - 1 **Haul No.** 309
Depth M 155 161 Direction 333
Water Temp: Surface Bottom Distance 0.9 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	27.70	306
Sidestripe	24.80	82
Crangons	0.60	
Eualus	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish
Eulachon 0.50

Selachii

Date Jul 14 1998 **Time** 19:45 **Duration (min)** 30 **Area** 9 - 1 **Haul No.** 310
Depth M 148 165 Direction 146
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	43.30	360
Sidestripe	12.30	72
Crangons	0.10	
Eualus	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish
Eulachon 0.70

Selachii

Date Jul 14 1998 **Time** 20:55 **Duration (min)** 30 **Area** 9 - 1 **Haul No.** 311
Depth M 159 165 Direction 258
Water Temp: Surface Bottom Distance 0.8 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	45.10	270
Sidestripe	15.00	66
Crangons	1.20	
Eualus	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish
Eulachon 0.60

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Area 9-IN, July, 1998

Date Jul 15 1998 **Time** 8:37 **Duration (min)** 32 **Area** 9 - 1 **Haul No.** 312
Depth M 154 157 Direction 262
Water Temp: Surface Bottom Distance 0.8 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	40.60	264
Sidestripe	22.00	78
Crangons	0.60	
Eualus	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish
Eulachon 0.30

Selachii

Date Jul 15 1998 **Time** 13:35 **Duration (min)** 30 **Area** 9 - 1 **Haul No.** 315
Depth M 179 196 Direction 312
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	10.40	264
Sidestripe	48.10	96
Crangons	0.10	
Eualus	0.10	
Glass Shrimp	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish

Selachii

Date Jul 15 1998 **Time** 15:30 **Duration (min)** 20 **Area** 9 - 1 **Haul No.** 316
Depth M 159 166 Direction 113
Water Temp: Surface Bottom Distance 0.8 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	11.00	208
Sidestripe	22.40	68
Crangons	0.40	
Eualus	0.10	
Glass Shrimp	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Area 9-IN, July, 1998

Date Jul 15 1998 **Time** 19 : 10 **Duration (min)** 30 **Area** 9 - 1 **Haul No.** 317
Depth M 152 163 Direction 150
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	Weight	Num/Kg
Smooth Pink	28.90	248
Sidestripe	44.90	82
Crangons	0.10	
Eualus	0.10	
Glass Shrimp	0.10	

Invertebrates **Flatfish**

Rockfish **Roundfish** **Selachii**

Date Jul 15 1998 **Time** 20 : 40 **Duration (min)** 30 **Area** 9 - 1 **Haul No.** 318
Depth M 152 157 Direction 140
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	Weight	Num/Kg
Smooth Pink	31.00	180
Sidestripe	25.90	106
Crangons	0.20	

Invertebrates **Flatfish**

Rockfish **Roundfish** **Selachii**

Date Jul 15 1998 **Time** 10 : 40 **Duration (min)** 30 **Area** 9 - 12 **Haul No.** 313
Depth M 170 174 Direction 69
Water Temp: Surface Bottom Distance 0.6 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	Weight	Num/Kg
Smooth Pink	41.10	208
Sidestripe	12.10	76
Crangons	0.50	
Eualus	0.10	
Glass Shrimp	1.00	

Invertebrates **Flatfish**

Rockfish **Roundfish** **Selachii**
Eulachon 0.40

All weights are in Kilograms

Shrimp Biomass Survey, Area 9-IN, July, 1998

Date Jul 15 1998 **Time** 12:15 **Duration (min)** 25 **Area** 9 - 12 **Haul No.** 314
Depth M 166 172 Direction 168
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	17.30	218
Sidestripe	19.20	86
Crangons	1.20	
Eualus	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish

Eulachon	0.10

Selachii

All weights are in Kilograms

Appendix 3

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 8 : 40 **Duration (min)** 35 **Area** 7 - 25 **Haul No.** 211
Depth M 165 168 Direction 323
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	55.90	268
Prawn	0.10	
Sidestripe	10.60	
Crangons	1.30	
Eualus	0.10	
Glass Shrimp	3.90	

Invertebrates	
Squat Squid	0.20

Flatfish	
English Sole	0.30
Flathead Sole	0.60
Rex Sole	4.30
Slender Sole	4.40

Rockfish

Roundfish	
Eulachon	0.20
Eelpouts	4.10

Selachii	
Spotted Ratfish	0.50

Date Jul 15 1998 **Time** 9 : 45 **Duration (min)** 30 **Area** 7 - 25 **Haul No.** 212
Depth M 174 176 Direction 347
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	27.20	256
Sidestripe	9.80	140
Crangons	0.10	
Glass Shrimp	2.10	

Invertebrates	
Squat Squid	0.10
Squid	0.10

Flatfish	
Flathead Sole	0.20
Rex Sole	1.90
Slender Sole	2.70

Rockfish

Roundfish	
Eelpouts	3.40
Poachers	0.20

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 10 :55 **Duration (min)** 30 **Area** 7 - 25 **Haul No.** 213
Depth M 174 174 Direction 177
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	11.90	326
Sidestripe	5.20	116
Crangons	0.30	
Glass Shrimp	0.90	

Invertebrates	

Flatfish	
Rex Sole	0.90
Slender Sole	1.10

Rockfish

Roundfish	
Eelpouts	1.40

Selachii	
Spotted Ratfish	0.40

Date Jul 15 1998 **Time** 7 :00 **Duration (min)** 31 **Area** 7 - 26 **Haul No.** 110
Depth M 154 161 Direction 164
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 92 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	76.70	236
Prawn	0.10	
Sidestripe	10.60	79

Invertebrates	
Jellyfish	0.10
Squat Squid	0.10

Flatfish

Rockfish	
Redstripe	0.10

Roundfish	
Eelpouts	1.70
Poachers	0.10

Selachii	
Spotted Ratfish	0.60

Date Jul 15 1998 **Time** 8 :15 **Duration (min)** 30 **Area** 7 - 26 **Haul No.** 111
Depth M 148 152 Direction 250
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 50 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	33.90	279
Prawn	0.10	
Sidestripe	8.30	71

Invertebrates	
Squat Squid	0.10

Flatfish	
Dover Sole	0.10
Rex Sole	0.10
Turbot	0.10

Rockfish

Roundfish	
Eulachon	3.50
Eelpouts	2.20

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 9:30 **Duration (min)** 30 **Area** 7 - 26 **Haul No.** 112
Depth M 143 148 Direction 188
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 61 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	28.90	230
Prawn	0.10	
Sidestripe	8.60	80

Rockfish

Roundfish	
Eulachon	14.80
Eelpouts	3.10

Selachii

Date Jul 15 1998 **Time** 10:45 **Duration (min)** 30 **Area** 7 - 26 **Haul No.** 113
Depth M 141 143 Direction 255
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 35 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	21.30	213
Prawn	0.10	
Sidestripe	2.20	

Invertebrates	
Squat Squid	0.10

Flatfish	
Rex Sole	0.10
Turbot	0.10
Slender Sole	0.10

Rockfish

Redstripe	0.10

Roundfish	
Eulachon	8.80
Eelpouts	2.90

Selachii

Date Jul 15 1998 **Time** 14:45 **Duration (min)** 30 **Area** 7 - 26 **Haul No.** 116
Depth M 152 155 Direction 2
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	3.30	182
Sidestripe	6.50	60

Invertebrates	
Jellyfish	0.10

Flatfish	
Rex Sole	0.10

Rockfish

Roundfish	
Eulachon	45.20
Eelpouts	0.10

Selachii	
Spotted Ratfish	0.10

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 12:00 **Duration (min)** 35 **Area** 7 - 26 **Haul No.** 214
Depth M 165 165 Direction 186
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	79.30	296
Prawn	0.10	
Sidestripe	9.30	106
Crangons	1.70	
Glass Shrimp	1.70	

Invertebrates

Flatfish

Flathead Sole	1.10
Rex Sole	2.30
Slender Sole	4.50

Rockfish

Roundfish

Eulachon	0.20
Eelpouts	5.60

Selachii

Spotted Ratfish	1.50

Date Jul 15 1998 **Time** 13:10 **Duration (min)** 30 **Area** 7 - 26 **Haul No.** 215
Depth M 166 166 Direction 186
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	25.00	310
Prawn	0.10	
Sidestripe	6.40	92
Crangons	0.30	

Invertebrates

Flatfish

English Sole	0.40
Flathead Sole	0.10
Rex Sole	2.90
Slender Sole	2.40

Rockfish

Roundfish

Eulachon	14.80
Eelpouts	2.20
Pacific Hake	0.80

Selachii

Spotted Ratfish	0.70

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 14:45 **Duration (min)** 35 **Area** 7 - 26 **Haul No.** 216
Depth M 165 165 Direction 17
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	15.20	310
Prawn	0.10	
Sidestripe	5.50	86
Crangons	0.10	

Invertebrates	
Squat Squid	0.10

Flatfish	
Flathead Sole	1.40
Rex Sole	1.60
Slender Sole	1.00

Rockfish	
Rougheye	0.20

Roundfish	
Eulachon	1.40
Eelpouts	2.10
Pacific Hake	0.20

Selachii

Date Jul 15 1998 **Time** 15:50 **Duration (min)** 30 **Area** 7 - 26 **Haul No.** 217
Depth M 161 161 Direction 17
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	54.30	282
Prawn	0.10	
Sidestripe	12.10	106
Crangons	1.20	

Invertebrates	
Squat Squid	0.10

Flatfish	
English Sole	0.60
Flathead Sole	1.20
Rex Sole	0.90

Rockfish	
Rougheye	0.30

Roundfish	
Eulachon	4.30
Eelpouts	9.30

Selachii	
Spotted Ratfish	1.10

Date Jul 15 1998 **Time** 17:05 **Duration (min)** 35 **Area** 7 - 26 **Haul No.** 218
Depth M 163 163 Direction 161
Water Temp: Surface Bottom Distance 1.7 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	90.00	248
Sidestripe	11.40	91
Crangons	1.90	

Invertebrates

Flatfish	
Flathead Sole	1.20
Rex Sole	1.30
Slender Sole	6.80

Rockfish	
Rougheye	0.30

Roundfish	
Eulachon	0.10
Eelpouts	6.90

Selachii	
Spotted Ratfish	0.90

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 18 : 05 **Duration (min)** 40 **Area** 7 - 26 **Haul No.** 219
Depth M 155 155 Direction 167
Water Temp: Surface Bottom Distance 1.5 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	111.3	360
Prawn	0.10	
Sidestripe	11.90	103
Crangons	2.30	

Invertebrates	
Squat Squid	0.10

Flatfish	
English Sole	0.10
Flathead Sole	0.90
Rex Sole	1.10
Slender Sole	3.50

Rockfish

Roundfish	
Eulachon	0.10
Eelpouts	4.80

Selachii	
Spotted Ratfish	1.20

Date Jul 15 1998 **Time** 19 : 15 **Duration (min)** 25 **Area** 7 - 26 **Haul No.** 220
Depth M 146 152 Direction 162
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	27.90	392
Prawn	0.10	
Sidestripe	4.70	98
Crangons	0.60	

Invertebrates

Flatfish	
Flathead Sole	0.40
Rex Sole	0.50
Slender Sole	1.60

Rockfish

Roundfish	
Eulachon	0.60
Eelpouts	1.10

Selachii	
Spotted Ratfish	0.30

Date Jul 15 1998 **Time** 20 : 05 **Duration (min)** 35 **Area** 7 - 26 **Haul No.** 221
Depth M 137 146 Direction 159
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	26.10	414
Prawn	0.10	
Sidestripe	6.00	96
Crangons	0.50	

Invertebrates	
Squat Squid	0.10

Flatfish	
Flathead Sole	0.80
Rex Sole	0.90
Turbot	0.20
Slender Sole	1.40

Rockfish

Roundfish	
Eulachon	6.10
Eelpouts	4.20

Selachii	
Spotted Ratfish	1.60

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 6:50 **Duration (min)** 30 **Area** 10 - 1 **Haul No.** 301
Depth M 35 161 Direction 169
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	7.40	252
Sidestripe	9.00	82
Crangons	0.20	
Eualus	0.10	

Invertebrates **Flatfish**

Rockfish **Roundfish** **Selachii**

Date Jul 14 1998 **Time** 8:00 **Duration (min)** 30 **Area** 10 - 1 **Haul No.** 302
Depth M 155 159 Direction 239
Water Temp: Surface Bottom Distance 1.5 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	42.30	238
Sidestripe	18.20	82
Crangons	0.10	
Eualus	0.10	

Invertebrates **Flatfish**

Rockfish **Roundfish** **Selachii**

Date Jul 14 1998 **Time** 9:10 **Duration (min)** 30 **Area** 10 - 1 **Haul No.** 303
Depth M 170 181 Direction 47
Water Temp: Surface Bottom Distance 1.5 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	27.50	170
Sidestripe	5.80	52
Crangons	0.40	
Eualus	0.10	

Invertebrates **Flatfish**

Rockfish **Roundfish** **Selachii**

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 10 : 25 **Duration (min)** 30 **Area** 10 - 1 **Haul No.** 304
Depth M 152 168 Direction 11
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**	**Flatfish**
Smooth Pink	21.40	280		
Sidestripe	10.30	62		
Crangons	0.40			
Eualus	0.10			

Rockfish **Roundfish** **Selachii**

Date Jul 14 1998 **Time** 11 : 40 **Duration (min)** 30 **Area** 10 - 1 **Haul No.** 305
Depth M 144 148 Direction 142
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**	**Flatfish**
Smooth Pink	4.10	314		
Sidestripe	6.00	54		
Crangons	0.10			

Rockfish **Roundfish** **Selachii**

Date Jul 14 1998 **Time** 12 : 55 **Duration (min)** 30 **Area** 10 - 1 **Haul No.** 306
Depth M 155 166 Direction 234
Water Temp: Surface Bottom Distance 1.8 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**	**Flatfish**
Smooth Pink	25.60	198		
Sidestripe	8.70	54		
Crangons	0.40			
Eualus	0.10			

Rockfish **Roundfish** **Selachii**

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 14 : 32 **Duration (min)** 24 **Area** 10 - 1 **Haul No.** 307
Depth M 183 194 Direction 215
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	18.40	210
Sidestripe	7.10	64
Crangons	0.20	
Crangons	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish

Selachii

Date Jul 14 1998 **Time** 16 : 10 **Duration (min)** 30 **Area** 10 - 1 **Haul No.** 308
Depth M 148 159 Direction 173
Water Temp: Surface Bottom Distance 0.6 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 27426
Net Effective Opening (feet) 42.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	12.00	238
Sidestripe	11.20	78
Crangons	0.20	
Eualus	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish

Selachii

Date Jul 14 1998 **Time** 13 : 26 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 405
Depth M 146 146 Direction 350
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	250.3	394

Invertebrates	
Squat Squid	0.10

Flatfish	
Rex Sole	0.20
Turbot	0.20
Slender Sole	0.10

Rockfish	
Darkblotched	0.10

Roundfish	
Eulachon	0.10
Walleye Pollock	0.20

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 14:40 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 406
Depth M 148 152 Direction 180
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	116.4	410			Flathead Sole	0.30
					Turbot	0.30
					Slender Sole	0.20
Rockfish			**Roundfish**		**Selachii**	

Date Jul 14 1998 **Time** 15:58 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 407
Depth M 148 155 Direction 4
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	73.90	398			Flathead Sole	0.70
					Rex Sole	0.10
					Turbot	4.00
					Slender Sole	0.30
Rockfish			**Roundfish**		**Selachii**	

Date Jul 14 1998 **Time** 17:05 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 408
Depth M 157 157 Direction 350
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	95.10	368	Squat Squid	0.10	Flathead Sole	1.30
Crangons	0.10				Rex Sole	0.40
					Turbot	4.10
					Slender Sole	0.60
Rockfish			**Roundfish**		**Selachii**	
Darkblotched	0.10		Eelpouts	0.20	Spotted Ratfish	0.10

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 18:20 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 409
Depth M 159 161 Direction 340
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	90.10	299
Sidestripe	1.80	
Crangons	0.10	

Invertebrates	
Squat Squid	0.30

Flatfish	
Dover Sole	1.00
Flathead Sole	2.30
Rex Sole	0.60
Turbot	3.30
Slender Sole	0.90

Rockfish

Roundfish	
Eulachon	7.70
Eelpouts	0.20

Selachii	
Spotted Ratfish	0.10

Date Jul 14 1998 **Time** 19:35 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 410
Depth M 165 168 Direction 0
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	52.90	278
Crangons	0.10	

Invertebrates	
Squat Squid	0.20

Flatfish	
Dover Sole	0.70
Flathead Sole	1.20
Rex Sole	0.20
Turbot	2.00
Slender Sole	1.40

Rockfish

Roundfish	
Eulachon	0.80
Eelpouts	1.40
Poachers	0.10

Selachii	
Spotted Ratfish	0.20

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 20 : 40 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 411
Depth M 165 183 Direction 298
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	28.30	275

Invertebrates	
Squat Squid	0.50

Flatfish	
Flathead Sole	0.60
Rex Sole	0.80
Turbot	1.90
Slender Sole	3.30

Rockfish

Roundfish	
Eulachon	0.60
Eelpouts	1.40

Selachii

Date Jul 15 1998 **Time** 11 : 10 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 412
Depth M 192 192 Direction 180
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	35.30	276
Prawn	0.10	
Sidestripe	18.80	121

Invertebrates	
Squat Squid	0.20

Flatfish	
Flathead Sole	0.40
Rex Sole	0.10
Turbot	0.80
Slender Sole	0.40

Rockfish	
Darkblotched	0.10

Roundfish	
Eulachon	2.20
Eelpouts	0.80
Pacific Hake	0.20

Selachii

Date Jul 15 1998 **Time** 12 : 34 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 413
Depth M 181 183 Direction 220
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	100.2	239
Sidestripe	9.50	108

Invertebrates	
Squat Squid	0.20

Flatfish	
Flathead Sole	0.30
Turbot	0.90
Slender Sole	0.20

Rockfish	
Redbanded	0.10

Roundfish	
Eulachon	0.30
Eelpouts	0.30
Pacific Hake	0.20

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 13:47 **Duration (min)** 36 **Area** 107 - 2 **Haul No.** 414
Depth M 177 179 Direction 235
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	29.50	258
Sidestripe	2.60	121

Invertebrates	
Squat Squid	0.30

Flatfish	
Flathead Sole	1.40
Rex Sole	0.30
Turbot	0.30
Slender Sole	0.30

Rockfish	
Splitnose	0.10

Roundfish	
Eulachon	0.30
Eelpouts	0.70

Selachii

Date Jul 15 1998 **Time** 15:04 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 415
Depth M 187 201 Direction 310
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	60.20	283
Sidestripe	9.60	126

Invertebrates	
Urchins	0.10
Squat Squid	0.10

Flatfish	
Flathead Sole	0.90
Turbot	7.00
Slender Sole	0.90

Rockfish

Roundfish	
Eulachon	79.40
Eelpouts	1.70

Selachii

Date Jul 15 1998 **Time** 16:50 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 416
Depth M 210 216 Direction 100
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	9.10	247
Sidestripe	8.50	98

Invertebrates	
Squat Squid	0.10

Flatfish	
Flathead Sole	0.60
Rex Sole	0.10
Turbot	0.60
Slender Sole	0.60

Rockfish

Roundfish	
Eulachon	52.40
Eelpouts	0.10
Pacific Hake	1.70

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 18 : 18 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 417
Depth M 192 192 Direction 160
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	58.70	249	Squat Squid	0.30	Flathead Sole	1.00
Sidestripe	21.40	121			Turbot	1.00
					Slender Sole	0.50
Rockfish			**Roundfish**		**Selachii**	
			Eulachon	21.30	Spotted Ratfish	0.20
			Eelpouts	1.00		
			Pacific Hake	0.30		

Date Jul 14 1998 **Time** 11 : 09 **Duration (min)** 32 **Area** 107 - 2 **Haul No.** 503
Depth M 130 132 Direction 322
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	37.80	309	Jellyfish	7.50	Turbot	3.40
Rockfish			**Roundfish**		**Selachii**	

Date Jul 14 1998 **Time** 12 : 35 **Duration (min)** 31 **Area** 107 - 2 **Haul No.** 504
Depth M 139 141 Direction 317
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	86.60	307			Flathead Sole	0.70
					Turbot	7.50
Rockfish			**Roundfish**		**Selachii**	
			Eulachon	0.10		

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 13:43 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 505
Depth M 126 128 Direction 304
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	0.70	326	Jellyfish	4.00	Turbot	8.30
Rockfish			**Roundfish**		**Selachii**	

Date Jul 14 1998 **Time** 14:56 **Duration (min)** 31 **Area** 107 - 2 **Haul No.** 506
Depth M 137 141 Direction 308
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	61.50	270	Squat Squid	0.10	Flathead Sole	0.20
					Rex Sole	0.10
					Turbot	4.20
Rockfish			**Roundfish**		**Selachii**	
Silvergray	3.00					

Date Jul 14 1998 **Time** 16:09 **Duration (min)** 32 **Area** 107 - 2 **Haul No.** 507
Depth M 146 152 Direction 299
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	150.6	236	Squat Squid	0.10	Flathead Sole	0.80
					Rex Sole	0.10
					Turbot	0.40
Rockfish			**Roundfish**		**Selachii**	
Yellowtail	2.40		Walleye Pollock	0.10	Spotted Ratfish	0.10
Darkblotched	0.10		Eelpouts	0.10		
			Poachers	0.10		

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 17:27 **Duration (min)** 31 **Area** 107 - 2 **Haul No.** 508
Depth M 119 144 Direction 11
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	79.10	344	Squat Squid	0.10	Flathead Sole	0.10
					Rex Sole	0.40
					Turbot	3.00
Rockfish			**Roundfish**		**Selachii**	
			Poachers	0.10	Spotted Ratfish	0.20

Date Jul 14 1998 **Time** 18:37 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 509
Depth M 113 154 Direction 19
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	Weight	Num/Kg	Invertebrates	Flatfish	
Smooth Pink	11.90	320		Dab (Pacific)	0.30
				English Sole	0.10
				Flathead Sole	0.10
				Petrale Sole	0.50
				Turbot	2.30
Rockfish			**Roundfish**	**Selachii**	

Date Jul 14 1998 **Time** 19:45 **Duration (min)** 31 **Area** 107 - 2 **Haul No.** 510
Depth M 150 183 Direction 12
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	16.60	296	Squat Squid	0.10	Rex Sole	0.30
Sidestripe	0.10				Turbot	4.00
					Slender Sole	0.40
Rockfish			**Roundfish**		**Selachii**	
Darkblotched	2.50		Eulachon	0.40	Spotted Ratfish	0.10
			Eelpouts	0.10		

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 20:56 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 511
Depth M 174 187 Direction 13
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	4.50	165	Jellyfish	1.50	Dover Sole	0.40
Sidestripe	0.70	51	Squat Squid	0.10	Flathead Sole	1.10
					Rex Sole	0.10
					Turbot	1.50
Rockfish			**Roundfish**		**Selachii**	
Darkblotched	0.20		Eulachon	0.50		

Date Jul 15 1998 **Time** 11:30 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 512
Depth M 163 174 Direction 99
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	21.50	248	Urchins	0.10	Flathead Sole	1.70
Sidestripe	0.20		Squat Squid	0.10	Turbot	1.00
Rockfish			**Roundfish**		**Selachii**	
Darkblotched	3.10		Eulachon	0.50		
			Eelpouts	0.10		

Date Jul 15 1998 **Time** 12:45 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 513
Depth M 154 157 Direction 37
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	4.30	342	Jellyfish	4.70	Flathead Sole	0.50
Sidestripe	0.10		Squat Squid	0.10	Turbot	2.90
Rockfish			**Roundfish**		**Selachii**	
			Eulachon	0.80		
			Walleye Pollock	0.10		

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 14 : 27 **Duration (min)** 25 **Area** 107 - 2 **Haul No.** 514
Depth M 155 157 Direction 294
Water Temp: Surface Bottom Distance 0.5 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	2.90	296
Prawn	0.10	
Humpback	0.10	
Sidestripe	0.10	
Pinks (Flexed)	0.10	
Crangons	0.10	

Invertebrates	
Jellyfish	3.50
Squat Squid	0.10

Flatfish	
Flathead Sole	0.40
Turbot	1.40

Rockfish

Roundfish	
Eulachon	0.20
Walleye Pollock	0.30
Pacific Hake	0.10
Poachers	0.10
Dwarf Wrymouths	0.10

Selachii	
Spotted Ratfish	0.10

Date Jul 15 1998 **Time** 15 : 25 **Duration (min)** 32 **Area** 107 - 2 **Haul No.** 515
Depth M 165 166 Direction 348
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	12.60	213
Sidestripe	1.50	49
Eualus	0.10	

Invertebrates	
Squat Squid	0.10

Flatfish	
Flathead Sole	0.50
Turbot	7.00
Slender Sole	0.30

Rockfish
Darkblotched 0.20

Roundfish	
Eulachon	0.10
Walleye Pollock	0.30
Eelpouts	0.10
Pacific Hake	0.20
Dwarf Wrymouths	0.10

Selachii	
Spotted Ratfish	0.10

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 16 : 42 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 516
Depth M 176 185 Direction 17
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	Weight	Num/Kg
Smooth Pink	17.60	266
Prawn	1.00	28
Sidestripe	20.50	76
Crangons	0.10	
Eualus	0.10	

Invertebrates	
Squat Squid	0.10
Squat Lobster	0.10

Flatfish	
Flathead Sole	0.10
Turbot	5.30
Slender Sole	0.20

Rockfish	
Darkblotched	0.20

Roundfish	
Eulachon	0.10
Walleye Pollock	0.10
Pacific Hake	0.10
Poachers	0.10
Sculpins	0.10

Selachii	
Spotted Ratfish	0.30

Date Jul 15 1998 **Time** 18 : 23 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 517
Depth M 198 205 Direction 205
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	Weight	Num/Kg
Smooth Pink	18.10	171
Sidestripe	12.50	73
Crangons	0.10	

Invertebrates	
Squat Squid	0.30

Flatfish	
Flathead Sole	0.10
Rex Sole	0.10
Turbot	0.40

Rockfish	
Darkblotched	0.20

Roundfish	
Eulachon	2.90
Eelpouts	0.10
Pacific Hake	1.20
Dwarf Wrymouths	0.10

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 20 : 04 **Duration (min)** 30 **Area** 107 - 2 **Haul No.** 518
Depth M 181 185 Direction 145
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	Weight	Num/Kg
Smooth Pink	93.60	277
Sidestripe	10.70	80
Crangons	0.10	

Rockfish	
Darkblotched	0.10

Invertebrates	
Squat Squid	0.70
Sea Lilies &	0.10

Roundfish	
Eulachon	0.10
Eelpouts	0.70
Poachers	0.10
Dwarf Wrymouths	0.10

Flatfish	
Flathead Sole	0.20
Turbot	1.00
Slender Sole	2.50

Selachii

Date Jul 15 1998 **Time** 12 : 00 **Duration (min)** 37 **Area** 107 - 3 **Haul No.** 114
Depth M 143 146 Direction 343
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 42 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	11.30	156
Sidestripe	2.80	

Rockfish

Invertebrates	
Jellyfish	0.10
Squat Squid	0.10

Roundfish	
Eulachon	27.60

Flatfish	
Slender Sole	0.10

Selachii

Date Jul 15 1998 **Time** 13 : 20 **Duration (min)** 32 **Area** 107 - 3 **Haul No.** 115
Depth M 143 146 Direction 323
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 69 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	10.10	200
Prawn	0.10	
Sidestripe	2.00	

Rockfish

Invertebrates	
Jellyfish	0.10

Roundfish	
Eulachon	54.10
Eelpouts	2.70

Flatfish	
Turbot	0.10
Slender Sole	0.10

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 8 : 40 **Duration (min)** 30 **Area** 107 - 3 **Haul No.** 401
Depth M 139 150 Direction 10
Water Temp: Surface Bottom Distance 0.9 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	56.70	552

Invertebrates	
Squat Squid	0.10

Flatfish	
Flathead Sole	1.10
Rex Sole	0.60
Turbot	1.90
Slender Sole	2.10

Rockfish

Roundfish	
Eulachon	1.80
Pacific Herring	0.40
Walleye Pollock	0.80
Eelpouts	0.50

Selachii	
Spotted Ratfish	0.20

Date Jul 14 1998 **Time** 9 : 50 **Duration (min)** 30 **Area** 107 - 3 **Haul No.** 402
Depth M 110 146 Direction 210
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	46.40	376
Prawn	0.20	
Sidestripe	0.10	

Invertebrates	
Squat Squid	0.20

Flatfish	
English Sole	0.50
Flathead Sole	1.80
Rex Sole	1.30
Turbot	1.10

Rockfish	
Darkblotched	0.10

Roundfish	
Eulachon	0.80
Walleye Pollock	1.20
Eelpouts	0.20

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 10:55 **Duration (min)** 30 **Area** 107 - 3 **Haul No.** 403
Depth M 144 146 Direction 304
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	26.60	426

Invertebrates	
Jellyfish	3.70
Squat Squid	0.10

Flatfish	
English Sole	0.10
Flathead Sole	2.60
Rex Sole	0.10
Turbot	1.60
Slender Sole	2.00

Rockfish

Roundfish	
Eulachon	0.80
Walleye Pollock	2.60
Eelpouts	0.30
Pacific Hake	0.30

Selachii

Date Jul 14 1998 **Time** 12:18 **Duration (min)** 30 **Area** 107 - 3 **Haul No.** 404
Depth M 143 143 Direction 320
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 26354
Net Effective Opening (feet) 45.0

Shrimp	Weight	Num/Kg
Smooth Pink	264.1	384

Invertebrates

Flatfish	
Flathead Sole	0.90
Turbot	0.50
Slender Sole	0.10

Rockfish

Roundfish	
Eelpouts	0.10

Selachii	
Spotted Ratfish	0.10

Date Jul 14 1998 **Time** 8:47 **Duration (min)** 30 **Area** 107 - 3 **Haul No.** 501
Depth M 126 143 Direction 13
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	Weight	Num/Kg
Smooth Pink	8.50	382

Invertebrates	
Jellyfish	1.80

Flatfish	
Flathead Sole	0.10
Rex Sole	0.10
Turbot	3.10

Rockfish

Roundfish	
Eulachon	0.40
Walleye Pollock	0.40
Pacific Hake	0.10

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 9:54 **Duration (min)** 30 **Area** 107 - 3 **Haul No.** 502
Depth M 128 141 Direction 189
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DH Total Catch Remark Usable Vessel 20823
Net Effective Opening (feet) 46.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	7.20	319	Jellyfish	7.60	Flathead Sole	0.10
			Squat Squid	0.10	Turbot	0.10
Rockfish			**Roundfish**		**Selachii**	
			Eulachon	0.10	Spotted Ratfish	0.10
			Walleye Pollock	0.40		

Date Jul 14 1998 **Time** 16:25 **Duration (min)** 32 **Area** 108 - 1 **Haul No.** 106
Depth M 159 161 Direction 10
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 58 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	37.50	203				
Sidestripe	5.00	90				
Rockfish			**Roundfish**		**Selachii**	
Redstripe	0.10		Eulachon	8.30	Spotted Ratfish	0.10
			Eelpouts	5.80		

Date Jul 14 1998 **Time** 17:47 **Duration (min)** 28 **Area** 108 - 1 **Haul No.** 107
Depth M 163 165 Direction 4
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 45 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	**Weight**	**Num/Kg**	**Invertebrates**		**Flatfish**	
Smooth Pink	26.80	165	Heart Urchin	0.10	Dover Sole	0.10
Sidestripe	4.70	95	Squat Squid	0.10	Rex Sole	0.10
Crangons	0.10					
Rockfish			**Roundfish**		**Selachii**	
			Eulachon	7.40		
			Eelpouts	2.70		

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 19 : 10 **Duration (min)** 30 **Area** 108 - 1 **Haul No.** 108
Depth M 152 155 Direction 280
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 25 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	14.40	169
Sidestripe	2.90	59
Crangons	0.10	

Invertebrates

Flatfish

Rockfish

Roundfish

Eulachon	3.40
Eelpouts	1.90

Selachii

Date Jul 14 1998 **Time** 20 : 18 **Duration (min)** 24 **Area** 108 - 1 **Haul No.** 109
Depth M 152 159 Direction 280
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 15 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	9.90	225
Sidestripe	3.60	76

Invertebrates

Squat Squid	0.10

Flatfish

Dover Sole	0.10
Rex Sole	0.10
Slender Sole	0.10

Rockfish

Roundfish

Eulachon	0.80
Eelpouts	0.30
Pacific Hake	0.30

Selachii

Date Jul 15 1998 **Time** 18 : 25 **Duration (min)** 35 **Area** 108 - 1 **Haul No.** 117
Depth M 177 185 Direction 182
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 62 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	48.50	281
Sidestripe	2.40	104
Crangons	0.10	

Invertebrates

Squat Squid	0.10

Flatfish

Rex Sole	0.10
Slender Sole	0.10

Rockfish

Roundfish

Eulachon	4.80
Eelpouts	3.60

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 15 1998 **Time** 19:59 **Duration (min)** 31 **Area** 108 - 1 **Haul No.** 118
Depth M 188 194 Direction 193
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 80 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	79.50	283
Prawn	0.10	
Sidestripe	0.10	

Rockfish	
Redstripe	0.10

Invertebrates	
Squat Squid	0.10

Roundfish	
Eulachon	2.00
Walleye Pollock	0.10
Eelpouts	1.80
Poachers	0.10

Flatfish	

Selachii	
Spotted Ratfish	0.10

Date Jul 14 1998 **Time** 13:05 **Duration (min)** 30 **Area** 108 - 1 **Haul No.** 205
Depth M 192 192 Direction 224
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	11.50	364
Sidestripe	0.10	

Rockfish	
Shortspine	0.10

Invertebrates	
Squat Squid	0.10

Roundfish	
Eulachon	0.10
Eelpouts	0.20

Flatfish	
Slender Sole	0.10

Selachii	

Date Jul 14 1998 **Time** 17:45 **Duration (min)** 40 **Area** 108 - 1 **Haul No.** 209
Depth M 187 187 Direction 48
Water Temp: Surface Bottom Distance 1.5 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	85.20	324
Sidestripe	1.00	
Crangons	0.10	
Eualus	0.10	

Rockfish	

Invertebrates	
Squat Squid	0.40

Roundfish	
Eulachon	9.20
Eelpouts	1.00
Pacific Hake	0.20
Poachers	0.10

Flatfish	
Flathead Sole	0.10
Rex Sole	0.30
Slender Sole	0.80

Selachii	

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 19 : 20 **Duration (min)** 30 **Area** 108 - 1 **Haul No.** 210
Depth M 168 168 Direction 56
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg
Smooth Pink	71.30	354
Sidestripe	0.50	
Crangons	0.10	

Invertebrates	
Squat Squid	0.70

Flatfish	
Flathead Sole	0.40
Rex Sole	0.80
Slender Sole	1.10

Rockfish

Roundfish	
Eulachon	7.10
Eelpouts	4.20
Pacific Hake	0.40

Selachii

Date Jul 14 1998 **Time** 11 : 56 **Duration (min)** 30 **Area** 109 - 0 **Haul No.** 103
Depth M 177 188 Direction 1
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 54 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	51.30	285
Sidestripe	0.10	

Invertebrates	
Squat Squid	1.10

Flatfish

Rockfish

Redstripe	0.10

Roundfish	
Eulachon	0.60
Eelpouts	0.70
Poachers	0.10

Selachii

Date Jul 14 1998 **Time** 13 : 13 **Duration (min)** 31 **Area** 109 - 0 **Haul No.** 104
Depth M 177 187 Direction 4
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 90 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg
Smooth Pink	87.50	215
Sidestripe	0.10	

Invertebrates	
Squat Squid	0.10
Starfish	0.10

Flatfish

Rockfish

Darkblotched	0.10

Roundfish	
Eulachon	1.30
Poachers	0.10

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 14:55 **Duration (min)** 37 **Area** 109 - 0 **Haul No.** 105
Depth M 172 176 Direction 1
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 112 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	80.70	197	Brittle Stars	0.10	Dover Sole	0.10
Sidestripe	6.20	100	Squat Squid	0.10	Rex Sole	0.10
Crangons	0.10				Turbot	0.10
Rockfish			**Roundfish**		**Selachii**	
			Eulachon	17.10		

Date Jul 14 1998 **Time** 12:25 **Duration (min)** 15 **Area** 109 - 0 **Haul No.** 204
Depth M 188 188 Direction 334
Water Temp: Surface Bottom Distance 0.7 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	25.20	384	Octopus	0.10	Rex Sole	0.10
Sidestripe	0.30		Squat Squid	0.40	Slender Sole	0.20
Crangons	0.10					
Rockfish			**Roundfish**		**Selachii**	
			Eulachon	0.40		
			Eelpouts	0.30		
			Poachers	0.20		

Date Jul 14 1998 **Time** 14:05 **Duration (min)** 30 **Area** 109 - 0 **Haul No.** 206
Depth M 196 201 Direction 219
Water Temp: Surface Bottom Distance 1.2 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	33.40	396	Squat Squid	0.10	Rex Sole	0.10
Sidestripe	0.10				Slender Sole	0.10
Crangons	0.10					
Rockfish			**Roundfish**		**Selachii**	
Shortspine	0.10		Eulachon	0.20	Spotted Ratfish	0.10
			Eelpouts	0.10		
			Poachers	0.10		

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 15:20 **Duration (min)** 35 **Area** 109 - 0 **Haul No.** 207
Depth M 194 194 Direction 35
Water Temp: Surface Bottom Distance 1.3 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	30.10	406
Prawn	0.10	
Sidestripe	0.10	
Crangons	0.10	

Invertebrates	
Squat Squid	0.40

Flatfish	
Dover Sole	0.70
Rex Sole	0.70
Slender Sole	0.60

Rockfish	
Rougheye	0.10
Redbanded	0.10

Roundfish	
Eulachon	1.70
Eelpouts	0.30
Pacific Hake	0.10
Poachers	0.10

Selachii

Date Jul 14 1998 **Time** 16:35 **Duration (min)** 35 **Area** 109 - 0 **Haul No.** 208
Depth M 190 194 Direction 55
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	86.50	370
Sidestripe	1.00	
Crangons	0.10	
Eualus	0.10	

Invertebrates	
Squat Squid	0.30

Flatfish	
Slender Sole	1.50

Rockfish

Roundfish	
Eulachon	8.30
Eelpouts	0.60
Pacific Hake	0.20
Poachers	0.10

Selachii

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 8:25 **Duration (min)** 32 **Area** 110 - 0 **Haul No.** 101
Depth M 179 183 Direction 1
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 58 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	9.80	394	Squat Squid	0.10	Dover Sole	9.40
Sidestripe	0.10				Rex Sole	14.70
					Turbot	5.40
					Rock Sole	0.10
Rockfish			**Roundfish**		**Selachii**	
Redstripe	3.10		Walleye Pollock	7.60	Spotted Ratfish	5.40
			Poachers	0.10		

Date Jul 14 1998 **Time** 10:35 **Duration (min)** 32 **Area** 110 - 0 **Haul No.** 102
Depth M 192 198 Direction 1
Water Temp: Surface Bottom Distance 1 Naut. Mi.
Type of Gear DH Total Catch 39 Remark Usable Vessel 25936
Net Effective Opening (feet) 39.0

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	26.90	422	Squat Squid	3.10	Rex Sole	2.40
Sidestripe	2.10					
Rockfish			**Roundfish**		**Selachii**	
Redstripe	1.70		Eelpouts	2.80	Spotted Ratfish	0.10
			Poachers	0.10		

Date Jul 14 1998 **Time** 8:45 **Duration (min)** 30 **Area** 110 - 0 **Haul No.** 201
Depth M 194 194 Direction 15
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	Weight	Num/Kg	Invertebrates		Flatfish	
Smooth Pink	30.30	424	Squat Squid	0.20	English Sole	0.10
Sidestripe	0.20				Turbot	0.30
Crangons	0.10				Slender Sole	0.40
Rockfish			**Roundfish**		**Selachii**	
			Eelpouts	0.30		

All weights are in Kilograms

Shrimp Biomass Survey, Queen Charlotte Sound, July, 1998

Date Jul 14 1998 **Time** 9:55 **Duration (min)** 35 **Area** 110 - 0 **Haul No.** 202
Depth M 196 198 Direction 8
Water Temp: Surface Bottom Distance 1.1 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	41.50	488
Sidestripe	0.30	

Invertebrates	
Squat Squid	0.60

Flatfish	
Dover Sole	0.20
Rex Sole	0.40
Slender Sole	1.10

Rockfish

Roundfish	
Eulachon	0.10
Eelpouts	0.40
Poachers	0.60

Selachii

Date Jul 14 1998 **Time** 11:10 **Duration (min)** 35 **Area** 110 - 0 **Haul No.** 203
Depth M 192 196 Direction 27
Water Temp: Surface Bottom Distance 1.4 Naut. Mi.
Type of Gear DS Total Catch Remark Usable Vessel 24469
Net Effective Opening (feet) 43.5

Shrimp	**Weight**	**Num/Kg**
Smooth Pink	33.60	358
Sidestripe	0.10	
Crangons	0.10	

Invertebrates	
Squid	0.20

Flatfish	
English Sole	0.20
Flathead Sole	0.10
Rex Sole	0.60
Slender Sole	0.40

Rockfish	
Darkblotched	0.10

Roundfish	
Eelpouts	1.10
Poachers	0.10

Selachii

All weights are in Kilograms