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**1997 Industry Sponsored Shrimp Surveys  
and Resulting Management Actions –  
Area 12, April and November 1997**

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1997 INDUSTRY SPONSORED SHRIMP SURVEYS AND RESULTING  
MANAGEMENT ACTIONS  
AREA 12, APRIL AND NOVEMBER 1997

by

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## ABSTRACT

Boutillier, J.A., J.A. Bond, and R.M. Harbo. 1998. 1997 Industry sponsored shrimp surveys and resulting management actions Area 12, April and November 1997. Can. Manuscr. Rep. Fish. Aquat. Sci. 2458: 94 p.

Area-swept shrimp trawl surveys were undertaken for the first time in Pacific Fisheries Management Area 12 in April and November, 1997 by four volunteer commercial shrimp vessels and the DFO vessel Caligus. The Pacific Coast Shrimpers' Cooperative Association contributed funds to the survey and assessments. Area 12 is a large area with numerous small isolated fisheries that land a variety of shrimp species complexes. The fishery expanded in 1995 and 1996 with the majority of effort and landings being the northern (spiny) shrimp, *Pandalus borealis eous*, the sidestripe shrimp, *Pandalopsis dispar* and the humpback shrimp, *Pandalus hypsinotus*. Five other commercial pandalids were also taken.

Horizontal and vertical trap sets were used to evaluate the availability of shrimp to the trawl surveys. Pre- and post-fishery biomass indices of shrimp were determined by species in select trawlable areas of Area 12. The collection of shrimp data and the bycatch of halibut and eulachon were priorities over detailed information on bycatch. Landings of prawns, halibut or eulachon were very minor.

A fixed exploitation rate of 33% was applied to the biomass estimates by species. Catch ceilings, quotas, and other management actions as a result of the surveys are discussed. Area 12 was divided into two management areas, 12-Inside and 12-Outside with species specific quotas. The 12-Inside area was open April 21 to October 2, 1997. The 12-Outside area was open April 21 to August 19, 1997 and then reopened December 17, 1997 to March 21, 1998 following the November assessment. The landings for Area 12 in the 1997/98 season were <200 t, greater than any other year, with the exception of the 546 t landed in the peak year, 1996. A delay in the fishery opening to mid-May, 1998 was recommended due to the high proportion of ovigerous shrimp in the April 1997 survey.

These survey data are the start of a long term data base of survey indices to be combined with logbook data, biological sampling and other fishery data. Until a long term data base is available, the initial biomass indices will be used as absolute estimates 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, and R.M. Harbo. 1998. 1997 Industry sponsored shrimp surveys and resulting management actions Area 12, April and November 1997. Can. Manuscr. Rep. Fish. Aquat. Sci. 2458: 94 p.

Les premiers relevés de la crevette au chalut par balayage de secteur ont été menés en avril et novembre 1997 par quatre crevettiers commerciaux volontaires et par le navire *Caligus* du MPO dans le secteur 12 de gestion des pêches du Pacifique. Les relevés et les évaluations ont bénéficié du financement de la Pacific Coast Shrimpers' Cooperative Association. Le secteur 12 est une vaste zone où existent de nombreuses petites pêcheries isolées qui débarquent divers complexes d'espèces de crevettes. La pêche a connu un essor en 1995 et 1996, et la majorité de l'effort et des débarquements concernaient la crevette nordique (épineuse) *Pandalus borealis eous*, la crevette à flancs rayés, *Pandalopsis dispar*, et la crevette à front rayé, *Pandalus hypsinotus*. Cinq autres espèces de pandalidés ont également été pêchées.

Des pièges mouillés à la verticale et à l'horizontale ont servi à évaluer la capturabilité des crevettes dans les chaluts des relevés. Nous avons déterminé les indices de la biomasse de crevette par espèce, avant et après la pêche, dans certaines zones chalutables du secteur 12. La collecte de données sur les crevettes et les prises accessoires de flétan et d'eulakane avaient la priorité sur l'information détaillée concernant les prises accessoires. Les débarquements de crevettes, de flétan et d'eulakane étaient minimes.

Un taux fixe d'exploitation de 33 % a été appliqué aux estimations de la biomasse par espèce. Nous analysons les plafonds de capture, les quotas et d'autres mesures de gestion qui ont été prises suite aux relevés. Le secteur 12 a été divisé en deux sous-secteurs, 12-intérieur et 12-extérieur, chacun faisant l'objet de quotas spécifiques. Le sous-secteur 12-intérieur a été ouvert du 21 avril au 2 octobre 1997. Le sous-secteur 12-extérieur a été ouvert du 21 avril au 19 août 1997, puis rouvert du 17 décembre 1997 au 21 mars 1998 par suite du relevé de novembre. Les débarquements du secteur 12 pour la saison 1997-1998 ont été de < 200 t, c'est-à-dire supérieurs à ceux de toutes les autres années, sauf 1996 (546 t). Il a été recommandé de repousser l'ouverture à la mi-mai 1998 étant donné la forte proportion de femelles ovigères lors du relevé d'avril 1997.

Les données recueillies constituent le fondement d'une base de données à long terme des indices fournis par les relevés, qui seront combinés aux données des journaux de pêche, aux résultats de l'échantillonnage biologique et à d'autres données provenant des pêches. D'ici à ce que la base soit utilisable, les indices initiaux de la biomasse serviront d'estimations absolues pour l'établissement des quotas. Le travail d'évaluation et de gestion nécessitera un effort de collaboration entre le MPO et les intervenants.

## Assessment and Management Framework

This report is part of a series of documents that outline the assessment data and management processes that were used in 1997 in the shrimp trawl fishery for specific areas of the coast. The shrimp trawl fishery is a complex fishery that takes place in a variety of areas from large offshore grounds to small isolated inshore waters. 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 a single target species to multi-species fisheries. Many of the shrimp trawl fisheries in British Columbia are new or developing and there is little or no information available from which to assess the stocks.

The new suite of management principles were developed for these fisheries as a result of discussions and concerns expressed in Pacific Stock Assessment Review Committee (PSARC) assessments of inshore (Boutillier et al. 1996) and offshore (Boutillier et al. 1997) shrimp fisheries. Different management systems were adopted for offshore and inshore fisheries. For offshore fisheries on the West Coast of Vancouver Island (Pacific Fisheries Management Areas 121, 123, 124, 125, and portions of 23), time and area closures were established. Recruitment to these offshore fisheries have a strong environmental response as well as a strong interdependence between grounds. For inshore fisheries and fisheries for which there were little or no assessment data, each area was assigned a fixed arbitrary catch ceiling based on its history or a precautionary limit of 10 t. These arbitrary catch ceilings could then be adjusted inseason if other information from fishery independent surveys and catches indicate that the biomass of the area times a fixed exploitation rate of 33% produced catch ceilings for the area which are either less than or greater than the arbitrary levels.

Area swept trawl surveys provide the fishery independent biomass indices for the area. These indices provide trends in abundance which in the long term will provide absolute estimates of abundance by modeling of these survey trend indices with the catch history from the area. However, until a reliable long term data base of survey indices and catches are available, the initial biomass indices will be used as absolute estimates for the purpose of quota adjustment.

In the long term there are a number of issues that need to be addressed in each of the fisheries to establish a management system that will ensure conservation and sustainable utilization. These issues include: quantifying the biotic and abiotic factors that affect the population, quantifying biological compensatory mechanisms, calculating compensatory mortality thresholds, evaluating factors affecting availability, modifying survey designs to address issues related to quantifying untrawlable areas and adjusting estimates to reflect vertical migration of the animals and evaluating and modifying the existing management system such that it meets conservation and sustainable utilization goals.

The management and assessment process is an interactive 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 the department and stakeholders to achieve meaningful results while adhering to precautionary principles.

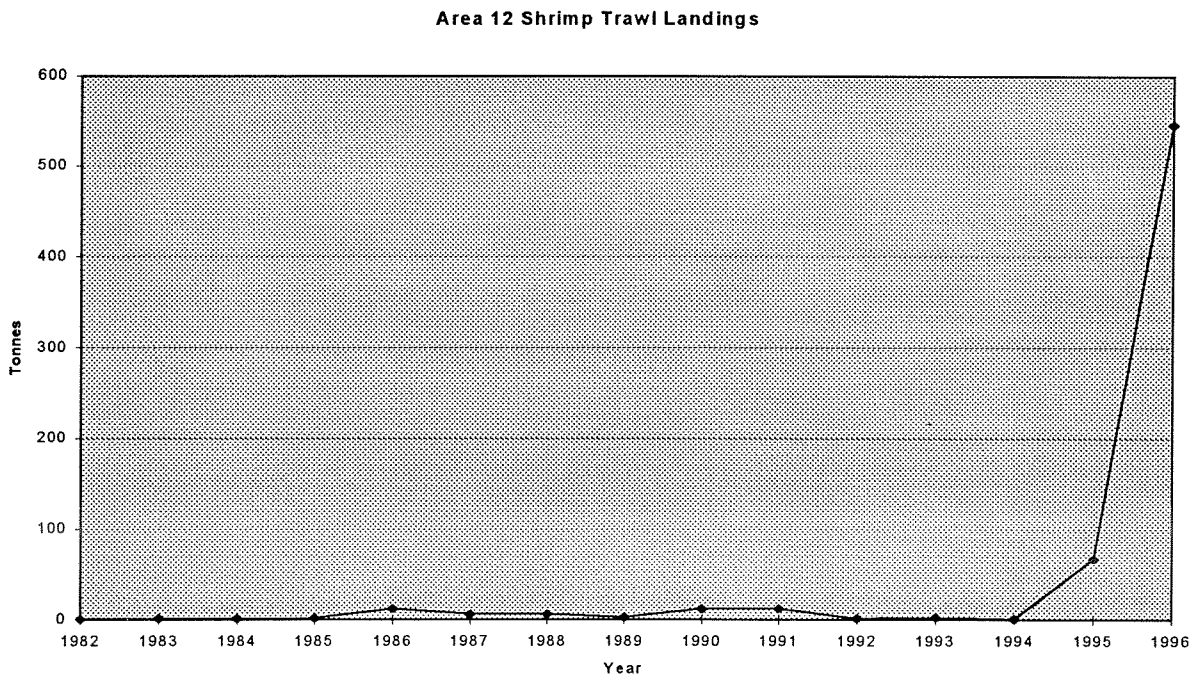


## INTRODUCTION

This report summarizes the range of activities, analysis, interpretation and resulting management actions of two "fishery independent" shrimp surveys that were conducted on April 9-17, 1997 and November 7-14, 1997 in Pacific Fishery Management Area 12 on the Pacific coast of Canada.

Area 12 is a large area that has a number of small isolated fisheries that target on a variety of species complexes. At least seven commercial shrimp are harvested by trawl in the area: *Pandalus borealis eous* (northern (or spiny) pink); *P. jordani* (smooth pink); *P. goniurus* (flexed pink), *P. danae* (coonstripe); *P. hypsinotus* (humpback); *P. platyceros* (prawn); and *Pandalopsis dispar* (sidestripe). Although there have been trawl fisheries for shrimp for a number of years in this area, it was not until recent years that there was a consistent strong effort in the area as can be seen in the area landing figures in Figure 1.

Figure 1 : Fish slip shrimp (all species combined) landing statistics from the Area 12 shrimp trawl fishery.



## OBJECTIVE

The objectives of these surveys were to provide pre- and post-fishery biomass indices of shrimp by species in select trawlable areas of Area 12, test the feasibility of using traps to evaluate the density of shrimp in untrawlable areas, test sampling techniques to evaluate the availability of shrimp to the trawl survey, and collect bycatch

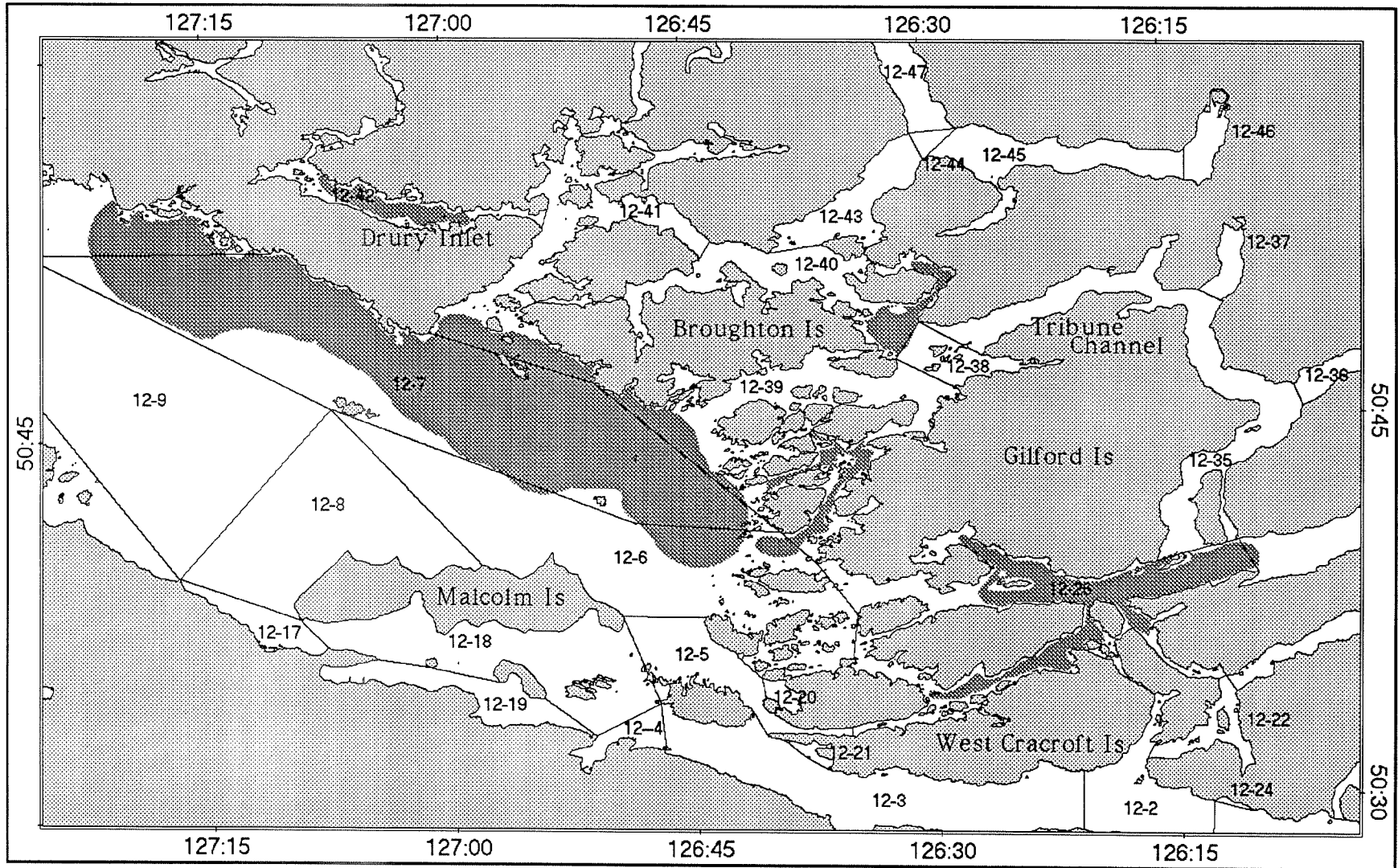
data on prawns, halibut, and eulachon. To do this there were three survey techniques used:

1. Area swept trawl surveys to determine the fishable biomass index of shrimp by species in the various trawlable areas.
2. Long-lined trap sets placed inside and outside the trawl survey area to delimit the component of stock outside the trawlable area.
3. Vertical trap sets placed in trawlable area to estimate the proportion of the shrimp stock by species off bottom and not accessible to the trawl.

## METHODS

The survey in April provided pre-fishery biomass indices of shrimp abundance for Pacific Fisheries Management Areas (PFMA) 12-26, 12-39, 12-40 and 12-42 (Fig. 2). The survey was conducted using the DFO research vessel *Caligus* and four volunteer commercial fishing vessels: F.V. *Diligent* (Captain Hannu Harju); F.V. *Foxy Lady II* (Captain Murray Tanner); F.V. *Frigga* (Captain Ross Michelson); and F.V. *Mae Ann* (Captain David Renwall). Vessels were staffed with biological technicians, who were funded by DFO management and science. The vessels that volunteered provided trawl gear in good working order as well as accommodation and provisions for the technician.

Figure 2. Survey areas in Area 12, April and November 1997.



The survey in November provided both initial and comparative biomass estimates of various areas. A survey of subareas 12-06/07 provided a initial biomass index of shrimp abundance for the area after the initial fishery reached its arbitrary catch ceiling and was closed. Repeat post-fishery biomass indices of shrimp abundance comparable to the April survey were collected for subareas 12-26, 12-39 and 12-40 (Fig. 2). For this survey the same industry and research vessels were used but the Pacific Coast Shrimpers' Cooperative Association (PCSCA) contributed \$12,500 to partially fund contract biological technicians. PCSCA also contributed \$500 to each commercial vessel to offset the cost of fuel.

The key activities that were carried out were:

1. Pre-survey digitizing and mapping of the general area to be surveyed from hydrographic data charts.
2. Preparation of sampling manuals, data sheets and field equipment for observers and boats participating in the survey.
3. Pre-survey meetings were held with industry participants to determine the area of the survey. As a result of information from harvest log data, as well as input from fishers at the pre-survey meeting, specific mapping of the survey area was conducted and pre-assigned sampling locations were determined.
4. Once the vessels participating in the survey were identified, an analysis of the logbook data was conducted to determine if any between vessel effort standardization was required.
5. The gear used by each vessel was documented and standardized to area swept.
6. Biological technicians were trained with respect to sampling requirements and assigned to each vessel.
7. The survey was broken down into components: area swept trawls, on bottom trap sets using standard Ladner Prawn traps, and off-bottom vertical trap sets using fine meshed small Pardiac traps.

## **Mapping**

Locations of shrimp trawl activity were identified from the commercial shrimp harvest log data for the years 1995 and 1996 and substantiated independently through a meeting with fishers familiar with the area. Tow 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 drawn around the areas of most concentrated effort (clusters of location points), using the 50m and 200m contour lines as rough guides. 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 0.5 square nautical mile.

## **Field data**

All data was collected in a standard format which included details on the: sequential tow number<sup>1</sup>, 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 traveled, 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 April 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, pairwise 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 determined by consulting with net manufactures on their estimated opening. A few months prior to the survey, many of the manufacturers had participated in testing scale models of their trawls in a specially designed evaluation tank on the east coast of Canada. The effective net opening was calculated to be 0.6 meters shorter than the beam length, which varied by vessel. All nets used were high-rise beam trawls which were estimated to open vertically approximately 4-5 meters. 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-catch. It was felt that this equipment might reduce the catch of shrimp and therefore the separator gear was removed from the trawls for the survey.

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<sup>1</sup> each vessel started its tows with a different series e.g. the Mae Ann's were limited to 100-199 while the Diligent's tows were limited to 400-499.

## Area Swept Trawl Survey

Trawl tows were spaced systematically over the fishing grounds on a 300 m by 300 m grid. Table 1 below shows the area included in the survey by major fishing area.

Table 1 : The Pacific Fishery Management Areas and subareas surveyed in the Area 12 surveys and the respective sampling areas.

Subarea	Location	Area surveyed (km <sup>2</sup> )
12-6&7	Outside areas	384.83
12-26	Knight and Clio	60.49
12-39	Retreat Pass	15.49
12-40	Simoon and Penphrase	12.57
12-42	Drury Inlet	12.54

Tows were to be 30 minutes in duration, however, they were shortened if snags or bad bottom were encountered. The density of animals by species per square meter was then calculated using the following equation:

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

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

## Trapping

In addition to the area swept trawl survey, two types of trapping were conducted: on-bottom trapping in both untrawlable areas and trawlable areas and vertical off-bottom trapping in the trawlable and untrawlable areas. When possible, trapping was conducted at the same time as the trawl survey was being conducted. All trapping was carried out aboard the research vessel Caligus. The trapping was conducted to address two different concerns: the presence of shrimp on bottom that was untrawlable and the presence of shrimp off bottom that would not be captured by the trawl.

### Horizontal (on-bottom) trap sets

All on-bottom traps sets were overnight longlined strings of 5 or 10 small mesh (26 mm knot to knot) Ladner prawn traps (63.5 cm top diameter, 76.2 cm bottom diameter; 30.8 cm high) spaced along the groundline at 20 fm intervals. Sets were made in both untrawlable and trawlable locations. To calculate the density of shrimp in the untrawlable areas, we initially compared data collected from longlined traps in trawlable areas that were paired with trawl tows in close proximity. For this comparison,

we assumed that the average number of shrimp caught per trap was representative of the density of shrimp in the area as calculated from the closest trawl tow. We then compared the catch rates in the trap sets from trawlable areas with trap sets from adjacent untrawlable areas, to estimate shrimp densities in areas that were untrawlable. In a similar method, the numbers of shrimp caught in vertical trap lines left overnight were converted to a density value using densities observed for adjacent tows. For vertical trap lines that were fished overnight in trawlable and untrawlable areas, comparison of the density of the shrimp in the bottom traps were also used to calculate the density of shrimp in the untrawlable areas in a manner similar to that described above for on-bottom trap lines.

### **Vertical (off-bottom) trap sets**

Nightly diurnal vertical migration has been observed for several species of shrimp (Barr and McBride 1967, Barr 1970 and Beardsley 1973). To reduce the effects of this off-bottom nightly migration and ensure that we maximized the shrimp available to trawl, the survey was conducted only during daylight hours. In an effort to estimate the proportion of shrimp available to the bottom trawls, strings of fine mesh (7-10 mm) Pardiac traps (23.25 cm diameter by 10.25 cm high) were set vertically in the water column from the bottom to the surface during the daylight hours that the trawl portion of the survey was conducted. The number of shrimp caught in these vertical traps were used to estimate the proportion of the shrimp that were available to trawl at the time that the survey was conducted. Initial estimates of densities of shrimp per square meter calculated using data from trawl tows and on-bottom traps are calculated with the assumption that the shrimp are fully available to bottom trawl. With the information from daylight vertical sets, these initial density estimates were adjusted to account for the shrimp that were off the bottom and not available to be caught by in the trawl survey. It was assumed that all shrimp, 5 meters or less from the bottom, were available to trawl, while those shrimp above 5 meters would not be available to the trawl.

### **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 and longlined trap 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 standardized 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 in each age class, and subsequently to calculate the density of shrimp by number for each age in the area sampled. For the April samples the ovigerous and recently hatched animals were not included in the model analysis because these animals had stopped growing during the fall of 1996 once the eggs had been deposited on the pleopods. Aging was only conducted on the males, transitions and new females (primiparous) in the samples.

### **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 25,600 square meters (i.e. squares with sides of length 160 meters). The center point of each tow or trap line was assigned to the appropriate grid cell with weight and age class density information (calculated using the above methods).

A sector geospatial interpolation was then used to calculate values for empty grid cells within the total sampling area. The sector interpolation examined an area within a circle with a radius of ten grid cells (1600 meters), with the target cell (cell for which the value is being calculated) in the center of the circle. The circle is divided into six sectors, and the value for the target cell is estimated using a distance-weighted average of the nearest sample in each of the sectors. Thus, samples closer to the target cell have a greater influence on the interpolated value.

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 effective fishing power of the vessels were compared to one another, there was no consistent trend in the results. One vessel may have been significantly better than another in one area and on one day but another was better in another area at another time. As a consequence of the results of the catch per unit effort analysis being inconclusive, no effort standardization corrections were used in the analysis of biomass indices to account for between vessel differences. However it has recently come to our attention that there was some confusion by one of the vessels with respect to the size of gear they reported using. At most, this confusion would cause us to underestimate the density of shrimp from this particular vessel by 4-5% in the April survey, but because of time constraints the data published in this report reflects this error.



## Trawl survey

Table 2 below shows the subareas surveyed in April and November 1997, the total number of tows made and the actual area trawled during the surveys as a percentage of the total survey area from Table 1.

Table 2 : The subareas that were in the April and November surveys, the total number of tows made and area sampled as a percentage of the total survey area.

Survey	Subarea	Number of tows	% Area Swept
April	12-26	27	0.72%
April	12-39	12	1.08%
April	12-40	7	1.01%
April	12-42	10	0.58%
November	12-07	18	0.06%
November	12-26	14	0.32%
November	12-39	9	0.80%
November	12-40	7	0.94%

Detailed catch records are shown in Appendix Tables 1 and 4 for the April and November surveys respectively. Note that no halibut were caught in the April survey, while halibut were caught in only one tow in November, making up only 0.5143% of the total catch. Eulachon were caught in two tows in April, making up 0.0158% of the total catch. In November, eulachon appeared in three tows, and made up 0.0040% of the catch. Prawns were caught far more commonly, appearing in 33 tows in the April survey, but still making up only 1.4625% of the catch. In November, prawns were in 28 tows and made up 0.6014% of the catch.

## Trap Sets

### Vertical trap sets

The number of strings set in each survey are shown in the Table 3 below.

Table 3 : The number and type of vertical trap sets by subarea for each survey.

Survey	Subarea	Number of strings
April	12-26	9 daylight, 6 overnight
April	12-39	1 daylight, 3 overnight
April	12-40	1 daylight, 1 overnight
April	12-42	4 daylight
November	12-07	8 daylight
November	12-26	11 daylight

November	12-39	5 daylight
November	12-40	2 daylight

The proportion of shrimp available to trawl varied depending on the species and the area. Species such as humpbacks, coonstripes, prawns and sidestripe shrimp were all 100% available to the trawl i.e. within 5 m of the bottom in all areas in both surveys. In the April survey, there were no catches of these species in traps off the bottom, while in November there were some humpbacks and prawns in the 5 meter trap. Northern pink, smooth pink, and flexed pink shrimp however did vary considerably with respect to their availability to the trawl. Estimates of availability to the trawl survey varied from a low of 26.7% to a high of 100% for Northern pink shrimp depending on the subarea. See details, by subarea, in Table 4 below. Detailed catch records are shown in Appendix tables 2 and 5 for the April and November surveys respectively.

Table 4 : Percentage of Northern pink shrimp available to the trawl survey by survey and subarea.

Survey	Subarea	% Northern pink shrimp available to trawl
April	12-26	26.7%
April	12-39	100.0%
April	12-40	100.0%
April	12-42	100.0%
November	12-07	82.7%
November	12-26	33.0%
November	12-39	97.2%
November	12-40	98.2%

### Horizontal trap sets

The number of strings set in each survey are shown in Table 5 below. Detailed catch records are shown in Appendix tables 3 and 6 for the trap sets on and off trawlable bottom for the April and November surveys respectively.

Table 5 : The number of strings of gear set by survey and subarea.

Survey	Subarea	Number of strings
April	12-26	9
April	12-39	5
April	12-40	4

April	12-42	3
November	12-07	6
November	12-26	10
November	12-39	6
November	12-40	3

### Age Class Estimates

In the April survey there were still a significant proportion of berried and newly hatched females present in the catch. Table 6 below shows the proportion of berried shrimp by species and area that were still ovigerous at the time of the April survey. After hatching it is considered that most if not all of these shrimp will die.

Table 6 : The proportion of shrimp that were still carrying eggs or showing signs that eggs had recently hatched in the April survey, by species and subarea.

Species	Subarea	% Ovigerous
Northern pink	12-26	14.3%
	12-39	32.7%
	12-42	8.8%
Sidestripes	12-26	11.3%
	12-39	13.1%
	12-40	14.0%
Humpbacks	12-26	21.1%
	12-39	50.9%
	12-40	73.8%
	12-42	20.2%

The size of the animals by age class and species for the two surveys are shown by Pacific Fisheries Management subarea in the Table 7 below.

Table 7 : The size and weight of shrimp by cohort, by species, and by subarea for the April and November 1997 surveys.

Subarea	Month-Year	Species	Age0 length	Age1 length	Age2 length	Age3 length	Ovig shrimp length	Age 0 Wt	Age-1 Wt	Age-2 Wt	Age-3 Wt	Ovig Wt
12-26	Apr-97	North.Pink		10.8	16.1	19.5	20.6		1.1	3.2	5.2	6.1
12-26	Apr-97	Humpback		15.0	21.3	24.6	26.2		2.7	7.3	10.9	12.9
12-26	Apr-97	Sidestripe		15.2	22.1	26.0	28.7		2.3	7.0	11.4	15.3
12-39	Apr-97	North.Pink		10.6	16.2	21.2	19.3		1.1	3.2	6.5	5.1

12-39	Apr-97	Humpback		16.1	22.5	25.3	26.2		3.3	8.5	11.7	12.9
12-39	Apr-97	Sidestripe		15.0	22.3	26.2	29.1		2.2	7.2	11.6	15.9
12-40	Apr-97	Humpback		16.2	19.3	24.0	28.0		3.4	5.5	10.1	15.5
12-40	Apr-97	Sidestripe		16.4	22.8	26.6	30.3		2.8	7.7	12.2	18.0
12-42	Apr-97	North. Pink		11.3	16.0	19.2	20.0		1.3	3.1	5.0	5.6
12-42	Apr-97	Humpback		14.8	20.5	24.0	23.5		2.6	6.5	10.1	9.6
12-07	Nov-97	North. Pink	10.4	15.1	20.3			1.0	2.7	5.8		
12-07	Nov-97	Sidestripe	11.1	20.3	24.8	30		0.9	5.4	9.9	17.5	
12-26	Nov-97	North. Pink	9.8	15.4	18.4	21.7		0.9	2.8	4.5	6.9	
12-26	Nov-97	Humpback	11.9	20.2	25.9			1.4	6.3	12.5		
12-26	Nov-97	Sidestripe	11.0	20.1	24.1	29.3		0.9	5.2	9.0	16.3	
12-39	Nov-97	North. Pink	8.7	15.0	19.9			0.6	2.6	5.5		
12-39	Nov-97	Humpback		21.0	27.4	29.7			7.0	14.7	18.4	
12-39	Nov-97	Sidestripe		19.7	24.0	27.7			4.9	8.9	13.7	
12-40	Nov-97	North. Pink	10.6	15.1	18.9	22.4		1.1	2.7	4.8	7.5	
12-40	Nov-97	Humpback		21.5	26.9	30.2			7.5	13.9	19.2	
12-40	Nov-97	Sidestripe	12.0	20.5	25.3	30.4		1.1	5.6	10.5	18.2	

### Survey Biomass Indices

Biomass indices calculated by species, subarea and cohort for the two surveys are shown in Table 8 below.

Table 8 : Biomass indices and cohort strength for various species<sup>2</sup> by subarea, by survey.

Subarea	Month/ Year	Species	Tonnes	97 (000)	96 (000)	95 (000)	94 (000)	93 (000)	Shrimp /Kg
12-26	Apr-97	North. Pink	331		9819	43316	9365	12179	226
12-26	Apr-97	Humpback	3		57	169	20	68	118
12-26	Apr-97	Sidestripe	13		1589	690	306	203	218
12-39	Apr-97	North. Pink	139		10308	21177	0	15409	338
12-39	Apr-97	Coonstripe	0.4						
12-39	Apr-97	Humpback	30		364	867	178	1455	95
12-39	Apr-97	Sidestripe	5		192	384	26	82	150
12-40	Apr-97	North. Pink	19						
12-40	Apr-97	Humpback	0.3		0	1	6	17	69
12-40	Apr-97	Sidestripe	2		56	88	16	16	102
12-42	Apr-97	North. Pink	38		1409	5908	191	3436	289

<sup>2</sup> The species biomass indices were only calculated for subareas where catches were sufficient to indicate a significant presence in the area.

12-42	Apr-97	Coonstripe	2						
12-42	Apr-97	Humpback	16		576	1439	148	386	162
12-6/7	Nov-97	North. Pink	7	8	889	716			230
12-6/7	Nov-97	Smooth Pink	15						
12-6/7	Nov-97	Sidestripe	50	301	1899	2190	946		
12-26	Nov-97	North. Pink	79	396	7835	6225	5355		252
12-26	Nov-97	Smooth Pink	0.2						
12-26	Nov-97	Coonstripe	0.02						
12-26	Nov-97	Humpback	2	17	131	191			137
12-26	Nov-97	Sidestripe	9	283	840	289	159		174
12-39	Nov-97	North. Pink	89	362	9508	12750			254
12-39	Nov-97	Smooth Pink	0.007						
12-39	Nov-97	Coonstripe	0.3						
12-39	Nov-97	Humpback	12		1092	334	22		120
12-39	Nov-97	Sidestripe	4		166	110	150		114
12-40	Nov-97	North. Pink	3	13	780	309	22		325
12-40	Nov-97	Smooth Pink	0.2						
12-40	Nov-97	Coonstripe	0.02						
12-40	Nov-97	Humpback	0.5		47	10	2		124
12-40	Nov-97	Sidestripe	4	19	110	129	111		91

## DISCUSSION

This was the first time surveys like this have been conducted in Area 12. Needless to say there were some difficulties as well as a number of very positive results. It became obvious very quickly that the limited deck space of the vessels was a problem with respect to handling and sorting the catch. This impacted both on the number of tows that could be completed in a day and on the ability of the observer to get accurate samples and weights of shrimp in addition to other species. As a result of this, the survey was restricted in scope in terms of the areas to be covered (e.g. the outside area had to be dropped in the April survey) and at the end of the first day it was decided that the priority had to be collection of accurate shrimp, eulachon and halibut catch data with a lower priority assigned to collection of detailed information of catches of other species. This is evident in the catch records seen in Appendix Table 1 and 3 which show total catch weights which do not match with species catch weights.

The next item of interest was that catches from the first trap off the bottom (5 m) in the vertical traps sets may have been competing with the traps on either side. This probably resulted in a bias that underestimated the concentration of shrimp available to the trawl. It is interesting to note, that for those species which did come off the bottom during daylight hours, the behavior was not consistent between subareas. In the

November survey catches of prawns off the bottom may indicate a problem with the setting of traps in some sets. If the line is not taut enough then the first trap off the bottom may hang down and touch the bottom. This would bias the results towards overestimating of the amount of shrimp off the bottom and unavailable to the trawl, and therefore overestimating the shrimp biomass indices.

From the long-lined traps in untrawlable areas, the results varied again by species and subarea. Significant quantities of shrimp were found in untrawlable areas for benthic species like prawns and humpbacks but the concentration of the more pelagic species, like pinks and sidestripes appear to be greatest in the trawlable areas. There seems to be very limited information coming from these sets at present especially for species like pinks and sidestripes. There needs to be further refinement as to how we can get more information from these sets. Options that need to be considered would include smaller meshed traps to eliminate loss of smaller shrimp through the mesh, and looking at more sets over a larger area.

Logistically it is useful to note the efficacy of the two trapping techniques depends on the species and area being surveyed. The vertical sets provided information that was used in the calculation of biomass indices in some but not all subareas for northern pink, smooth pink or flexed pink shrimp. They did not provide any useful information necessary for inclusion into the estimation procedure for other species of shrimp, since vertical migration affecting availability to the trawl is not a problem.

Horizontal long-line trap sets on untrawlable bottom seem to provide the most useful information when expanding the range of concentrations of benthic species like coonstripes, humpbacks and prawns. The trawl surveys were fairly successful at delimiting the areas of concentrations for pink and sidestripe populations, however, it was difficult to delimit the area of concentrations of humpback and coonstripe shrimp without a much more in-depth horizontal trapping survey.

There were a number of weather and gear problems in the November survey. These difficulties reduced the amount of area surveyed, as seen in Table 2, and may have compromised our ability for develop reliable comparisons. This is particularly a problem in 12-26, where sample coverage was reduced to less than half of the April survey coverage.

## **MANAGEMENT ACTIONS AND FISHERIES IN AREA 12**

Considering the history of the fishery in Area 12 (Fig. 1), a survey was required by managers prior to setting catch ceilings for Area 12 and opening the fishery (Southey et. al.; in prep.). Following the survey, the area was opened April 21, 1997, pending the analyses of the results of the survey. Preliminary analyses were

completed July 15, 1997, and precautionary catch ceilings were set from the survey biomass estimates.

### **Initial Catch Ceilings- August, 1997**

Area 12 was subdivided into two shrimp management areas and the following TAC's were set based on a fixed exploitation rate of 0.33 x biomass survey indices (see Table 8):

#### **12 Inside - Subareas 12-22, 12-23 and 12-26 to 12-48:**

0.33 x 536 t pinks = 173.58 t = 382, 675 lb.  
= TAC of 380,000 lb. (172.4 t) pinks

0.33 x 48.7 t humpbacks = 16.07 t = 35,430 lb.  
= TAC of 35,000 lb. (15.88 t) humpbacks

0.33 Sidelstripes = 6.86 t = 15,132 lb.  
= TAC of 15,000 lb. sidestripes

For management purposes, landings of coonstripes were included in the pinks allocation.

### **Area 12-Inside Fishery**

The first catch ceiling to be reached was for sidestripes as indicated in Table 9 below. Subsequently 12-Inside Area was closed on October 2, 1997. The fishery for pinks was closed at the same time due to the bycatch of sidestripes in the pink fishery. Fishers landed a variety of small shrimp combined as "pinks", not sorting or reporting sidestripe or other shrimp in the catch. Catch ceilings were not reached for humpbacks.

Table 9 : Hailed inseason landings for the 12-Inside shrimp trawl area.

Species	Hailed inseason catch from AMR for Area 12-Inside	% of Catch/TAC
Pinks <sup>3</sup> and coonstripes	275,786 lb. (125 t)	73% TAC
Humpbacks	8,367 lb. (3.8 t)	24% TAC
Sidelstripes	16, 756 lb. (7.6 t)	112 % TAC

<sup>3</sup> Pinks equals all species combined (northern pinks, smooth pinks and flexed pinks).

The catch by species was determined as best as possible from hauls, landing reports and direct communication with the buyers and some of the skippers on the grounds.

No market or biological samples were taken in the Area 12 Inside fishery and as such it was not possible to detail the impact of the fishery on each cohort. In general it had to be assumed that the catch was proportional to the catch composition at the time of the survey. This is known to be incorrect as the post-spawning individuals will probably die and the new recruits of 1+ and 0+ individuals become more available to the fishery as they grow throughout the year.

A post-survey meeting was held in Nanaimo on September 24, 1997 to review the April survey results, the fishery to date, and options for a further survey. The consensus of the group was that for initial surveys of an area, local, knowledgeable fishers should participate. However, once several areas had been surveyed, and grid/tow locations set for the resurveys, it would be more cost effective to have a single vessel dedicated to surveys.

#### **Area 12-Outside preliminary catch ceiling**

Following the April 1997 survey, 12-Outside was created. It was composed of subareas 12-1 to 12-21, 12-24 and 12-25 ( see Figure 2). Since this area had not been surveyed in April, an arbitrary precautionary catch ceiling of 10 t (22,046 lb.) for all species combined was announced on August 8, 1997. Following the weekly report of shrimp landings on August 14, a closure was announced on August 15 and the 12-Outside area was closed August 19, 1997. At the time of closure, the hailed landings by fishers were 18,472 lb. (8.4 t) Sidestripes and 34,498 lb. pinks and other shrimp (15.6 t) (Aug. 14/97 Weekly Shrimp Trawl Summary Report, AMR). When estimates of missing landings were added to the hailed catches, this brought the total estimated landings to 18,472 lb. (8.4 t; 33 %) sidestripes and 37,402 lb. (17 t; 67%) pinks and other species, for a total estimate of 55, 874 lb. (25.4 t).

#### **Management Actions Following the November, 1997 survey**

After the fisheries had been closed in Area 12, a second survey was conducted on November 7-14. The survey biomass indices from this survey are presented in Table 8. Biomass estimates were then calculated for each subarea by combining the survey biomass indices and the catch up to the time of the survey. The results were reviewed by managers on December 9, 1997 and a further fishing opportunity was announced on December 17, 1997, for the 12-outside shrimp area only.



### Northern pink survey estimates and the fishery

For the 12-inside subareas resurveyed (12-26, 12-39, and 12-40), the biomass indices of Northern pink shrimp declined by 318 t from the April estimate of 489 t to 171 t for the November survey. At this time we assume that for surviving cohorts losses in weight from natural mortality balance gains in weight due to growth and recruitment. If this assumption was correct, then there are three factors that would account for the large declining trend in biomass indices: fishery landings, die off of last years female spawners (present in the April survey but absent in the November survey), and changing survey pattern. The fishery from the areas resurveyed accounted for landings of approximately 125 t. The proportion of the total biomass in April that was made up of last years female spawners varied by subarea from 27.3% to 49.8% with a weighted average of 35.5%. These animals normally die shortly after egg hatch. For the resurveyed subareas, this die off could account for a loss of 167 tonnes although probably 2-3 tonnes of this would have been taken in the commercial catch. Unfortunately no market samples were obtained from this fishery and it is not known how long or what proportion of the catch may have been composed of this component of the stock. In the November survey, the number of tows was reduced considerably in some areas due to breakdowns and poor weather ( see Table 2).

For 12-outside the estimated quota for pinks was  $0.33 \times (22 \text{ t survey index} + 17 \text{ t catch}) = 0.33 \times 39 = 12.9 \text{ t TAC}$  (for the purposes of this preliminary estimate of initial biomass i.e. index + catch, it was assumed that losses due to natural mortality were equal to gains due to growth). This quota was already exceeded by the fishery to date which had landed an estimated 17 t.

### Sidestripe survey estimates and the fishery

For the 12-inside areas resurveyed, there was a small decrease in sidestripes indices from 20 t in April to 17 t in the November survey. There were an estimated 7.6 t (16,756 lb.) landed in the fishery, 4 t was probably lost to mortality of 1996 female spawners, increases occurred with the new recruits of the 1997 year class in the November survey and there was a 47% average increase in weight of the 1+, 2+ and 3+ animals. The accuracy of survey, as it stands now, is not sufficient to measure reliably a difference of 2 t in areas like 12-40.

For 12-outside, the biomass of sidestripes and the TAC were calculated in the same manner as outlined for pinks above. The TAC for sidestripes in 12-outside was calculated to be  
 $0.33 (50 \text{ t survey} + 8.4 \text{ t fishery}) = 0.33 \times 58.4 \text{ t} = 19.3 \text{ t TAC}$ .

The fishery had landed 8.4 t of the 19.3 t, which left 10.9 t TAC = 23,970 lb. which could be taken.

### **Humpbacks survey estimates and the fishery**

For the 12-inside areas resurveyed, there was a decline in humpback biomass from 33 t in April to less than 15 t in November. The fishery landed an estimated 3.8 t (8,376 lb.). The difference between these estimates is complicated by the biomass of a large number of ovigerous females taken in the April 1997 fishery. This component of the stock probably died following spawning, and this could have accounted for as much as 24 t with the weight of 1996 female spawners making up 23% to 79.9% of the April indices.

### **Management Actions**

Area 12-inside remained closed for the remainder of the shrimp year i.e. until hatching had been completed in the spring of 1998. For Area 12-outside, since the TAC had been taken for pinks, the fishers proposed a selective fishery for the sidestripes, using larger mesh nets. As a result the area was reopened in from December 17, 1997 to March, 1998 for a selective sidestripe fishery, which was to be conducted using larger mesh nets and observer coverage to evaluate the success of the selectivity. Despite repeated attempts by the service contractor, there was no observer coverage of this fishery.

## **CONCLUSIONS AND RECOMMENDATIONS FOR IMPROVEMENTS**

### **Stock Assessment Surveys**

1. Market samples are required in May - June to determine the percentage of ovigerous shrimp still in the catch and at later periods to determine the impact of the fishery by year class.
2. Smaller meshed traps need to be used on horizontal lines in future to ensure that we do not bias the samples from untrawlable areas when determining the cohort structure of the stocks.
3. More vertical sets need to be conducted in the assessments of pelagic shrimp. This would allow us to see if the distribution of pelagic pink and sidestripe shrimp on and off the bottom is a function of density, depth, time of day (morning/afternoon), etc.
4. Vertical traps need to be set properly. This may include investigating evaluation tools like time depth recorders, etc. to ensure that this is the case.

5. There are still other areas in Area 12 that need to be included into the overall survey if we are going to continue to manage using the large scale inshore and offshore shrimp management areas.
6. More consistency is needed in the number and areas towed to reduce the types of discrepancies that occurred between the April and November surveys.
7. Other geospatial analytical tools such as kriging need to be investigated.
8. Inseason biological sampling will provide additional biological information on the catch composition of the fishery by species, sex, and age.

### **Fishery Management**

1. The catch ceilings derived from the surveys in 1997 (229 t ) were less than half of the reported landings in Area 12 in 1996 (>480 t), but greater than any landings in Area 12 prior to 1996.
2. The fishery in area 12 Inside should be delayed to May 15, to allow shrimp to complete spawning.
3. Additional information on gear, area, and other factors for selective fishing of larger shrimp such as sidestripes is required.
4. Species catch ceilings were set following surveys. The shrimp (prawn) trap fishery in this area was open from April 15 to July 10, 1997 (87 days) for subareas 12-20 to 12-48. The balance of area 12 closed with the coastwide closure on July 29, 1997. The shrimp trawl fishery was open in 12-Inside from April 21 to October 2, 1997. The 12-Outside area was open from April 21 to August 19, 1997 and from December 17, 1997 to March, 1998. There are concerns from both shrimp trawl and shrimp trap fishers regarding allocation of humpbacks. This is considered to be a new fishery in this area and further development of a management and assessment framework is required under the guidance of the Seafood Diversification Board.
5. An attempt at forecasting available shrimp in the next year's fishery should be undertaken. Will annual surveys be required prior to the fishery? or during the fishery? If the area is opened prior to a new survey, what catch ceilings should be set?
6. Consultation with industry is required to develop time and area closures for species management or gear selectivity for different species (especially the larger, higher valued sidestripes and humpbacks).

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## Appendix 1

## Trawl Summary, Area 12, April 1997

There were 57 Tows.

Total Weight for all tows, 4,741 Kg.

		Weight in Kg	Percent of Total	Number of Tows
<b>Shrimp Species</b>				
Northern (Spiny) Pink	Pandalus borealis eous	3,048.54	64.2989	50
Smooth Pink	Pandalus jordani	4.00	0.0844	2
Prawn	Pandalus platyceros	69.34	1.4625	33
Coonstripe	Pandalus danae	14.45	0.3048	3
Humpback	Pandalus hypsinotus	396.10	8.3544	41
Sidestripe	Pandalopsis dispar	323.75	6.8284	38
Bluespot	Pandalus stenolepsis	6.10	0.1287	1
Shrimp	Nantantia (Order)	14.95	0.3153	7
Flexed Pink	Pandalus goniurus	14.85	0.3132	6
Crangonidae	Crangonidae (Family)	6.20	0.1308	1
Crangons	Crangon spp	16.20	0.3417	20
Crangon Communis	Crangon communis	10.10	0.2130	2
Eualus	Eualus spp	1.00	0.0211	4
Glass Shrimp	Pasiphaea pacifica	1.75	0.0369	5
<b>Other Invertebrates</b>				
Octopus	Octopoda (Order)	0.25	0.0053	1
Squid	Teuthoidea (Order)	0.25	0.0053	1
<b>Flatfish</b>				
English Sole	Pleuronectes vetulus	2.70	0.0569	2
Flathead Sole	Hippoglossoides elassodon	9.50	0.2004	3
Rex Sole	Errex zachirus	0.45	0.0095	2
Turbot	Atheresthes stomias	1.00	0.0211	1
Rock Sole	Pleuronectes bilineatus	0.50	0.0105	1
Slender Sole	Eopsetta exilis	1.15	0.0243	2
<b>Roundfish</b>				
Eulachon	Thaleichthys pacificus	0.75	0.0158	2
Walleye Pollock	Theragra chalcogramma	1.80	0.0380	2
Eelpouts	Zoarcidae (Family)	2.80	0.0591	3
Pacific Hake	Merluccius productus	0.25	0.0053	2
Sculpins	Cottidae (Family)	3.85	0.0812	3
Shiner Perch	Cymatogaster aggregata	17.10	0.3607	2
<b>Selachii</b>				
Spotted Ratfish	Hydrolagus colliei	9.00	0.1898	2

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 14 1997      **Time** 12 :27      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 101  
**Depth** M 101 97      **Direction** 231  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	10.40	427	Octopus	0.25 Flathead Sole 2.90
Prawn	0.90	33	Squid	0.25 Rock Sole 0.50
Humpback	0.10	10		Slender Sole 0.90
Sidestripe	2.70	225		
Crangons	0.30			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>
			Eulachon	0.50
			Eelpouts	0.30
			Pacific Hake	0.15
			Sculpins	0.10
			Shiner Perch	1.10

**Date** Apr 14 1997      **Time** 13 :27      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 102  
**Depth** M 97 104      **Direction** 268  
**Water Temp:** Surface      Bottom      **Distance** 0.6 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	9.60	392		
Prawn	1.40			
Humpback	0.25			
Sidestripe	2.90	283		
Crangons	2.50			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 14 1997      **Time** 16 :09      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 103  
**Depth** M 101 141      **Direction** 246  
**Water Temp:** Surface      Bottom      **Distance** 0.7 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	50.70	401		
Prawn	0.70	26		
Sidestripe	3.40	226		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All Weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

<b>Date</b> Apr 14 1997	<b>Time</b> 17:50	<b>Duration (min)</b> 30	<b>Area</b> 12-26	<b>Haul No.</b> 104
Depth M 104 112			Direction 49	
Water Temp: Surface	Bottom		Distance 0.6 Naut. Mi.	
Type of Gear 4P	Total Catch	Remark Usable	Vessel 25808	
Net Effective Opening (feet)	41.0			

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	62.50	257		
Prawn	2.00			
Humpback	0.50			
Sidestripe	2.90	230		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b> Apr 15 1997	<b>Time</b> 7:25	<b>Duration (min)</b> 30	<b>Area</b> 12 - 26	<b>Haul No.</b> 105
Depth M 80 91			Direction 54	
Water Temp: Surface	Bottom		Distance 0.8 Naut. Mi.	
Type of Gear 4P	Total Catch	Remark Usable	Vessel 25808	
Net Effective Opening (feet)	41.0			

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	65.20	266		
Prawn	4.00	34		
Humpback	19.90	134		
Sidestripe	0.25			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b> Apr 15 1997	<b>Time</b> 9:08	<b>Duration (min)</b> 30	<b>Area</b> 12 - 26	<b>Haul No.</b> 106
Depth M 102 110			Direction 217	
Water Temp: Surface	Bottom		Distance 0.8 Naut. Mi.	
Type of Gear 4P	Total Catch	Remark Usable	Vessel 25808	
Net Effective Opening (feet)	41.0			

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	46.10	414		
Prawn	0.25			
Humpback	3.20	65		
Sidestripe	9.70	154		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All Weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

<b>Date</b>	<b>Apr 15 1997</b>	<b>Time</b>	<b>10 :25</b>	<b>Duration (min)</b>	<b>32</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>107</b>
Depth M	101 99						Direction	242	
Water Temp:	Surface	Bottom					Distance	0.9 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	25808		
Net Effective Opening (feet)	41.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	48.90	459		
Prawn	0.25			
Humpback	0.25			
Sidestripe	4.70	160		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b>	<b>Apr 15 1997</b>	<b>Time</b>	<b>11 :33</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>108</b>
Depth M	97 102						Direction	209	
Water Temp:	Surface	Bottom					Distance	0.7 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	25808		
Net Effective Opening (feet)	41.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	19.10	331		
Prawn	1.00			
Sidestripe	4.70	183		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b>	<b>Apr 16 1997</b>	<b>Time</b>	<b>16 :36</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>114</b>
Depth M	181 190						Direction	207	
Water Temp:	Surface	Bottom					Distance	0.8 Naut. Mi.	
Type of Gear	4P	Total Catch	0	Remark	Usable	Vessel	25808		
Net Effective Opening (feet)	41.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.25			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms



## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

<b>Date</b>	<b>Apr 17 1997</b>	<b>Time</b>	<b>8 :38</b>	<b>Duration (min)</b>	<b>17</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>116</b>
Depth M	134						Direction		
Water Temp:	Surface	Bottom					Distance		Naut. Mi.
Type of Gear	4P	Total Catch		Remark	Mechanical Problem	Vessel	25808		
Net Effective Opening (feet)	41.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>			<b>Flatfish</b>		
Sidestripe	0.00								
<b>Rockfish</b>				<b>Roundfish</b>			<b>Selachii</b>		

<b>Date</b>	<b>Apr 14 1997</b>	<b>Time</b>	<b>12 :02</b>	<b>Duration (min)</b>	<b>22</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>200</b>
Depth M	106	73					Direction		
Water Temp:	Surface	Bottom					Distance	0.6	Naut. Mi.
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	22995		
Net Effective Opening (feet)	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>			<b>Flatfish</b>		
Northern (Spiny) Pink	42.40	285							
Prawn	15.10								
Humpback	10.60								
Sidestripe	10.60	100							
Other Shrimp	0.80								
<b>Rockfish</b>				<b>Roundfish</b>			<b>Selachii</b>		

<b>Date</b>	<b>Apr 14 1997</b>	<b>Time</b>	<b>15 :10</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>201</b>
Depth M	102	106					Direction		
Water Temp:	Surface	Bottom					Distance	0.8	Naut. Mi.
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	22995		
Net Effective Opening (feet)	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>			<b>Flatfish</b>		
Northern (Spiny) Pink	65.50	222							
Humpback	1.50								
Sidestripe	20.40	190							
Other Shrimp	8.70								
<b>Rockfish</b>				<b>Roundfish</b>			<b>Selachii</b>		

All Weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

<b>Date</b>	Apr 14 1997	<b>Time</b>	17:15	<b>Duration (min)</b>	30	<b>Area</b>	12 - 26	<b>Haul No.</b>	202
<b>Depth</b>	M 112 123						Direction		
<b>Water Temp:</b>	Surface	Bottom					Distance	0.8 Naut. Mi.	
<b>Type of Gear</b>	4P	<b>Total Catch</b>		<b>Remark</b>	Usable	<b>Vessel</b>	22995		
<b>Net Effective Opening (feet)</b>	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Northern (Spiny) Pink	164.0	286							
Prawn	3.70								
Humpback	0.50								
Sidestripe	22.00	222							
Other Shrimp	1.20								
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

<b>Date</b>	Apr 15 1997	<b>Time</b>	7:35	<b>Duration (min)</b>	30	<b>Area</b>	12 - 26	<b>Haul No.</b>	203
<b>Depth</b>	M 115 123						Direction		
<b>Water Temp:</b>	Surface	Bottom					Distance	0.9 Naut. Mi.	
<b>Type of Gear</b>	4P	<b>Total Catch</b>		<b>Remark</b>	Usable	<b>Vessel</b>	22995		
<b>Net Effective Opening (feet)</b>	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Northern (Spiny) Pink	5.00	250							
Prawn	2.30								
Humpback	0.25								
Sidestripe	9.13	333							
Other Shrimp	0.25								
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

<b>Date</b>	Apr 15 1997	<b>Time</b>	8:42	<b>Duration (min)</b>	30	<b>Area</b>	12 - 26	<b>Haul No.</b>	204
<b>Depth</b>	M 95 115						Direction		
<b>Water Temp:</b>	Surface	Bottom					Distance	0.7 Naut. Mi.	
<b>Type of Gear</b>	4P	<b>Total Catch</b>	74	<b>Remark</b>	Usable	<b>Vessel</b>	22995		
<b>Net Effective Opening (feet)</b>	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Northern (Spiny) Pink	42.30	250							
Humpback	2.10								
Sidestripe	14.10	286							
Other Shrimp	3.50								
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 15 1997      **Time** 10 : 10      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 205  
**Depth** M 106 128      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 145      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 90.90      571  
Prawn 4.30  
Humpback 0.25  
Sidestripe 32.50      333  
Other Shrimp 0.25

**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 15 1997      **Time** 12 : 25      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 206  
**Depth** M 97 106      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 73      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 44.60      400  
Prawn 1.00  
Humpback 0.25  
Sidestripe 10.70      250  
Other Shrimp 0.25  
Crangon 4.00

**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 16 1997      **Time** 16 : 33      **Duration (min)** 25      **Area** 12 - 26      **Haul No.** 213  
**Depth** M 187 192      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 25      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Sidestripe 1.60      143

**Rockfish**      **Roundfish**      **Selachii**

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 16 1997      **Time** 17:45      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 214  
**Depth** M 174 183      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 36      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Sidestripe	13.30	250		
Crangons	0.50			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 17 1997      **Time** 9:05      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 215  
**Depth** M 188 201      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.6 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 30      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.25			
Sidestripe	3.60	213		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 14 1997      **Time** 15:13      **Duration (min)** 15      **Area** 12 - 26      **Haul No.** 301  
**Depth** M 66 73      **Direction** 330  
**Water Temp:** Surface      Bottom      **Distance** 0.4 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	42.40	318		
Prawn	0.90	37		
Humpback	4.00	133		
Sidestripe	0.20	230		
Flexed Pink	0.25			
Crangons	0.10			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 14 1997      **Time** 17:30      **Duration (min)** 15      **Area** 12 - 26      **Haul No.** 302  
**Depth** M 53 62      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.4 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

**Shrimp**      **Weight**      **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 43.60      340  
Prawn 2.10      47  
Humpback 1.20      170  
Sidestripe 0.25  
Flexed Pink 0.25  
Crangons 0.25

**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 15 1997      **Time** 8:23      **Duration (min)** 15      **Area** 12 - 26      **Haul No.** 303  
**Depth** M 115 123      **Direction** 295  
**Water Temp:** Surface      Bottom      **Distance** 0.4 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 28      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

**Shrimp**      **Weight**      **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 6.44      305  
Prawn 0.54  
Humpback 0.25  
Sidestripe 10.72      204  
Crangons 0.25  
Eualus 0.25

**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 15 1997      **Time** 11:40      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 304  
**Depth** M 113 152      **Direction** 300  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 25      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

**Shrimp**      **Weight**      **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 1.20      312  
Prawn 0.25  
Sidestripe 3.70      148  
Crangons 0.30  
Eualus 0.25  
Glass Shrimp 0.25

**Rockfish**      **Roundfish**      **Selachii**

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

<b>Date</b>	<b>Apr 14 1997</b>	<b>Time</b>	<b>14 :26</b>	<b>Duration (min)</b>	<b>9</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>401</b>
Depth M	117 117						Direction	82	
Water Temp:	Surface	Bottom					Distance	0.1 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Snagged - Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Northern (Spiny) Pink	155.0	170							
Sidestripe	0.00								
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

<b>Date</b>	<b>Apr 14 1997</b>	<b>Time</b>	<b>16 :07</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>402</b>
Depth M	115 112						Direction	305	
Water Temp:	Surface	Bottom					Distance	0.5 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Smooth Pink	2.00	222							
Prawn	0.25	62							
Humpback	0.25								
Sidestripe	20.00	80							
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

<b>Date</b>	<b>Apr 14 1997</b>	<b>Time</b>	<b>17 :33</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>403</b>
Depth M	112 115						Direction	287	
Water Temp:	Surface	Bottom					Distance	0.8 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Smooth Pink	2.00	222							
Prawn	1.00	30							
Sidestripe	20.00	77							
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 15 1997      **Time** 14 :55      **Duration (min)** 25      **Area** 12 - 39      **Haul No.** 109  
**Depth** M 68 86      **Direction** 88  
**Water Temp:** Surface      Bottom      **Distance** 0.7 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 431.4      286  
Humpback 103.5      82  
**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 15 1997      **Time** 17 :25      **Duration (min)** 18      **Area** 12 - 39      **Haul No.** 110  
**Depth** M 73 84      **Direction** 0  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 197.5      236  
Prawn 3.70      58  
Humpback 9.30      140  
**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 16 1997      **Time** 9 :02      **Duration (min)** 16      **Area** 12 - 39      **Haul No.** 111  
**Depth** M 60 62      **Direction** 203  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 109.2      426  
Prawn 0.25  
Humpback 9.10      100  
**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 16 1997      **Time** 9 :53      **Duration (min)** 30      **Area** 12 - 39      **Haul No.** 112  
**Depth** M 40 37      **Direction** 157  
**Water Temp:** Surface      Bottom      **Distance** 0.7 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink 0.25  
Humpback 0.25  
**Rockfish**      **Roundfish**      **Selachii**

All Weights are in Kilograms

**Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997**

<b>Date</b>	<b>Apr 16 1997</b>	<b>Time</b>	<b>10 :56</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 39</b>	<b>Haul No.</b>	<b>113</b>
Depth	M 73 86						Direction	252	
Water Temp:	Surface	Bottom					Distance	0.8 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	25808		
Net Effective Opening (feet)	41.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	173.9	230		
Prawn	4.60	140		
Humpback	7.40	190		
Sidestripe	20.50	154		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b>	<b>Apr 15 1997</b>	<b>Time</b>	<b>15 :40</b>	<b>Duration (min)</b>	<b>36</b>	<b>Area</b>	<b>12 - 39</b>	<b>Haul No.</b>	<b>207</b>
Depth	M 66 77						Direction		
Water Temp:	Surface	Bottom					Distance	0.4 Naut. Mi.	
Type of Gear	4P	Total Catch	333	Remark	Usable	Vessel	22995		
Net Effective Opening (feet)	42.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	266.4	400		
Prawn	0.25			
Humpback	19.40			
Sidestripe	0.25			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b>	<b>Apr 15 1997</b>	<b>Time</b>	<b>17 :00</b>	<b>Duration (min)</b>	<b>15</b>	<b>Area</b>	<b>12 - 39</b>	<b>Haul No.</b>	<b>208</b>
Depth	M 68 64						Direction		
Water Temp:	Surface	Bottom					Distance	0.4 Naut. Mi.	
Type of Gear	4P	Total Catch	490	Remark	Usable	Vessel	22995		
Net Effective Opening (feet)	42.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	380.0	400		
Prawn	12.00			
Humpback	67.40			
Sidestripe	0.25			
Bluespot	6.10			
Crangon	6.10			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms



## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 16 1997      **Time** 8 :45      **Duration (min)** 15      **Area** 12 - 39      **Haul No.** 209  
**Depth** M 37 44      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 40      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Humpback      2.50  
Crangons      0.25  
**Rockfish**      **Roundfish**      **Selachii**  
Shiner Perch      16.00

**Date** Apr 16 1997      **Time** 9 :30      **Duration (min)** 30      **Area** 12 - 39      **Haul No.** 210  
**Depth** M 44 44      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 31      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Humpback      3.00  
Crangons      0.25  
**Rockfish**      **Roundfish**      **Selachii**  
Sculpins      3.50

**Date** Apr 16 1997      **Time** 10 :30      **Duration (min)** 30      **Area** 12 - 39      **Haul No.** 211  
**Depth** M 62 69      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 116      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink      0.25  
Prawn      0.25  
Humpback      33.00  
Sidestripe      1.00  
Crangons      0.25  
**Rockfish**      **Roundfish**      **Selachii**

**Date** Apr 16 1997      **Time** 11 :50      **Duration (min)** 30      **Area** 12 - 39      **Haul No.** 212  
**Depth** M 91 101      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 170      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

**Shrimp**      **Weight** **Num/Kg**      **Invertebrates**      **Flatfish**  
Northern (Spiny) Pink      64.00      250  
Prawn      0.25  
Coonstripe      8.00  
Sidestripe      34.00      143  
Crangons      0.25  
**Rockfish**      **Roundfish**      **Selachii**

All Weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 17 1997      **Time** 11 :50      **Duration (min)** 20      **Area** 12 - 39      **Haul No.** 216  
**Depth** M 95 101      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.4 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 82      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	34.20	286		
Prawn	3.40			
Humpback	2.30			
Sidestripe	23.00	155		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 17 1997      **Time** 8 :22      **Duration (min)** 20      **Area** 12 - 40      **Haul No.** 310  
**Depth** M 117 146      **Direction** 30  
**Water Temp:** Surface      Bottom      **Distance** 0.7 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 17      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.25			English Sole 1.00
Prawn	0.45	29		Flathead Sole 4.00
Sidestripe	2.90	88		Rex Sole 0.25
Crangons	0.25			Turbot 1.00
Glass Shrimp	0.25			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>
			Walleye Pollock 0.70	Spotted Ratfish 5.50
			Eelpouts 1.50	
			Pacific Hake 0.10	
			Sculpins 0.25	

**Date** Apr 17 1997      **Time** 10 :02      **Duration (min)** 30      **Area** -12 - 40      **Haul No.** 311  
**Depth** M 123 165      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 12      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.10			English Sole 1.70
Sidestripe	2.00	99		Flathead Sole 2.60
Crangons	0.10			Rex Sole 0.20
Glass Shrimp	0.10			Slender Sole 0.25
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>
			Eulachon 0.25	Spotted Ratfish 3.50
			Walleye Pollock 1.10	
			Eelpouts 1.00	

All Weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

<b>Date</b>	<b>Apr 15 1997</b>	<b>Time</b>	<b>12 : 26</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 40</b>	<b>Haul No.</b>	<b>404</b>
Depth	M 57 59						Direction	78	
Water Temp:	Surface	Bottom					Distance	0.8 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	2.10	333		
Prawn	0.20			
Humpback	1.40			
Sidestripe	0.20	40		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b>	<b>Apr 15 1997</b>	<b>Time</b>	<b>13 : 48</b>	<b>Duration (min)</b>	<b>16</b>	<b>Area</b>	<b>12 - 40</b>	<b>Haul No.</b>	<b>405</b>
Depth	M 60 71						Direction	178	
Water Temp:	Surface	Bottom					Distance	0.7 Naut. Mi.	
Type of Gear	4P	Total Catch	194	Remark	Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	180.7	308		
Prawn	0.80			
Humpback	2.30	67		
Sidestripe	5.50	163		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

<b>Date</b>	<b>Apr 17 1997</b>	<b>Time</b>	<b>8 : 19</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 40</b>	<b>Haul No.</b>	<b>411</b>
Depth	M 115 141						Direction	247	
Water Temp:	Surface	Bottom					Distance	0.9 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.55			
Prawn	0.10			
Humpback	0.40			
Sidestripe	4.70	75		
Crangons	0.30			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 17 1997      **Time** 9 :31      **Duration (min)** 30      **Area** 12 - 40      **Haul No.** 412  
**Depth** M 183 198      **Direction** 202  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.10			
Sidestripe	0.15	80		
Glass Shrimp	0.60			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 17 1997      **Time** 10 :46      **Duration (min)** 23      **Area** 12 - 40      **Haul No.** 413  
**Depth** M 134 123      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.05			
Prawn	0.90	27		
Sidestripe	5.00	75		
Glass Shrimp	0.55			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 16 1997      **Time** 8 :53      **Duration (min)** 10      **Area** 12 - 42      **Haul No.** 305  
**Depth** M 42 44      **Direction** 90  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.90	466		
Humpback	4.90	142		
Flexed Pink	3.30	362		
Crangons	1.10			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 16 1997      **Time** 12 :46      **Duration (min)** 5      **Area** 12 - 42      **Haul No.** 307  
**Depth** M 37 42      **Direction** 90  
**Water Temp:** Surface      **Bottom**      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 46.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	1.60	845		
Humpback	8.20	200		
Flexed Pink	9.00	376		
Crangons	3.10			
Eualus	0.25			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 16 1997      **Time** 14 :27      **Duration (min)** 10      **Area** 12 - 42      **Haul No.** 308  
**Depth** M 53 57      **Direction**      **Distance** 0.3 Naut. Mi.  
**Water Temp:** Surface      **Bottom**      **Vessel** 23460  
**Type of Gear** 4P      **Total Catch** 94      **Remark** Usable  
**Net Effective Opening (feet)** 46.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	31.50	356		English Sole
Humpback	12.40	176		Flathead Sole
Crangons	1.10			Rock Sole
Eualus	0.25			Sand Sole
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>
			Pacific Herring	
			Walleye Pollock	
			Eelpouts	
			Pacific Hake	
			Midshipman	
			Shiner Perch	

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

<b>Date</b>	<b>Apr 16 1997</b>	<b>Time</b>	<b>15 :37</b>	<b>Duration (min)</b>	<b>10</b>	<b>Area</b>	<b>12 - 42</b>	<b>Haul No.</b>	<b>309</b>
Depth	M 57 59						Direction	100	
Water Temp:	Surface	Bottom					Distance	0.3 Naut. Mi.	
Type of Gear	4P	Total Catch	65	Remark	Usable	Vessel	23460		
Net Effective Opening (feet)	46.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Northern (Spiny)	37.10	372				English Sole			
Humpback	4.10	157				Flathead Sole			
Flexed Pink	0.25					Sand Sole			
Crangons	0.25								
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			
Pacific Herring									
Walleye Pollock									
Eelpouts									
Sculpins									
Shiner Perch									

<b>Date</b>	<b>Apr 15 1997</b>	<b>Time</b>	<b>17 :57</b>	<b>Duration (min)</b>	<b>8</b>	<b>Area</b>	<b>12 - 42</b>	<b>Haul No.</b>	<b>406</b>
Depth	M 48 55						Direction		
Water Temp:	Surface	Bottom					Distance	0.2 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Northern (Spiny)	1.50	163							
Prawn	0.25								
Coonstripe	0.25	120							
Humpback	21.00	129							
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

<b>Date</b>	<b>Apr 16 1997</b>	<b>Time</b>	<b>8 :58</b>	<b>Duration (min)</b>	<b>10</b>	<b>Area</b>	<b>12 - 42</b>	<b>Haul No.</b>	<b>407</b>
Depth	M 35 37						Direction	113	
Water Temp:	Surface	Bottom					Distance	0.3 Naut. Mi.	
Type of Gear	4P	Total Catch		Remark	Usable	Vessel	28752		
Net Effective Opening (feet)	42.0								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>			
Northern (Spiny)	2.30	240							
Humpback	3.50	125							
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>			

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, April 1997

**Date** Apr 16 1997      **Time** 10 :07      **Duration (min)** 10      **Area** 12 - 42      **Haul No.** 408  
**Depth** M 42 44      **Direction** 143  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny)	0.70	625		
Humpback	10.50	220		
Flexed Pink	1.80			
Crangons	2.50			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 16 1997      **Time** 11 :50      **Duration (min)** 10      **Area** 12 - 42      **Haul No.** 409  
**Depth** M 51 54      **Direction** 66  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny)	10.80	331		
Coonstripe	6.20			
Humpback	11.80	158		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Apr 16 1997      **Time** 14 :35      **Duration (min)** 10      **Area** 12 - 42      **Haul No.** 410  
**Depth** M 60 68      **Direction** 160  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch**      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny)	102.6	233		
Humpback	8.90	154		
Crangonidae	6.20			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Appendix 2

## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

Date	Apr 9 1997	Set Time	17 :28	Duration (hrs)	17.32	Area	12 - 26	Haul No.	31
Depth	M 129	Water Temp:	Surface	Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel			3
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Prawn	1.25	61	49			
2	4.572	M	Northern Pink	0.25	35	140			
3	9.144	M	Northern Pink	0.25	51	204			
4	18.288	M	Northern Pink	0.10	19	190			
5	54.864	M	Northern Pink	0.15	31	207			
6	91.44	M	Northern Pink	0.15	31	207			

Date	Apr 9 1997	Set Time	17 :40	Duration (hrs)	16.67	Area	12 - 26	Haul No.	32
Depth	M 98	Water Temp:	Surface	Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel			3
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		1				
1	0	M	Humpback	0.05	11	220			
1	0	M	Prawn	1.53	60	39			
2	4.572	M	Northern Pink	0.50	114	228			
3	9.144	M	Northern Pink	0.80	237	296			
4	18.288	M	Northern Pink	0.95	308	324			
5	54.864	M	Northern Pink	1.20	466	388			
6	91.44	M	Northern Pink	1.55	544	351			

Date	Apr 10 1997	Set Time	10 :35	Duration (hrs)	6.58	Area	12 - 26	Haul No.	33
Depth	M 99	Water Temp:	Surface	Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel			3
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink	0.05	10	200			
1	0	M	Humpback	0.30	51	170			
1	0	M	Prawn	0.30	12	40			
2	4.572	M	Northern Pink	0.01	4	400			
3	9.144	M	Northern Pink	0.50	268	536			
4	18.288	M	Northern Pink	0.67	309	461			
5	54.864	M	Nothing		0				
6	91.44	M	Nothing		0				

All weights are in Kilograms



## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

Date	Apr 10 1997	Set Time	11 :05	Duration (hrs)	6.25	Area	12 - 26	Haul No.	34
Depth	M 125	Water Temp:	Surface	Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink	0.25	98	392			
1	0	M	Sidestripe		1				
1	0	M	Humpback	0.01	2	200			
1	0	M	Prawn	1.80	87	48			
2	4.572	M	Northern Pink	0.30	105	350			
3	9.144	M	Northern Pink	1.30	463	356			
4	18.288	M	Northern Pink	3.60	1,375	382			
5	64.008	M	Nothing		0				
6	109.728	M	Nothing		0				

Date	Apr 10 1997	Set Time	17 :55	Duration (hrs)	15.08	Area	12 - 26	Haul No.	35
Depth	M 198	Water Temp:	Surface	Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		1				
1	0	M	Sidestripe	0.01	3	300			
1	0	M	Prawn	0.15	7	47			
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Northern Pink		2				
5	36.576	M	Northern Pink		5				
6	54.864	M	Northern Pink		4				
7	91.44	M	Northern Pink		10				
8	128.016	M	Northern Pink		33				
9	164.592	M	Northern Pink		170				
10	182.88	M	Northern Pink		180				

Date	Apr 11 1997	Set Time	8 :40	Duration (hrs)	4.33	Area	12 - 26	Haul No.	36
Depth	M 123	Water Temp:	Surface	Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink	0.27	82	304			
1	0	M	Humpback	0.03	5	167			
1	0	M	Prawn	1.55	74	48			
2	4.572	M	Northern Pink	0.42	146	348			
3	9.144	M	Northern Pink	2.22	838	377			
4	18.288	M	Northern Pink	3.51	1,391	396			
5	36.576	M	Northern Pink	0.70	290	414			
6	54.864	M	Nothing		0				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

Date	Apr 11 1997	Set Time	9 :40	Duration (hrs)	3.58	Area	12 - 26	Haul No.	37
Depth	M 97	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink	0.10	24	240			
1	0	M	Humpback	0.05	9	180			
1	0	M	Prawn	0.30	13	43			
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Nothing		0				
5	36.576	M	Nothing		0				
6	54.864	M	Nothing		0				

Date	Apr 14 1997	Set Time	12 :55	Duration (hrs)	3.75	Area	12 - 26	Haul No.	45
Depth	M 118	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		4				
1	0	M	Prawn		1				
2	4.572	M	Nothing		0				
3	9.144	M	Northern Pink		2				
4	18.288	M	Northern Pink		4				
5	36.576	M	Nothing		0				
6	54.864	M	Nothing		0				

Date	Apr 14 1997	Set Time	13 :25	Duration (hrs)	4.00	Area	12 - 26	Haul No.	46
Depth	M 140	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		1				
1	0	M	Prawn	1.80	70	39			
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Nothing		0				
5	36.576	M	Nothing		0				
6	54.864	M	Nothing		0				
7	73.152	M	Nothing		0				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

Date	Apr 14 1997	Set Time	16 :50	Duration (hrs)	18.83	Area	12 - 26	Haul No.	49
Depth	M 120	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		45				
1	0	M	Sidestripe		5				
1	0	M	Humpback		2				
1	0	M	Prawn		21				
2	4.572	M	Northern Pink		41				
3	9.144	M	Northern Pink		115				
4	18.288	M	Northern Pink		118				
5	36.576	M	Northern Pink		81				
6	54.864	M	Nothing		0				

Date	Apr 14 1997	Set Time	18 :15	Duration (hrs)	15.17	Area	12 - 26	Haul No.	50
Depth	M 104	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	4.572	M	Northern Pink		109				
2	9.144	M	Northern Pink		265				
3	18.288	M	Northern Pink		375				
4	36.576	M	Northern Pink		155				
5	54.864	M	Northern Pink		125				
6	73.152	M	Northern Pink		97				

Date	Apr 14 1997	Set Time	18 :35	Duration (hrs)	14.25	Area	12 - 26	Haul No.	51
Depth	M 93	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		1				
1	0	M	Humpback		13				
1	0	M	Prawn		49				
2	4.572	M	Northern Pink		94				
3	9.144	M	Northern Pink		139				
4	18.288	M	Northern Pink		107				
5	36.576	M	Northern Pink		92				
6	54.864	M	Northern Pink		123				
7	73.152	M	Northern Pink		71				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

Date	Apr 15 1997	Set Time	9 :30	Duration (hrs)	3.50	Area	12 - 26	Haul No.	52	
Depth M	101	Water Temp: Surface		Bottom						
Type of Gear	G6	Total Catch	Remark	Usable	Vessel		3			
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg				
1	0	M	Northern Pink		91					
1	0	M	Sidestripe		1					
1	0	M	Humpback		9					
1	0	M	Prawn		19					
2	9.144	M	Northern Pink		150					
3	18.288	M	Northern Pink		248					
4	27.432	M	Northern Pink		2					
5	36.576	M	Nothing		0					
6	45.72	M	Nothing		0					
7	54.864	M	Nothing		0					
8	73.152	M	Nothing		0					

Date	Apr 15 1997	Set Time	9 :50	Duration (hrs)	3.42	Area	12 - 26	Haul No.	53	
Depth M	88	Water Temp: Surface		Bottom						
Type of Gear	G6	Total Catch	Remark	Usable	Vessel		3			
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg				
1	0	M	Northern Pink		6					
1	0	M	Humpback		22					
1	0	M	Prawn		15					
2	9.144	M	Nothing		0					
3	18.288	M	Nothing		0					
4	27.432	M	Nothing		0					
5	36.576	M	Nothing		0					
6	45.72	M	Nothing		0					
7	54.864	M	Nothing		0					
8	73.152	M	Nothing		0					

Date	Apr 12 1997	Set Time	13 :45	Duration (hrs)	2.50	Area	12 - 39	Haul No.	41	
Depth M	80	Water Temp: Surface		Bottom						
Type of Gear	G6	Total Catch	Remark	Usable	Vessel		3			
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg				
1	0	M	Flexed Pink		4					
1	0	M	Northern Pink		32					
1	0	M	Humpback	0.25	30	120				
1	0	M	Prawn		5					
2	4.572	M	Nothing		0					
3	9.144	M	Nothing		0					
4	18.288	M	Nothing		0					
5	36.576	M	Nothing		0					
6	54.864	M	Nothing		0					

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

Date	Apr 12 1997	Set Time	14 :25	Duration (hrs)	20.75	Area	12 - 39	Haul No.	42
Depth	M 70	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Flexed Pink		1				
1	0	M	Smooth Pink		1				
1	0	M	Northern Pink		58				
1	0	M	Humpback		3				
1	0	M	Prawn		20				
2	4.572	M	Smooth Pink		1				
2	4.572	M	Northern Pink		14				
3	9.144	M	Northern Pink		4				
4	18.288	M	Northern Pink		22				
5	36.576	M	Northern Pink		2				
6	54.864	M	Northern Pink		1				

Date	Apr 12 1997	Set Time	15 :30	Duration (hrs)	18.33	Area	12 - 39	Haul No.	43
Depth	M 80	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Coonstripe		1				
1	0	M	Humpback		1				
1	0	M	Prawn	0.95	40	42			
2	9.144	M	Northern Pink		3				
3	18.288	M	Northern Pink		7				
4	36.576	M	Northern Pink		9				
5	54.864	M	Smooth Pink		2				
5	54.864	M	Northern Pink		17				

Date	Apr 12 1997	Set Time	16 :20	Duration (hrs)	17.33	Area	12 - 39	Haul No.	44
Depth	M 84	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		7				
1	0	M	Humpback	0.10	7	70			
2	4.572	M	Flexed Pink		2				
2	4.572	M	Northern Pink		106				
3	18.288	M	Flexed Pink		6				
3	18.288	M	Northern Pink		220				
4	36.576	M	Flexed Pink		3				
4	36.576	M	Northern Pink		222				
5	54.864	M	Northern Pink		206				
6	73.152	M	Northern Pink		200				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

<b>Date</b>	<b>Apr 11 1997</b>	<b>Set Time</b>	<b>19 :40</b>	<b>Duration (hrs)</b>	<b>13.00</b>	<b>Area</b>	<b>12 - 40</b>	<b>Haul No.</b>	<b>39</b>
<b>Depth M</b>	<b>64</b>	<b>Water Temp: Surface</b>		<b>Bottom</b>					
<b>Type of Gear</b>	<b>G6</b>	<b>Total Catch</b>		<b>Remark</b>	<b>Usable</b>	<b>Vessel</b>		<b>3</b>	
<b>Trap Number</b>	<b>Height off Bottom</b>	<b>Height Unit</b>	<b>Species</b>	<b>Weight</b>	<b>Number Caught</b>	<b>Num/Kg</b>			
1	0	M	Northern Pink	0.02	10	500			
1	0	M	Humpback	0.25	19	76			
2	4.572	M	Northern Pink	0.22	59	268			
3	9.144	M	Northern Pink	0.46	124	270			
4	18.288	M	Northern Pink	0.93	225	242			
5	36.576	M	Northern Pink	1.00	257	257			
6	54.864	M	Flexed Pink		1				
6	54.864	M	Northern Pink	0.72	192	267			

<b>Date</b>	<b>Apr 12 1997</b>	<b>Set Time</b>	<b>9 :10</b>	<b>Duration (hrs)</b>	<b>2.75</b>	<b>Area</b>	<b>12 - 40</b>	<b>Haul No.</b>	<b>40</b>
<b>Depth M</b>	<b>63</b>	<b>Water Temp: Surface</b>		<b>Bottom</b>					
<b>Type of Gear</b>	<b>G6</b>	<b>Total Catch</b>		<b>Remark</b>	<b>Usable</b>	<b>Vessel</b>		<b>3</b>	
<b>Trap Number</b>	<b>Height off Bottom</b>	<b>Height Unit</b>	<b>Species</b>	<b>Weight</b>	<b>Number Caught</b>	<b>Num/Kg</b>			
1	0	M	Northern Pink	0.35	89	254			
1	0	M	Humpback		2				
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Nothing		0				
5	36.576	M	Nothing		0				
6	54.864	M	Nothing		0				

<b>Date</b>	<b>Apr 16 1997</b>	<b>Set Time</b>	<b>8 :25</b>	<b>Duration (hrs)</b>	<b>4.83</b>	<b>Area</b>	<b>12 - 42</b>	<b>Haul No.</b>	<b>54</b>
<b>Depth M</b>	<b>30</b>	<b>Water Temp: Surface</b>		<b>Bottom</b>					
<b>Type of Gear</b>	<b>G6</b>	<b>Total Catch</b>		<b>Remark</b>	<b>Usable</b>	<b>Vessel</b>		<b>3</b>	
<b>Trap Number</b>	<b>Height off Bottom</b>	<b>Height Unit</b>	<b>Species</b>	<b>Weight</b>	<b>Number Caught</b>	<b>Num/Kg</b>			
1	0	M	Flexed Pink		6				
1	0	M	Coonstripe		5				
1	0	M	Humpback		138				
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Nothing		0				
5	27.432	M	Nothing		0				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, April 1997

Date	Apr 16 1997	Set Time	8 :35	Duration (hrs)	4.83	Area	12 - 42	Haul No.	55
Depth	M 41	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		1				
1	0	M	Flexed Pink		14				
1	0	M	Coonstripe		1				
1	0	M	Humpback		26				
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Nothing		0				
5	27.432	M	Nothing		0				
6	36.576	M	Nothing		0				

Date	Apr 16 1997	Set Time	8 :45	Duration (hrs)	4.75	Area	12 - 42	Haul No.	56
Depth	M 55	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		1				
1	0	M	Humpback		129				
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Nothing		0				
5	27.432	M	Nothing		0				
6	36.576	M	Nothing		0				

Date	Apr 16 1997	Set Time	8 :50	Duration (hrs)	4.83	Area	12 - 42	Haul No.	57
Depth	M 60	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Northern Pink		7				
1	0	M	Humpback		64				
2	4.572	M	Nothing		0				
3	9.144	M	Nothing		0				
4	18.288	M	Nothing		0				
5	27.432	M	Nothing		0				
6	36.576	M	Nothing		0				
7	45.72	M	Nothing		0				

All weights are in Kilograms

## Appendix 3

## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 9 1997	Set Time	16 :25	Duration (hrs)	20.50	Area	12 - 26	Haul No.	1
Depth	M 210	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Sidestripe	0.07	5	71	6	Sidestripe		12	
1	Prawn	0.10	4	40	6	Prawn		7	
2	Sidestripe		1		6	Northern Pink		1	
2	Prawn		1		7	Sidestripe		6	
2	Northern Pink		1		7	Prawn		4	
3	Sidestripe		6		7	Northern Pink		2	
3	Prawn		2		8	Sidestripe		5	
4	Sidestripe		7		8	Prawn		8	
4	Prawn		1		8	Northern Pink		1	
4	Northern Pink		1		9	Sidestripe		6	
5	Prawn		1		9	Prawn		24	
					9	Northern Pink		1	
					10	Sidestripe		16	
					10	Prawn		6	
					10	Northern Pink		1	

Date	Apr 9 1997	Set Time	16 :42	Duration (hrs)	20.63	Area	12 - 26	Haul No.	2
Depth	M 48	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		12		6	Prawn		12	
1	Northern Pink		4		7	Prawn		16	
2	Prawn		25		8	Prawn		24	
2	Northern Pink		1		9	Prawn		42	
3	Prawn		38		10	Prawn		21	
4	Prawn		32						
5	Prawn		6						
5	Northern Pink		1						

All weights are in Kilograms



## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 9 1997	Set Time	16 :55	Duration (hrs)	20.83	Area	12 - 26	Haul No.	3
Depth	M 116	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel			3
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		12		6	Humpback		2	
1	Prawn		35		6	Prawn		51	
1	Northern Pink		2		6	Northern Pink		2	
2	Humpback		3		7	Humpback		3	
2	Prawn		36		7	Prawn		26	
2	Northern Pink		9		7	Northern Pink		1	
3	Humpback		5		8	Prawn		44	
3	Prawn		52		8	Northern Pink		1	
3	Northern Pink		6		9	Prawn		28	
4	Humpback		5		10	Humpback		2	
4	Prawn		58		10	Prawn		38	
4	Northern Pink		4						
5	Humpback		17						
5	Prawn		34						
5	Northern Pink		1						

Date	Apr 9 1997	Set Time	17 :07	Duration (hrs)	21.05	Area	12 - 26	Haul No.	4
Depth	M 48	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel			3
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		23		6	Prawn		16	
2	Prawn		6		7	Humpback		5	
3	Humpback		1		7	Prawn		13	
3	Prawn		16		7	Northern Pink		21	
3	Northern Pink		7		8	Humpback		8	
4	Prawn		26		8	Prawn		12	
5	Humpback		3		8	Northern Pink		10	
5	Prawn		24		9	Humpback		11	
5	Northern Pink		10		9	Prawn		17	
					10	Prawn		32	

Date	Apr 10 1997	Set Time	8 :45	Duration (hrs)	6.17	Area	12 - 26	Haul No.	5
Depth	M 38	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch	0	Remark	Usable	Vessel			3
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Nothing		0		6	Nothing		0	
2	Nothing		0		7	Nothing		0	
3	Nothing		0		8	Nothing		0	
4	Nothing		0		9	Nothing		0	
5	Nothing		0		10	Nothing		0	

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 10 1997	Set Time	9 :00	Duration (hrs)	6.33	Area	12 - 26	Haul No.	6
Depth M	98	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Northern Pink		4		6	Humpback		43	
1	Humpback		20		6	Prawn		51	
1	Prawn		53		6	Northern Pink		3	
2	Prawn		61		7	Humpback		26	
2	Humpback		18		7	Prawn		62	
2	Northern Pink		11		7	Northern Pink		19	
3	Humpback		23		8	Humpback		32	
3	Prawn		76		8	Prawn		71	
3	Sidestripe		1		8	Northern Pink		12	
3	Northern Pink		11		9	Humpback		33	
4	Northern Pink		6		9	Prawn		45	
4	Prawn		105		9	Northern Pink		13	
4	Humpback		25		10	Humpback		25	
5	Northern Pink		3		10	Prawn		72	
5	Humpback		19		10	Northern Pink		3	
5	Prawn		88						

Date	Apr 10 1997	Set Time	9 :15	Duration (hrs)	6.50	Area	12 - 26	Haul No.	7
Depth M	101	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		87		6	Humpback		20	
1	Northern Pink		10		6	Prawn		77	
1	Sidestripe		1		6	Northern Pink		3	
1	Humpback		25		7	Humpback		17	
2	Northern Pink		10		7	Prawn		44	
2	Prawn		41		7	Northern Pink		6	
2	Humpback		12		8	Humpback		7	
3	Prawn		44		8	Prawn		38	
3	Humpback		5		8	Northern Pink		6	
3	Northern Pink		14		9	Humpback		15	
4	Humpback		5		9	Prawn		84	
4	Prawn		44		10	Humpback		8	
4	Northern Pink		11		10	Prawn		82	
5	Northern Pink		6						
5	Humpback		17						
5	Prawn		42						

All weights are in Kilograms

**Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997**

<b>Date</b>	<b>Apr 10 1997</b>	<b>Set Time</b>	<b>9 :30</b>	<b>Duration (hrs)</b>	<b>6.67</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>8</b>
<b>Depth</b>	<b>M 46</b>	<b>Water Temp:</b>		<b>Surface</b>	<b>Bottom</b>				
<b>Type of Gear</b>	<b>A1</b>	<b>Total Catch</b>		<b>Remark</b>	<b>Usable</b>	<b>Vessel</b>	<b>3</b>		
<b>Trap Number</b>	<b>Species</b>	<b>Weight</b>	<b>Number Caught</b>	<b>Num/Kg</b>	<b>Trap Number</b>	<b>Species</b>	<b>Weight</b>	<b>Number Caught</b>	<b>Num/Kg</b>
1	Nothing		0		6	Nothing		0	
2	Nothing		0		7	Nothing		0	
3	Nothing		0		8	Nothing		0	
4	Nothing		0		9	Nothing		0	
5	Nothing		0		10	Prawn	0.80	41	51

<b>Date</b>	<b>Apr 14 1997</b>	<b>Set Time</b>	<b>12 :35</b>	<b>Duration (hrs)</b>	<b>22.58</b>	<b>Area</b>	<b>12 - 26</b>	<b>Haul No.</b>	<b>18</b>
<b>Depth</b>	<b>M 67</b>	<b>Water Temp:</b>		<b>Surface</b>	<b>Bottom</b>				
<b>Type of Gear</b>	<b>A1</b>	<b>Total Catch</b>		<b>Remark</b>	<b>Usable</b>	<b>Vessel</b>	<b>3</b>		
<b>Trap Number</b>	<b>Species</b>	<b>Weight</b>	<b>Number Caught</b>	<b>Num/Kg</b>	<b>Trap Number</b>	<b>Species</b>	<b>Weight</b>	<b>Number Caught</b>	<b>Num/Kg</b>
1	Humpback		10		6	Humpback		2	
1	Prawn		23		6	Prawn		22	
2	Humpback		2		6	Northern Pink		8	
2	Prawn		23		7	Humpback		18	
3	Humpback		2		7	Prawn		5	
3	Prawn		16		7	Northern Pink		1	
4	Humpback		13		8	Humpback		2	
4	Prawn		25		8	Prawn		19	
5	Humpback		13		8	Northern Pink		9	
5	Prawn		10		9	Humpback		7	
5	Northern Pink		1		9	Prawn		20	
					9	Northern Pink		1	
					10	Sidestripe		1	
					10	Humpback		5	
					10	Prawn		40	

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 12 1997	Set Time	13 :40	Duration (hrs)	20.17	Area	12 - 39	Haul No.	13
Depth	M 65	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		49		6	Humpback		40	
1	Northern Pink		3		6	Prawn		17	
2	Humpback		35		6	Northern Pink		8	
2	Prawn		1		7	Humpback		37	
2	Northern Pink		1		7	Prawn		5	
3	Humpback		39		7	Northern Pink		14	
3	Northern Pink		13		8	Humpback		18	
4	Humpback		38		8	Prawn		1	
4	Prawn		1		8	Northern Pink		8	
4	Northern Pink		4		9	Humpback		58	
5	Humpback		33		9	Northern Pink		19	
5	Coonstripe		3		10	Humpback		17	
5	Prawn		21		10	Prawn		1	
5	Northern Pink		8		10	Northern Pink		26	

Date	Apr 12 1997	Set Time	14 :00	Duration (hrs)	20.33	Area	12 - 39	Haul No.	14
Depth	M 41	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		11		6	Humpback		6	
1	Northern Pink		18		6	Northern Pink		1	
2	Humpback		20		7	Humpback		11	
2	Northern Pink		8		7	Northern Pink		10	
3	Humpback		8		8	Northern Pink		2	
3	Northern Pink		7		9	Nothing		0	
4	Humpback		4		10	Nothing		0	
4	Northern Pink		5						
5	Humpback		14						
5	Northern Pink		13						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 12 1997	Set Time	14 : 20	Duration (hrs)	20.50	Area	12 - 39	Haul No.	15
Depth	M 66	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Sidestripe		1		6	Prawn		3	
1	Northern Pink		4		6	Sidestripe		2	
2	Humpback		4		6	Northern Pink		4	
2	Northern Pink		1		6	Humpback		4	
3	Humpback		5		7	Northern Pink		7	
4	Humpback		6		7	Prawn		19	
4	Prawn		10		7	Humpback		12	
4	Northern Pink		9		8	Northern Pink		9	
5	Northern Pink		4		8	Prawn		2	
					8	Humpback		1	
					9	Sidestripe		2	
					9	Humpback		10	
					9	Prawn		9	
					9	Northern Pink		4	
					10	Humpback		8	
					10	Sidestripe		1	
					10	Northern Pink		15	
					10	Prawn		2	

Date	Apr 12 1997	Set Time	15 : 10	Duration (hrs)	20.75	Area	12 - 39	Haul No.	16
Depth	M 86	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Sidestripe		1		6	Prawn		31	
1	Prawn		13		7	Sidestripe		1	
1	Smooth Pink		1		7	Humpback		1	
2	Prawn		23		7	Prawn		14	
2	Northern Pink		2		8	Sidestripe		1	
3	Humpback		1		8	Prawn		42	
3	Prawn		37		9	Prawn		33	
4	Sidestripe		1		10	Prawn		13	
4	Prawn		3						
4	Smooth Pink		1						
4	Northern Pink		1						
5	Sidestripe		1						
5	Prawn		31						
5	Smooth Pink		1						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 12 1997	Set Time	15 :50	Duration (hrs)	17.00	Area	12 - 39	Haul No.	17
Depth M	65	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		4		6	Humpback		50	
2	Humpback		20		7	Humpback		3	
3	Humpback		41		8	Humpback		18	
3	Prawn		2		9	Nothing		0	
4	Humpback		36		10	Humpback		48	
5	Humpback		1						

Date	Apr 11 1997	Set Time	18 :35	Duration (hrs)	14.08	Area	12 - 40	Haul No.	9
Depth M	148	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Sidestripe		2		6	Sidestripe		1	
2	Sidestripe		1		7	Nothing		0	
3	Sidestripe		1		8	Nothing		0	
4	Prawn		1		9	Nothing		0	
5	Prawn		3		10	Nothing		0	

Date	Apr 11 1997	Set Time	19 :20	Duration (hrs)	14.50	Area	12 - 40	Haul No.	10
Depth M	77	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		21		6	Humpback		18	
1	Prawn		31		6	Prawn		52	
1	Northern Pink		17		6	Northern Pink		43	
2	Humpback		18		7	Humpback		5	
2	Prawn		11		7	Prawn		39	
2	Northern Pink		4		7	Northern Pink		17	
3	Humpback		14		8	Humpback		7	
3	Prawn		25		8	Prawn		53	
3	Northern Pink		35		8	Northern Pink		17	
4	Humpback		35		9	Humpback		1	
4	Prawn		29		9	Prawn		35	
4	Northern Pink		20		9	Northern Pink		2	
5	Humpback		18		10	Humpback		11	
5	Prawn		50		10	Prawn		63	
5	Northern Pink		41		10	Northern Pink		9	

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 11 1997	Set Time	19 :20	Duration (hrs)	13.58	Area	12 - 40	Haul No.	11
Depth	M 77	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback	0.90	60	67	6	Humpback	0.53	41	77
1	Prawn		15		6	Prawn		1	
1	Northern Pink		3		6	Northern Pink		29	
2	Humpback	1.20	87	72	7	Humpback	1.05	77	73
2	Prawn		12		7	Northern Pink		31	
2	Northern Pink		7		8	Humpback	0.55	35	64
3	Humpback	1.45	103	71	8	Prawn		1	
3	Prawn		4		8	Northern Pink		10	
3	Northern Pink		5		9	Humpback	0.78	59	76
4	Humpback	0.73	51	70	9	Prawn		3	
4	Northern Pink		15		9	Northern Pink		37	
5	Humpback	1.46	95	65	10	Humpback	0.65	49	75
5	Northern Pink		8		10	Prawn		1	
					10	Northern Pink		40	

Date	Apr 12 1997	Set Time	9 :25	Duration (hrs)	2.17	Area	12 - 40	Haul No.	12
Depth	M 40	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		1		6	Nothing		0	
2	Humpback		2		7	Nothing		0	
3	Humpback		1		8	Nothing		0	
4	Humpback		1		9	Nothing		0	
5	Humpback		1		10	Nothing		0	

Date	Apr 15 1997	Set Time	19 :25	Duration (hrs)	13.83	Area	12 - 42	Haul No.	19
Depth	M 38	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		6		6	Coonstripe		1	
2	Humpback		15		6	Prawn		15	
2	Prawn		1		7	Humpback		2	
3	Humpback		6		7	Coonstripe		5	
3	Prawn		5		7	Prawn		4	
4	Humpback		1		8	Coonstripe		8	
5	Nothing		0		8	Prawn		26	
					9	Coonstripe		2	
					9	Prawn		9	
					10	Coonstripe		1	
					10	Prawn		9	

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, April 1997

Date	Apr 15 1997	Set Time	19 :40	Duration (hrs)	14.08	Area	12 - 42	Haul No.	20
Depth	M 58	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		16		6	Humpback		8	
2	Humpback		28		7	Prawn		1	
2	Northern Pink		1		8	Humpback		2	
3	Humpback		15		9	Humpback		6	
4	Humpback		8		10	Nothing		0	
5	Humpback		8						

Date	Apr 16 1997	Set Time	10 :30	Duration (hrs)	1.83	Area	12 - 42	Haul No.	21
Depth	M 48	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		1		6	Coonstripe		1	
2	Prawn		7		7	Humpback		1	
3	Prawn		1		7	Prawn		2	
4	Humpback		2		8	Humpback		1	
4	Coonstripe		1		8	Prawn		1	
4	Prawn		6		9	Humpback		5	
5	Humpback		1		10	Humpback		25	
5	Prawn		7						

All weights are in Kilograms



## Appendix 4

## Trawl Summary, Area 12, November, 1997

There were 48 Tows.

Total Weight for all tows, 3,743 Kg.

		Weight in Kg	Percent of Total	Number of Tows
<b>Shrimp Species</b>				
Northern (Spiny) Pink	<i>Pandalus borealis eous</i>	849.30	22.6915	46
Smooth Pink	<i>Pandalus jordani</i>	18.05	0.4823	19
Prawn	<i>Pandalus platyceros</i>	22.51	0.6014	28
Coonstripe	<i>Pandalus danae</i>	4.85	0.1296	9
Humpback	<i>Pandalus hypsinotus</i>	111.01	2.9660	31
Sidestripe	<i>Pandalopsis dispar</i>	216.75	5.7911	43
Flexed Pink	<i>Pandalus goniurus</i>	16.45	0.4395	7
Crangons	<i>Crangon spp</i>	2.15	0.0574	17
Spiny Side Shrimp	<i>Lebbeus groenlandicus</i>	0.10	0.0027	2
Heptacarpus kincaidi	<i>Heptacarpus kincaidi</i>	0.45	0.0120	9
Glass Shrimp	<i>Pasiphaea pacifica</i>	0.05	0.0013	1
<b>Flatfish</b>				
Pacific Halibut	<i>Hippoglossus stenolepis</i>	19.25	0.5143	1
<b>Roundfish</b>				
Eulachon	<i>Thaleichthys pacificus</i>	0.15	0.0040	3

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 11 1997      **Time** 13 :25      **Duration (min)** 30      **Area** 12 - 6      **Haul No.** 401  
**Depth** M 165 183      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 42      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.10	70		
Smooth Pink	0.20	100		
Prawn	0.05			
Sidestripe	0.80	85		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 9 :40      **Duration (min)** 10      **Area** 12 - 7      **Haul No.** 101  
**Depth** M 108 110      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 24      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.50			
Smooth Pink	0.60			
Prawn	0.05			
Sidestripe	2.10	114		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 10 :32      **Duration (min)** 30      **Area** 12 - 7      **Haul No.** 102  
**Depth** M 101 104      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 42      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.10			
Smooth Pink	0.80			
Prawn	0.05			
Sidestripe	6.60	98		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>
			Eulachon	0.05

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 11 1997      **Time** 12 :05      **Duration (min)** 20      **Area** 12 - 7      **Haul No.** 103  
**Depth** M 108 112      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 73      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.10			
Smooth Pink	2.70	231		
Prawn	0.70			
Humpback	0.05			
Sidestripe	5.30	100		
Crangons	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 14 :20      **Duration (min)** 35      **Area** 12 - 7      **Haul No.** 104  
**Depth** M 113 113      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 48      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.05			
Smooth Pink	4.70	257		
Prawn	0.05			
Sidestripe	6.90	104		
Crangons	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 10 :58      **Duration (min)** 38      **Area** 12 - 7      **Haul No.** 201  
**Depth** M 106 107      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 102      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	5.90	220		Pacific Halibut 19.25
Smooth Pink	1.40			
Sidestripe	16.30	109		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 11 1997      **Time** 12 :52      **Duration (min)** 22      **Area** 12 - 7      **Haul No.** 202  
**Depth** M 139 140      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.4 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 74      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.25	124		
Smooth Pink	0.90	220		
Sidestripe	3.40	115		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 13 :56      **Duration (min)** 24      **Area** 12 - 7      **Haul No.** 203  
**Depth** M 128 132      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 64      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.70	250		
Sidestripe	5.50	94		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 15 :17      **Duration (min)** 15      **Area** 12 - 7      **Haul No.** 204  
**Depth** M 137 183      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.4 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 19      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Sidestripe	0.20	135		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 16 :22      **Duration (min)** 18      **Area** 12 - 7      **Haul No.** 205  
**Depth** M 106 110      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 32      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.18	150		
Sidestripe	1.30	87		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

	<b>Date</b>	Nov	12	1997	<b>Time</b>	8	:	24
	<b>Duration (min)</b>	20	<b>Area</b>	12	-	7		<b>Haul No.</b>
								206
<b>Depth M</b>	137	177			<b>Direction</b>			
<b>Water Temp:</b>	Surface	Bottom			<b>Distance</b>	0.5	Naut. Mi.	
<b>Type of Gear</b>	4P	<b>Total Catch</b>	6	<b>Remark</b>	Usable	<b>Vessel</b>	22995	
<b>Net Effective Opening (feet)</b>	42.0							
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>		
Northern (Spiny) Pink	0.05							
Sidestripe	0.30	110						
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>		
<b>Date</b>		<b>Nov</b>	12	<b>1997</b>	<b>Time</b>	9	:	
<b>30</b>		<b>Duration (min)</b>	17	<b>Area</b>	12	-		<b>7</b>
<b>Haul No.</b>			207					
<b>Depth M</b>	165	183			<b>Direction</b>			
<b>Water Temp:</b>	Surface	Bottom			<b>Distance</b>	0.5	Naut. Mi.	
<b>Type of Gear</b>	4P	<b>Total Catch</b>	43	<b>Remark</b>	Usable	<b>Vessel</b>	22995	
<b>Net Effective Opening (feet)</b>	42.0							
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>		
Northern (Spiny) Pink	0.05							
Smooth Pink	0.05							
Sidestripe	1.20	130						
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>		
<b>Date</b>	Nov 12	1997	<b>Time</b>	11 :00	<b>Duration (min)</b>	31	<b>Area</b>	12 - 7
<b>Depth M</b>	130	135					<b>Direction</b>	
<b>Water Temp:</b>	Surface	Bottom					<b>Distance</b>	0.3 Naut. Mi.
<b>Type of Gear</b>	4P	<b>Total Catch</b>	87	<b>Remark</b>	Usable	<b>Vessel</b>	22995	
<b>Net Effective Opening (feet)</b>	42.0							
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>		
Northern (Spiny) Pink	0.40	286						
Smooth Pink	0.60	256						
Prawn	0.05							
Sidestripe	4.00	125						
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>		
				Eulachon	0.05			
<b>Date</b>		<b>Nov</b>	12	<b>1997</b>	<b>Time</b>	12	:	<b>37</b>
<b>Duration (min)</b>		<b>16</b>	<b>Area</b>	12	-	7		<b>Haul No.</b>
<b>Depth M</b>								<b>210</b>
<b>Water Temp:</b>	Surface	Bottom			<b>Direction</b>			
<b>Type of Gear</b>	4P	<b>Total Catch</b>	116	<b>Remark</b>	Usable	<b>Vessel</b>	22995	
<b>Net Effective Opening (feet)</b>	42.0							
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>		<b>Flatfish</b>		
Northern (Spiny) Pink	16.60	232						
Prawn	2.80	60						
Humpback	2.40	128						
Sidestripe	11.50	116						
<b>Rockfish</b>				<b>Roundfish</b>		<b>Selachii</b>		

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 11 1997      **Time** 9 :25      **Duration (min)** 30      **Area** 12 - 7      **Haul No.** 301  
**Depth** M 110 110      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 200      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	4.30	270		
Smooth Pink	3.00	190		
Prawn	0.05			
Humpback	0.05			
Sidestripe	34.40	87		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 12 :40      **Duration (min)** 22      **Area** 12 - 7      **Haul No.** 302  
**Depth** M 128 128      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.6 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 90      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.05			
Smooth Pink	0.20	240		
Sidestripe	4.20	91		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 11 1997      **Time** 16 :20      **Duration (min)** 30      **Area** 12 - 7      **Haul No.** 402  
**Depth** M 165 170      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 17      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.10	90		
Smooth Pink	0.20	115		
Prawn	0.05			
Sidestripe	0.40	83		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 12 1997      **Time** 11 :25      **Duration (min)** 30      **Area** 12 - 7      **Haul No.** 404  
**Depth** M 124 132      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 21      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.20	220		
Smooth Pink	0.20	270		
Prawn	0.05			
Sidestripe	1.90	104		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 13 1997      **Time** 9 :17      **Duration (min)** 34      **Area** 12 - 26      **Haul No.** 109  
**Depth** M 99 106      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 138      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	21.40	310		
Humpback	0.05			
Sidestripe	4.90	111		
Crangons	0.05			
Heptacarpus kincaidi	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 13 1997      **Time** 10 :47      **Duration (min)** 32      **Area** 12 - 26      **Haul No.** 110  
**Depth** M 95 102      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 71      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	5.90	312		
Smooth Pink	0.70			
Humpback	0.05			
Sidestripe	1.70	119		
Crangons	0.05			
Heptacarpus kincaidi	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 12 1997      **Time** 16 :27      **Duration (min)** 10      **Area** 12 - 26      **Haul No.** 211  
**Depth** M 110 119      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 28      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	10.50	204		
Prawn	0.81	51		
Humpback	0.91	152		
Sidestripe	1.55	195		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 13 1997      **Time** 9 :06      **Duration (min)** 15      **Area** 12 - 26      **Haul No.** 212  
**Depth** M 60 77      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 147      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	30.90	214		
Prawn	7.70	54		
Humpback	5.60	90		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 13 1997      **Time** 10 :57      **Duration (min)** 31      **Area** 12 - 26      **Haul No.** 213  
**Depth** M 174 220      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 2      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.13	200		
Humpback	0.20	135		
Sidestripe	0.15	153		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms



## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 13 1997      **Time** 12 :39      **Duration (min)** 31      **Area** 12 - 26      **Haul No.** 215  
**Depth** M 115 150      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 14      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	2.00	357		
Smooth Pink	0.05			
Prawn	0.35	27		
Sidestripe	3.00	333		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>
			Eulachon	0.05

**Date** Nov 13 1997      **Time** 13 :40      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 216  
**Depth** M 88 130      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.7 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 10      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	1.19	333		
Prawn	0.20			
Humpback	0.05			
Sidestripe	2.00	122		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 13 1997      **Time** 15 :16      **Duration (min)** 20      **Area** 12 - 26      **Haul No.** 217  
**Depth** M 201 251      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.7 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 9      **Remark** Usable      **Vessel** 22995  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.15	327		
Humpback	0.05			
Sidestripe	0.15	140		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 13 1997      **Time** 9:06      **Duration (min)** 15      **Area** 12 - 26      **Haul No.** 308  
**Depth** M 64 69      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 50      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	21.90	182		
Coonstripe	0.05			
Humpback	0.70	118		
Sidestripe	0.50	222		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 13 1997      **Time** 10:31      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 309  
**Depth** M 97 110      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.7 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 86      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	33.60	273		
Prawn	0.05			
Coonstripe	0.05			
Humpback	0.40			
Sidestripe	11.10	333		
Crangons	0.90			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 12 1997      **Time** 16:25      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 405  
**Depth** M 82 124      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 41      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	17.40	224		
Prawn	0.20	90		
Humpback	1.00	223		
Sidestripe	7.00	148		
Crangons	0.50			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 13 1997      **Time** 12 : 23      **Duration (min)** 30      **Area** 12 - 26      **Haul No.** 406  
**Depth** M 155 166      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 33      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	3.10	318		
Prawn	0.30	53		
Humpback	0.30	143		
Sidestripe	9.30	153		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 13 1997      **Time** 15 : 20      **Duration (min)** 15      **Area** 12 - 26      **Haul No.** 407  
**Depth** M 102 108      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 29      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	19.20	298		
Prawn	0.05			
Humpback	0.20	205		
Sidestripe	4.00	145		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 14 1997      **Time** 8 : 45      **Duration (min)** 15      **Area** 12 - 26      **Haul No.** 408  
**Depth** M 82 99      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 46      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	28.20	315		
Prawn	0.05			
Humpback	0.50	140		
Sidestripe	8.40	100		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 12 1997      **Time** 8 :38      **Duration (min)** 33      **Area** 12 - 39      **Haul No.** 105  
**Depth** M 46 49      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 467      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	69.10	288		
Humpback	14.50			
Flexed Pink	5.50			
Crangons	0.05			
Heptacarpus kincaidi	0.05			

**Rockfish**      **Roundfish**      **Selachii**

**Date** Nov 12 1997      **Time** 10 :55      **Duration (min)** 20      **Area** 12 - 39      **Haul No.** 106  
**Depth** M 66 73      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 196      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	73.80	401		
Prawn	1.60			
Coonstripe	3.30			
Humpback	10.70	145		
Sidestripe	1.60			
Flexed Pink	3.30			
Crangons	0.05			
Spiny Side Shrimp	0.05			
Heptacarpus kincaidi	0.05			

**Rockfish**      **Roundfish**      **Selachii**

**Date** Nov 12 1997      **Time** 11 : 42      **Duration (min)** 35      **Area** 12 - 39      **Haul No.** 107  
**Depth** M 57 77      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 182      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	100.0	389		
Prawn	5.90			
Coonstripe	1.20			
Humpback	15.30	127		
Sidestripe	1.20			
Flexed Pink	2.40			
Crangons	0.05			
Spiny Side Shrimp	0.05			
Heptacarpus kincaidi	0.05			

**Rockfish**      **Roundfish**      **Selachii**

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 12 1997      **Time** 13 :35      **Duration (min)** 15      **Area** 12 - 39      **Haul No.** 108  
**Depth** M 42 44      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.4 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 85      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	30.90	313		
Humpback	3.00			
Flexed Pink	5.10	324		
Crangons	0.05			
Heptacarpus kincaidi	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 12 1997      **Time** 8 :31      **Duration (min)** 25      **Area** 12 - 39      **Haul No.** 303  
**Depth** M 49 59      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.6 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 283      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	1.30	222		
Humpback	1.30	95		
Sidestripe	3.80	69		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 12 1997      **Time** 11 :25      **Duration (min)** 15      **Area** 12 - 39      **Haul No.** 305  
**Depth** M 77 77      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 69      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	4.00	250		
Prawn	0.05			
Coonstripe	0.05			
Humpback	0.90	118		
Sidestripe	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 12 1997      **Time** 12 : 21      **Duration (min)** 15      **Area** 12 - 39      **Haul No.** 306  
**Depth** M 73 79      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 62      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	21.20	286		
Smooth Pink	0.05			
Prawn	0.05			
Coonstripe	0.05			
Humpback	4.60	143		
Sidestripe	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 12 1997      **Time** 13 : 30      **Duration (min)** 25      **Area** 12 - 39      **Haul No.** 307  
**Depth** M 40 73      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.6 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 354      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	299.8	200		
Prawn	0.05			
Coonstripe	0.05			
Humpback	42.00	111		
Flexed Pink	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 12 1997      **Time** 9 : 03      **Duration (min)** 30      **Area** 12 - 39      **Haul No.** 403  
**Depth** M 141 152      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 16      **Remark** Usable      **Vessel** 28752  
**Net Effective Opening (feet)** 42.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.10	230		
Prawn	0.30	37		
Humpback	0.10	400		
Sidestripe	8.00	128		
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 14 1997      **Time** 8 : 14      **Duration (min)** 17      **Area** 12 - 40      **Haul No.** 111  
**Depth** M 53 60      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.5 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 59      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	10.10	374		
Humpback	4.20	123		
Crangons	0.05			
Heptacarpus kincaidi	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 14 1997      **Time** 9 : 27      **Duration (min)** 34      **Area** 12 - 40      **Haul No.** 112  
**Depth** M 117 139      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 43      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	1.70			
Smooth Pink	0.60			
Prawn	0.60			
Humpback	1.10			
Sidestripe	12.90	106		
Crangons	0.05			
Heptacarpus kincaidi	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 14 1997      **Time** 10 : 33      **Duration (min)** 32      **Area** 12 - 40      **Haul No.** 113  
**Depth** M 121 177      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.9 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 45      **Remark** Usable      **Vessel** 25808  
**Net Effective Opening (feet)** 41.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.50			
Smooth Pink	0.80			
Prawn	0.30			
Coonstripe	0.05			
Humpback	0.50			
Sidestripe	14.80	89		
Crangons	0.05			
Heptacarpus kincaidi	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

## Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997

**Date** Nov 13 1997      **Time** 16 :20      **Duration (min)** 30      **Area** 12 - 40      **Haul No.** 310  
**Depth** M 117 166      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 21      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.50	288		
Coonstripe	0.05			
Humpback	0.05			
Sidestripe	6.50	79		
Crangons	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 14 1997      **Time** 8 :08      **Duration (min)** 25      **Area** 12 - 40      **Haul No.** 311  
**Depth** M 59 73      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.3 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 26      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	10.80	300		
Humpback	0.20	140		
Sidestripe	0.60	104		
Flexed Pink	0.05			
Crangons	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

**Date** Nov 14 1997      **Time** 9 :30      **Duration (min)** 30      **Area** 12 - 40      **Haul No.** 312  
**Depth** M 117 146      **Direction**  
**Water Temp:** Surface      Bottom      **Distance** 0.8 Naut. Mi.  
**Type of Gear** 4P      **Total Catch** 44      **Remark** Usable      **Vessel** 23460  
**Net Effective Opening (feet)** 44.0

<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>	<b>Invertebrates</b>	<b>Flatfish</b>
Northern (Spiny) Pink	0.30	353		
Smooth Pink	0.30	217		
Prawn	0.05			
Humpback	0.05			
Sidestripe	6.00	94		
Flexed Pink	0.05			
Crangons	0.05			
<b>Rockfish</b>			<b>Roundfish</b>	<b>Selachii</b>

All weights are in Kilograms



**Shrimp Biomass Survey, Detailed Trawls of Area 12, November 1997**

<b>Date</b>	<b>Nov 14 1997</b>	<b>Time</b>	<b>10 :48</b>	<b>Duration (min)</b>	<b>30</b>	<b>Area</b>	<b>12 - 40</b>	<b>Haul No.</b>	<b>313</b>
<b>Depth</b>	<b>M 135 165</b>						<b>Direction</b>		
<b>Water Temp:</b>	<b>Surface</b>		<b>Bottom</b>				<b>Distance</b>	<b>0.7 Naut. Mi.</b>	
<b>Type of Gear</b>	<b>4P</b>	<b>Total Catch</b>	<b>24</b>	<b>Remark</b>	<b>Usable</b>	<b>Vessel</b>	<b>23460</b>		
<b>Net Effective Opening (feet)</b>	<b>44.0</b>								
<b>Shrimp</b>	<b>Weight</b>	<b>Num/Kg</b>		<b>Invertebrates</b>			<b>Flatfish</b>		
<b>Sidestripe</b>	<b>1.20</b>	<b>104</b>							
<b>Crangons</b>	<b>0.05</b>								
<b>Glass Shrimp</b>	<b>0.05</b>								
<b>Rockfish</b>				<b>Roundfish</b>			<b>Selachii</b>		

All weights are in Kilograms

## Appendix 5

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

Date	Nov 11 1997	Set Time	9 :30	Duration (hrs)	5.17	Area	12 - 7	Haul No.	63
Depth M	109	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		14				
1	0	M	Prawn		2				
1	0	M	Smooth Pink		13				
1	0	M	Northern Pink		2				
2	5	M	Smooth Pink		9				
3	10	M	Smooth Pink		4				
4	20	M	Nothing		0				
5	30	M	Nothing		0				
6	40	M	Nothing		0				
7	50	M	Nothing		0				

Date	Nov 11 1997	Set Time	9 :40	Duration (hrs)	5.33	Area	12 - 7	Haul No.	64
Depth M	106	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Crangons		1				
1	0	M	Prawn		18				
1	0	M	Humpback		2				
1	0	M	Northern Pink		6				
2	5	M	Nothing		0				
3	10	M	Nothing		0				
4	20	M	Nothing		0				
5	30	M	Nothing		0				
6	40	M	Nothing		0				
7	50	M	Nothing		0				

Date	Nov 11 1997	Set Time	12 :50	Duration (hrs)	4.58	Area	12 - 7	Haul No.	65
Depth M	107	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		1				
1	0	M	Smooth Pink		35				
2	5	M	Smooth Pink		4				
3	10	M	Nothing		0				
4	20	M	Smooth Pink		3				
5	30	M	Smooth Pink		6				
6	40	M	Nothing		0				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

Date	Nov 11 1997	Set Time	13 :30	Duration (hrs)	2.67	Area	12 - 7	Haul No.	66
Depth	M 123	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		6				
1	0	M	Prawn		2				
1	0	M	Smooth Pink		39				
2	10	M	Smooth Pink		1				
3	20	M	Nothing		0				
4	30	M	Nothing		0				
5	40	M	Nothing		0				
6	50	M	Nothing		0				

Date	Nov 12 1997	Set Time	8 :30	Duration (hrs)	5.00	Area	12 - 7	Haul No.	67
Depth	M 126	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		24				
1	0	M	Northern Pink		24				
2	5	M	Northern Pink		4				
3	10	M	Northern Pink		16				
4	20	M	Northern Pink		1				
5	30	M	Nothing		0				
6	40	M	Nothing		0				

Date	Nov 12 1997	Set Time	9 :50	Duration (hrs)	4.33	Area	12 - 7	Haul No.	68
Depth	M 128	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Smooth Pink		7				
1	0	M	Northern Pink		6				
2	5	M	Smooth Pink		5				
3	10	M	Smooth Pink		1				
4	20	M	Nothing		0				
5	30	M	Nothing		0				
6	40	M	Nothing		0				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

Date	Nov 12 1997	Set Time	9 : 50	Duration (hrs)	4.92	Area	12 - 7	Haul No.	69
Depth	M 148	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		11				
1	0	M	Sidestripe		1				
1	0	M	Smooth Pink		7				
1	0	M	Northern Pink		9				
2	5	M	Eualus		5				
3	10	M	Smooth Pink		8				
4	20	M	Northern Pink		2				
5	30	M	Nothing		0				
6	40	M	Nothing		0				

Date	Nov 12 1997	Set Time	10 : 45	Duration (hrs)	4.83	Area	12 - 7	Haul No.	70
Depth	M 160	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		10				
1	0	M	Smooth Pink		4				
1	0	M	Northern Pink		5				
2	5	M	Smooth Pink		2				
4	20	M	Northern Pink		1				
5	30	M	Nothing		0				
6	40	M	Nothing		0				

Date	Nov 7 1997	Set Time	11 : 40	Duration (hrs)	5.83	Area	12 - 26	Haul No.	51
Depth	M 51	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Prawn		7				
1	0	M	Humpback		143				
2	5	M	Northern Pink		0				
3	10	M	Northern Pink		7				
4	36.576	M	Northern Pink		0				
5	54.864	M	Northern Pink		1				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

Date	Nov 7 1997	Set Time	11 :50	Duration (hrs)	5.50	Area	12 - 26	Haul No.	52
Depth	M 79	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Prawn		7				
1	0	M	Humpback		148				
1	0	M	Northern Pink		1				
2	5	M	Northern Pink		8				
3	10	M	Northern Pink		22				
4	20	M	Northern Pink		17				
5	30	M	Northern Pink		0				
6	40	M	Northern Pink		5				

Date	Nov 7 1997	Set Time	12 :05	Duration (hrs)	5.17	Area	12 - 26	Haul No.	53
Depth	M 98	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		1				
1	0	M	Prawn		16				
1	0	M	Humpback		131				
1	0	M	Northern Pink		3				
2	5	M	Humpback		2				
2	5	M	Northern Pink		4				
3	10	M	Northern Pink		0				
4	20	M	Northern Pink		32				
5	30	M	Northern Pink		3				
6	40	M	Northern Pink		1				
7	50	M	Northern Pink		0				

Date	Nov 8 1997	Set Time	8 :40	Duration (hrs)	5.92	Area	12 - 26	Haul No.	54
Depth	M 47	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Humpback		49				
1	0	M	Coonstripe		1				
2	5	M	Humpback		11				
3	10	M	Northern Pink		0				
4	20	M	Northern Pink		0				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

Date	Nov 8 1997	Set Time	8 :50	Duration (hrs)	6.00	Area	12 - 26	Haul No.	55
Depth M	100	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Prawn		22				
1	0	M	Humpback		163				
1	0	M	Northern Pink		7				
2	5	M	Northern Pink		0				
3	10	M	Northern Pink		4				
4	20	M	Northern Pink		0				
5	30	M	Northern Pink		0				
6	40	M	Northern Pink		0				
7	50	M	Northern Pink		0				

Date	Nov 8 1997	Set Time	8 :55	Duration (hrs)	6.08	Area	12 - 26	Haul No.	56
Depth M	57	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Prawn		8				
1	0	M	Humpback		80				
1	0	M	Northern Pink		2				
2	5	M	Northern Pink		0				
3	10	M	Northern Pink		0				
4	20	M	Northern Pink		0				
5	30	M	Northern Pink		0				

Date	Nov 8 1997	Set Time	9 :00	Duration (hrs)	5.75	Area	12 - 26	Haul No.	57
Depth M	114	Water Temp: Surface		Bottom					
Type of Gear	G6	Total Catch	Remark	Usable		Vessel		3	
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Eualus		2				
1	0	M	Prawn		30				
1	0	M	Humpback		99				
1	0	M	Northern Pink		6				
2	5	M	Northern Pink		35				
3	10	M	Northern Pink		95				
4	20	M	Northern Pink		138				
5	30	M	Northern Pink		3				
6	40	M	Northern Pink		1				
7	50	M	Northern Pink		0				

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

**Date** Nov 13 1997 **Set Time** 8 :55 **Duration (hrs)** 6.25 **Area** 12 - 26 **Haul No.** 71  
**Depth** M 50 **Water Temp:** Surface Bottom  
**Type of Gear** G6 **Total Catch** **Remark** **Usable** **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Nothing		0	
2	5	M	Nothing		0	
3	10	M	Nothing		0	
4	20	M	Nothing		0	

**Date** Nov 13 1997 **Set Time** 9 :05 **Duration (hrs)** 6.17 **Area** 12 - 26 **Haul No.** 72  
**Depth** M 69 **Water Temp:** Surface Bottom  
**Type of Gear** G6 **Total Catch** **Remark** **Usable** **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Prawn		12	
1	0	M	Humpback		156	
1	0	M	Northern Pink		2	
2	5	M	Humpback		10	
3	10	M	Nothing		0	
4	20	M	Nothing		0	
5	30	M	Northern Pink		2	
6	40	M	Nothing		0	

**Date** Nov 13 1997 **Set Time** 9 :15 **Duration (hrs)** 6.17 **Area** 12 - 26 **Haul No.** 73  
**Depth** M 101 **Water Temp:** Surface Bottom  
**Type of Gear** G6 **Total Catch** **Remark** **Usable** **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Eualus		1	
1	0	M	Prawn		31	
1	0	M	Humpback		160	
1	0	M	Northern Pink		3	
2	5	M	Humpback		1	
2	5	M	Northern Pink		7	
3	10	M	Northern Pink		53	
4	20	M	Northern Pink		33	
5	30	M	Nothing		0	
6	40	M	Nothing		0	

All weights are in Kilograms

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

**Date** Nov 13 1997 **Set Time** 10 :15 **Duration (hrs)** 3.67 **Area** 12 - 26 **Haul No.** 74

**Depth** M 101 **Water Temp:** Surface Bottom

**Type of Gear** G6 **Total Catch** **Remark** **Usable** **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Eualus		1	
1	0	M	Humpback		47	
2	5	M	Smooth Pink		3	
2	5	M	Northern Pink		2	
3	10	M	Northern Pink		2	
4	20	M	Smooth Pink		1	
4	20	M	Northern Pink		2	
5	30	M	Nothing		0	
6	40	M	Nothing		0	

**Date** Nov 9 1997 **Set Time** 8 :40 **Duration (hrs)** 6.08 **Area** 12 - 39 **Haul No.** 58

**Depth** M 51 **Water Temp:** Surface Bottom

**Type of Gear** G6 **Total Catch** **Remark** **Usable** **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Flexed Pink		33	
1	0	M	Coonstripe		40	
2	5	M	Northern Pink		0	
3	10	M	Northern Pink		0	
4	20	M	Northern Pink		0	

**Date** Nov 9 1997 **Set Time** 9 :00 **Duration (hrs)** 5.33 **Area** 12 - 39 **Haul No.** 59

**Depth** M 80 **Water Temp:** Surface Bottom

**Type of Gear** G6 **Total Catch** **Remark** **Usable** **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Prawn		16	
1	0	M	Humpback		89	
2	5	M	Prawn		15	
2	5	M	Humpback		69	
3	10	M	Coonstripe		1	
4	20	M	Northern Pink		0	
5	30	M	Northern Pink		0	
6	40	M	Northern Pink		0	

**Date** Nov 9 1997 **Set Time** 9 :40 **Duration (hrs)** 5.67 **Area** 12 - 39 **Haul No.** 60

**Depth** M 53 **Water Temp:** Surface Bottom

**Type of Gear** G6 **Total Catch** **Remark** **Usable** **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Humpback		18	
2	5	M	Northern Pink		0	
3	10	M	Northern Pink		0	
4	20	M	Northern Pink		0	

All weights are in Kilograms



## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

**Date** Nov 9 1997 **Set Time** 9 :45 **Duration (hrs)** 5.67 **Area** 12 - 39 **Haul No.** 61

**Depth** M 70 **Water Temp:** Surface Bottom

**Type of Gear** G6 **Total Catch** **Remark** Usable **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Smooth Pink		15	
2	5	M	Smooth Pink		4	
3	10	M	Nothing		0	
4	20	M	Nothing		0	
5	30	M	Nothing		0	

**Date** Nov 9 1997 **Set Time** 10 :00 **Duration (hrs)** 5.67 **Area** 12 - 39 **Haul No.** 62

**Depth** M 62 **Water Temp:** Surface Bottom

**Type of Gear** G6 **Total Catch** **Remark** Usable **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Smooth Pink		4	
1	0	M	Humpback		1	
2	5	M	Nothing		0	
3	10	M	Nothing		0	
4	20	M	Nothing		0	
5	30	M	Nothing		0	

**Date** Nov 14 1997 **Set Time** 8 :45 **Duration (hrs)** 2.25 **Area** 12 - 40 **Haul No.** 75

**Depth** M 70 **Water Temp:** Surface Bottom

**Type of Gear** G6 **Total Catch** **Remark** Usable **Vessel** 3

Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg
1	0	M	Prawn		1	
1	0	M	Humpback		38	
1	0	M	Flexed Pink		1	
1	0	M	Northern Pink		21	
2	5	M	Nothing		0	
3	10	M	Nothing		0	
4	20	M	Nothing		0	
5	30	M	Nothing		0	

## Shrimp Biomass Survey, Vertical Traps in Area 12, November 1997

Date	Nov 14 1997	Set Time	9 :30	Duration (hrs)	2.42	Area	12 - 40	Haul No.	76
Depth	M 120	Water Temp:		Surface	Bottom				
Type of Gear	G6	Total Catch		Remark	Usable	Vessel	3		
Trap Number	Height off Bottom	Height Unit	Species	Weight	Number Caught	Num/Kg			
1	0	M	Prawn		3				
1	0	M	Smooth Pink		3				
1	0	M	Humpback		1				
1	0	M	Coonstripe		1				
1	0	M	Northern Pink		6				
2	5	M	Smooth Pink		1				
2	5	M	Northern Pink		2				
3	10	M	Nothing		0				
4	20	M	Nothing		0				
5	30	M	Nothing		0				

All weights are in Kilograms

## Appendix 6

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 11 1997	Set Time	9 : 10	Duration (hrs)	5.17	Area	12 - 7	Haul No.	16
Depth	M 108	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel			3
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		11						
1	Smooth Pink		1						
1	Northern Pink		4						
2	Prawn		24						
2	Northern Pink		7						
3	Prawn		15						
3	Northern Pink		10						
4	Prawn		63						
4	Northern Pink		2						
5	Prawn		28						
5	Northern Pink		1						

Date	Nov 11 1997	Set Time	10 : 00	Duration (hrs)	5.25	Area	12 - 7	Haul No.	17
Depth	M 124	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel			3
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Sidestripe		1						
1	Northern Pink		3						
1	Prawn		1						
1	Smooth Pink		3						
2	Northern Pink		9						
2	Smooth Pink		4						
3	Smooth Pink		4						
3	Northern Pink		6						
3	Sidestripe		5						
4	Northern Pink		5						
4	Smooth Pink		2						
4	Prawn		2						
4	Sidestripe		2						
5	Prawn		2						
5	Sidestripe		1						
5	Northern Pink		9						
5	Smooth Pink		4						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 11 1997	Set Time	10 :45	Duration (hrs)	4.83	Area	12 - 7	Haul No.	18
Depth	M 80	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		2						
1	Prawn		8						
1	Smooth Pink		7						
1	Northern Pink		1						
2	Prawn		7						
2	Smooth Pink		2						
3	Humpback		1						
3	Prawn		4						
3	Smooth Pink		6						
4	Prawn		9						
4	Smooth Pink		1						
5	Prawn		3						

Date	Nov 11 1997	Set Time	13 :20	Duration (hrs)	3.58	Area	12 - 7	Haul No.	19
Depth	M 118	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Smooth Pink		16						
2	Sidestripe		2						
2	Prawn		1						
2	Smooth Pink		15						
3	Sidestripe		1						
3	Smooth Pink		25						
4	Prawn		1						
4	Smooth Pink		4						
5	Sidestripe		1						
5	Prawn		2						
5	Smooth Pink		34						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 12 1997	Set Time	9 :30	Duration (hrs)	4.92	Area	12 - 7	Haul No.	20
Depth M	124	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Eualus		1						
1	Northern Pink		1						
2	Sidestripe		4						
2	Smooth Pink		5						
2	Northern Pink		5						
3	Sidestripe		1						
3	Smooth Pink		6						
3	Northern Pink		4						
4	Smooth Pink		5						
4	Northern Pink		1						
5	Sidestripe		2						
5	Prawn		1						
5	Smooth Pink		11						
5	Northern Pink		5						

Date	Nov 12 1997	Set Time	11 :20	Duration (hrs)	5.00	Area	12 - 7	Haul No.	21
Depth M	143	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Eualus		1						
1	Prawn		1						
1	Northern Pink		2						
2	Nothing		0						
3	Nothing		0						
4	Nothing		0						
5	Nothing		0						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 7 1997	Set Time	13 :40	Duration (hrs)	20.08	Area	12 - 26	Haul No.	1
Depth	M 48	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark		Usable	Vessel	3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		24						
1	Prawn		21						
1	Northern Pink		1						
2	Eualus		1						
2	Humpback		41						
2	Prawn		14						
3	Humpback		12						
3	Prawn		14						
4	Eualus		2						
4	Humpback		34						
4	Prawn		25						
4	Northern Pink		1						
5	Eualus		13						
5	Humpback		16						
5	Prawn		22						

Date	Nov 7 1997	Set Time	14 :00	Duration (hrs)	20.08	Area	12 - 26	Haul No.	2
Depth	M 77	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark		Usable	Vessel	3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		3						
1	Humpback		17						
2	Northern Pink		5						
2	Prawn		1						
2	Humpback		28						
3	Northern Pink		4						
3	Prawn		11						
3	Humpback		28						
4	Eualus		4						
4	Northern Pink		1						
4	Humpback		40						
4	Prawn		9						
5	Humpback		59						
5	Northern Pink		7						
5	Eualus		6						
5	Prawn		11						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 7 1997	Set Time	14 :15	Duration (hrs)	20.25	Area	12 - 26	Haul No.	3
Depth	M 100	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Eualus		9						
1	Northern Pink		6						
1	Prawn		7						
1	Humpback		50						
2	Humpback		33						
2	Prawn		7						
3	Humpback		30						
3	Northern Pink		3						
3	Eualus		3						
3	Prawn		2						
4	Northern Pink		5						
4	Prawn		2						
4	Humpback		32						
4	Eualus		1						
5	Northern Pink		1						
5	Humpback		22						
5	Eualus		2						
5	Prawn		8						

Date	Nov 7 1997	Set Time	14 :20	Duration (hrs)	20.67	Area	12 - 26	Haul No.	4
Depth	M 100	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		35						
1	Northern Pink		1						
1	Prawn		6						
1	Eualus		16						
2	Northern Pink		13						
2	Eualus		5						
2	Prawn		9						
2	Humpback		53						
3	Northern Pink		8						
3	Prawn		2						
3	Humpback		42						
3	Eualus		2						
4	Humpback		23						
4	Prawn		2						
4	Northern Pink		6						
4	Eualus		25						
5	Humpback		50						
5	Eualus		7						
5	Northern Pink		3						
5	Prawn		2						

All weights are in Kilograms

**Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997**

Date	Nov 7 1997	Set Time	14 :35	Duration (hrs)	20.92	Area	12 - 26	Haul No.	5
Depth	M 114	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		39						
1	Northern Pink		9						
1	Prawn		16						
1	Eualus		9						
2	Northern Pink		14						
2	Eualus		14						
2	Prawn		10						
2	Humpback		41						
3	Northern Pink		2						
3	Prawn		10						
3	Humpback		50						
3	Eualus		4						
4	Humpback		45						
4	Prawn		14						
4	Northern Pink		13						
4	Eualus		28						
5	Humpback		54						
5	Eualus		12						
5	Northern Pink		10						
5	Prawn		9						

Date	Nov 7 1997	Set Time	14 :50	Duration (hrs)	20.92	Area	12 - 26	Haul No.	6
Depth	M 108	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		3						
1	Prawn		42						
2	Bluespot		3						
2	Yellowleg		5						
2	Humpback		11						
2	Prawn		39						
2	Northern Pink		3						
3	Yellowleg		3						
3	Humpback		1						
3	Prawn		17						
4	Humpback		4						
4	Prawn		33						
5	Humpback		5						
5	Prawn		32						

All weights are in Kilograms



## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 7 1997	Set Time	15 :05	Duration (hrs)	23.08	Area	12 - 26	Haul No.	7
Depth	M 74	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		1						
1	Prawn		40						
2	Eualus		1						
2	Spiny Side		1						
2	Prawn		19						
3	Prawn		3						
4	Prawn		25						
5	Humpback		1						
5	Prawn		18						

Date	Nov 7 1997	Set Time	15 :40	Duration (hrs)	21.83	Area	12 - 26	Haul No.	8
Depth	M 116	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Sidestripe		16						
2	Eualus		1						
2	Sidestripe		44						
2	Humpback		4						
2	Prawn		2						
3	Eualus		2						
3	Sidestripe		66						
3	Humpback		1						
3	Prawn		2						
3	Northern Pink		1						
4	Eualus		3						
4	Sidestripe		36						
4	Humpback		2						
4	Northern Pink		3						

Date	Nov 7 1997	Set Time	16 :00	Duration (hrs)	21.17	Area	12 - 26	Haul No.	9
Depth	M 38	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		10						
2	Coonstripe		2						
2	Prawn		35						
2	Smooth Pink		9						
3	Humpback		8						
3	Prawn		29						
4	Prawn		48						
4	Northern Pink		2						
5	Humpback		10						
5	Prawn		42						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 13 1997	Set Time	11 :15	Duration (hrs)	4.83	Area	12 - 26	Haul No.	22
Depth	M 59	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		2						
1	Prawn		17						
1	Northern Pink		1						
2	Humpback		29						
2	Prawn		57						
2	Northern Pink		15						
3	Humpback		27						
3	Prawn		23						
3	Northern Pink		11						
4	Humpback		14						
4	Prawn		24						
5	Humpback		4						
5	Prawn		3						

Date	Nov 8 1997	Set Time	16 :40	Duration (hrs)	17.58	Area	12 - 39	Haul No.	10
Depth	M 74	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Northern Pink		4						
1	Smooth Pink		1						
1	Humpback		17						
1	Prawn		3						
1	Sidestripe		2						
2	Sidestripe		2						
2	Northern Pink		7						
2	Smooth Pink		2						
2	Prawn		3						
2	Humpback		17						
3	Sidestripe		1						
3	Northern Pink		15						
3	Humpback		30						
3	Prawn		10						
3	Smooth Pink		2						
4	Northern Pink		11						
4	Smooth Pink		4						
4	Prawn		5						
4	Eualus		3						
4	Humpback		23						
4	Sidestripe		5						
5	Smooth Pink		1						
5	Northern Pink		20						
5	Humpback		50						
5	Sidestripe		2						
5	Prawn		9						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 8 1997	Set Time	17:05	Duration (hrs)	17.58	Area	12 - 39	Haul No.	11
Depth	M 43	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Flexed Pink		2						
1	Humpback		20						
1	Coonstripe		1						
1	Prawn		1						
2	Humpback		40						
2	Prawn		2						
2	Smooth Pink		1						
3	Flexed Pink		1						
3	Humpback		19						
3	Coonstripe		1						
3	Northern Pink		2						
4	Humpback		6						

Date	Nov 8 1997	Set Time	17:25	Duration (hrs)	18.00	Area	12 - 39	Haul No.	12
Depth	M 63	Water Temp: Surface		Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Northern Pink		3						
1	Prawn		22						
1	Coonstripe		1						
1	Humpback		15						
1	Eualus		2						
2	Coonstripe		4						
2	Northern Pink		4						
2	Eualus		1						
2	Flexed Pink		1						
2	Humpback		53						
2	Prawn		22						
3	Prawn		27						
3	Northern Pink		4						
3	Coonstripe		2						
3	Humpback		27						
3	Eualus		4						
4	Coonstripe		4						
4	Humpback		29						
4	Eualus		1						
4	Prawn		31						
4	Northern Pink		2						
5	Humpback		17						
5	Prawn		27						
5	Eualus		1						
5	Northern Pink		5						
5	Coonstripe		2						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 8 1997	Set Time	17 :40	Duration (hrs)	18.08	Area	12 - 39	Haul No.	13
Depth	M 40	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		0						
2	Humpback		2						
2	Coonstripe		1						
3	Humpback		4						
3	Coonstripe		5						
3	Prawn		1						
4	Humpback		1						
4	Coonstripe		8						
5	Coonstripe		2						

Date	Nov 8 1997	Set Time	17 :55	Duration (hrs)	19.17	Area	12 - 39	Haul No.	14
Depth	M 64	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Coonstripe		1						
1	Prawn		6						
1	Humpback		51						
2	Northern Pink		1						
2	Prawn		10						
2	Humpback		32						
3	Northern Pink		2						
3	Prawn		9						
3	Humpback		66						
4	Eualus		3						
4	Northern Pink		2						
4	Humpback		113						
4	Prawn		35						
4	Coonstripe		2						
5	Prawn		11						
5	Humpback		67						
5	Eualus		1						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 8 1997	Set Time	18 :20	Duration (hrs)	19.58	Area	12 - 39	Haul No.	15
Depth	M 74	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Sidestripe		6						
1	Humpback		2						
1	Prawn		2						
1	Northern Pink		1						
2	Sidestripe		2						
2	Humpback		7						
2	Northern Pink		2						
3	Sidestripe		3						
3	Humpback		2						
3	Northern Pink		1						
4	Sidestripe		2						
4	Prawn		1						
4	Northern Pink		1						
5	Humpback		0						

Date	Nov 14 1997	Set Time	8 :25	Duration (hrs)	2.25	Area	12 - 40	Haul No.	23
Depth	M 43	Water Temp:	Surface	Bottom					
Type of Gear	A1	Total Catch		Remark	Usable	Vessel		3	
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		36						
2	Humpback		23						
3	Humpback		5						
4	Humpback		10						
5	Humpback		8						

All weights are in Kilograms

## Shrimp Biomass Survey, Horizontal Traps in Area 12, November 1997

Date	Nov 14 1997	Set Time	9 :00	Duration (hrs)	2.25	Area	12 - 40	Haul No.	24
Depth	M 98	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Humpback		9						
1	Northern Pink		2						
1	Prawn		35						
2	Humpback		21						
2	Northern Pink		13						
2	Prawn		16						
3	Prawn		9						
3	Humpback		11						
3	Sidestripe		1						
3	Northern Pink		21						
4	Northern Pink		24						
4	Prawn		18						
4	Humpback		13						
4	Sidestripe		3						
5	Northern Pink		15						
5	Humpback		32						
5	Prawn		27						

Date	Nov 14 1997	Set Time	9 :20	Duration (hrs)	2.33	Area	12 - 40	Haul No.	25
Depth	M 127	Water Temp:		Surface	Bottom				
Type of Gear	A1	Total Catch	Remark	Usable	Vessel		3		
Trap Number	Species	Weight	Number Caught	Num/Kg	Trap Number	Species	Weight	Number Caught	Num/Kg
1	Prawn		2						
1	Humpback		1						
1	Northern Pink		9						
1	Smooth Pink		8						
2	Northern Pink		6						
2	Smooth Pink		1						
2	Prawn		3						
3	Prawn		3						
4	Sidestripe		1						
4	Northern Pink		1						
4	Prawn		3						
4	Smooth Pink		1						
5	Prawn		4						
5	Smooth Pink		4						
5	Humpback		1						
5	Northern Pink		4						

All weights are in Kilograms