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**Sentinel Surveys 1995-2007: Catch per  
Unit Effort in NAFO Subdivision 3Ps**

**Relevés sentinelles 1995-2007 –  
Prises par unité d'effort dans la  
sous-division 3Ps de l'OPANO**

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## **ABSTRACT**

Sentinel enterprises continued to collect catch rate and biological information on inshore 3Ps cod resources in 2006 and 2007. Gillnet catch rates (weekly average number of fish per net) in the most recent years remained low compared to 1996-98 catch rates. Catch rates in small mesh gillnet remained low. Length frequencies of cod caught in small mesh gillnet showed fewer fish at the two size modes (36-44 cm and 52-56 cm) than this gear catches since 2000. Linetrawl catch rates (weekly average number of fish per 1000 hooks) increased from 2000 and showed an increase in the number of fish at the 44-54 cm size range from 2002 to 2004. In 2005, linetrawl catch rates declined, but increased in 2006 and preliminary results indicate linetrawl catch rates remain high in 2007.

## **RÉSUMÉ**

L'entreprise Sentinel a continué de collecter les données relatives au taux de prise ainsi que les données biologiques concernant les ressources côtières de morue de la subdivision 3P en 2006 et 2007. Les taux de prise au filet maillant (nombre moyen hebdomadaire de poissons par filet) des dernières années sont restés faibles par rapport aux taux de prise de 1996 à 1998. Les taux de prise au moyen des petits filets maillants sont également restés faibles. Selon les fréquences de longueur des morues pêchées au moyen de petits filets maillants, le nombre de poissons des catégories de 36 à 44 cm et de 52 à 56 cm est en baisse par rapport à l'année 2000. Les taux de prise à la palangre (nombre moyen hebdomadaire de poissons par 1 000 hameçons) ont augmenté depuis l'année 2000, de même que le nombre de poissons de la catégorie de 44 à 54 cm, par rapport aux années 2002 à 2004. En 2005, les taux de prise à la palangre ont baissé, avant d'augmenter en 2006. Selon les résultats provisoires, les taux de prise à la palangre sont restés élevés en 2007.



## **INTRODUCTION**

Sentinel survey projects were formally announced by the Minister of Fisheries and Oceans in October 1994. The surveys in the DFO Newfoundland Region are an extension of the index fishermen's project from the Northern Cod Science Project with modifications to allow for science activities achievable only under a fishing moratorium. Sentinel data collection has continued during the index fishery of 1998 and commercial fisheries in 1999-2005.

The sentinel survey has the following objectives:

1. To develop a catch rate series for use in resource assessments.
2. To incorporate the knowledge of inshore fishers in to the resource assessment process.
3. To describe the temporal-spatial distribution of cod in the inshore area over a number of years through, for example, the use of catch rate information, tagging studies, by-catch information and fishers' observations.
4. To gather length frequencies, sex and maturity data and sample ages for use in resource assessment.
5. To establish a long-term physical oceanographic and environmental monitoring program of the inshore areas.
6. To provide a source of biological material for other researchers. For example, tissue for genetic, physiological and toxicological analyses, cod stomachs for food and feeding studies and by-catch information.

## **PARTICIPANTS**

The primary collectors of data in the sentinel survey are inshore fishers. Through consultation with inshore fishers and fisheries organizations, traditional inshore fishing grounds were identified and mapped, resulting in 16 locations in NAFO Subdiv. 3Ps.

Fishers from communities within the boundaries of the identified coastal areas and who met eligibility criteria were invited to apply to participate in the survey. Where more than one application was received from an area, the project partner conducted a draw or lottery to select the participant. While there was considerable interest in the project in most areas, there were many sites from which only one application was received and others where additional canvassing was required to enlist participants. Selected participants were required to complete a six-week course designed by the Marine Institute of Memorial University in consultation with DFO. Topics covered included scientific sampling methods and equipment, computer use, resource assessment basics and presentation skills.

In order to minimize inter-annual enterprise effects on data collection, participants are expected to remain with the survey over a number of years. It is also expected that most of the sampling activities will continue once commercial fishing operations resume and the sentinel participants will form a core of index fishers.

## **SITES**

Since 1995, participants from 19 communities have taken part in the Sentinel program. The specific location of each site was chosen after consultation between DFO scientists, fishermen and the Fish, Food and Allied Workers Union (FFAW). Site selection was based on the need to survey throughout inshore areas and targeted historical fishing areas and historical gear use patterns. Several sites no longer participate in the survey and in 2003 fourteen enterprises continued to collect information. From 2004 to 2007, thirteen sites continued with the program. In 2006, the enterprise in Francois retired and was replaced by another participant.

## **SAMPLING STRATEGY**

The communities of the enterprises involved in the Sentinel survey, as well as the number of sets completed each year and the total number of weeks allocated, are given in Table 1. Survey activity was lowest in 2003, when several sites were cut from the program due to funding pressures and the number of weeks allocated for the survey was also reduced. The timing of sampling was determined after discussions with fishers but was targeted for seasonally appropriate times based on historical fishing patterns. There was minimal disruption of these time frames in 1999 through 2007 due to the opening of the commercial fishery.

There were no traps involved in Sentinel sampling in 3Ps in 1999, or 2002-07; two traps were used in 2000 and three in 2001. Participants used either baited trawl lines or gillnets for the remaining weeks of the survey. Non-trap sites fished either baited trawls or gillnets for the full survey. While traps were in the water continuously, they were hauled three days per week. Hook and line and gillnet crews fished up to three days per week. Fishing days in the week were selected at the discretion of the crew and depend primarily on weather conditions.

When a cod trap was hauled, the crew estimated how much fish by weight had been caught, removed a random sample for biological sampling and released the remaining catch. Meshed and/or dead, floating fish were retained and brought ashore. Fishers were instructed to release as much live fish as possible.

Hook and line crews fished two tubs of baited linetrawl. Each tub consisted of approximately 500 hooks for a total of 1000 hooks per fishing day. Gillnet crews fished a maximum of six fifty fathom 5½ inch monofilament gillnets. Nets were rigged 2-3 to a fleet and up to three fleets were fished per fishing day. Selected sites fished one 3¼ inch monofilament gillnet tied to one 5½" gillnet one day per week. All fish caught in gillnets and on hooks were landed and measured. If catches exceeded 500 kg per week, the numbers of nets in a fleet were cut back. However, some consideration was given to bottom topography and net performance when reducing the number of nets in a fleet. Similarly, the number of hooks per tub was reduced if landings exceeded 500 kg per week. Other measures were considered if fish are particularly abundant in an area and catches appear to be excessive even with the minimal amounts of gear possible.

Prior to the start of sampling in 1995, a fixed (control) location on the fishing grounds was established for each site and will remain fixed for the duration of the project. Each fishing day, up to half of the gear was set at the control site. When competition with commercial fishers prevented setting at the control site, gear was set as close to the

control grounds as possible. The remainder of the gear (experimental) was set at one or two other locations on the fishing grounds at the discretion of the crew. The location of each fishing set was plotted on a nautical chart. The time of the set and the soak time for the gear were recorded. Other environmental observations were recorded, including wind direction and speed, percent cloud cover, tide conditions, presence of invertebrates (bait) and other fish species in the area, marine mammals, sea birds and any other variables which might have influenced fishing behavior. Selected sites were equipped with a CTD (measuring temperature and salinity at depth). At these locations, casts were conducted in the vicinity of fishing sets each fishing day. CTD locations were fished for subsequent years if possible.

When the gear was retrieved, catches from the control and experimental gear were kept separate and sampled on shore. All fish from gillnet, handline and linetrawl, and a sample of the catch from traps, were measured for length and sex. Otoliths were sampled on a length-stratified basis and stored in manila envelopes with relevant information recorded on the outside. Every other week, selected sites collected a sample of up to 100 frozen fish. These were transported to St. John's for detailed biological sampling. All information was recorded on forms similar to those used by the Port Sampling Section and on DFO Research Vessels. Other biological samples were collected as needed.

## **DATA PRESENTATION**

The data are summarized for all of 3Ps and presented by gear type. Summaries for each enterprise follow, in general, organized from east to west. This paper presents data for gillnet (5½" and 3¼" mesh) and linetrawl. The length frequency plots depict the number of fish at length scaled by total amount of gear fished so that changes in length frequency distribution may be compared across years. Lengths, in 1cm intervals, are from both control and experimental gear, and for gillnet and linetrawl represent every fish measured, as the total catch is measured. Length frequency summaries for NAFO division are shown as an average of the relative length frequencies for each fisher in the division. The second figure on each summary sheet gives catch details broken down by year, including total number of sets (Nhaults), number of sets in which no fish were caught (Nzero), and number of fish caught (Nmeas). The CPUE figures show control and experimental catches combined, in number of fish per net or per 1000 hooks by week and are constructed by calculating a daily catch rate for each set and averaging all the CPUEs for all sets in a given week.

## **RESULTS**

For those sites in 3Ps collecting data in 2006 and 2007, plots summarizing Sentinel survey activity since 1995 are presented in Fig. 1-90. Thirteen inshore fishing enterprises representing communities from St. Bride's to Burgeo participated in the 3Ps Sentinel Survey for 2006 and 2007. A total of 327 sets of 5½" gillnet and 61 sets of 3¼" gillnet resulted in total measurements of 3890 fish in 2006. Two hundred and fifty-four sets of linetrawl resulted in 19,470 measurements. Data collection is ongoing in 2007 and data presented for 2007 are current to the end of September.

Figures 1 and 2 update all set locations and catch per unit effort in scaled symbols that were surveyed in 2006. Figures 3 and 4 show set locations and scaled catch per unit effort for those sets completed up until the end of September in 2007. Linetrawl and gillnet are shown separately.

Figures 5 and 6 show the overall average CPUE (catch per unit of effort) for all of 3Ps and by community for 5½" gillnet and linetrawl. Gillnet CPUE is considerably lower in recent years in all communities. Linetrawl also declined from 1996 to 2000 but from 2001 to 2005 overall mean CPUE increased to about 100 fish per 1000 hooks. This increase was due largely to good catches of small fish in Burgeo and Ramea and some special sets on Burgeo Bank. As well, in 2002, the participant in Burgeo could not fish the required weeks in the first quarter due to mechanical failure. These weeks fished in previous years had lower catch rates and moderated the yearly mean CPUE. Catch rates in 2006 were higher than the 2001-04 level, at about 150 fish per 1000 hooks and preliminary data show 2007 catch rates to be at a similar level.

Figures 7-9 give length frequencies scaled by amount of activity for the three gear types used in Sentinel surveys. Five and a half inch gillnet catches declined steadily from 1996 to 2000 and have remained low since then (Fig. 7). Three and a quarter inch gillnet (Fig. 8) also declined during this time with changes in which mode of fish size was dominant in various years. The mode of larger fish (second peak in the frequency) was highest in 1996 and much less prominent from 2000 to 2007. Linetrawl frequencies (Fig. 9) showed fewer large fish from 1999 to 2004 but in 2006 and 2007 larger fish are represented in the frequencies than the previous few years.

The summary data for 3Ps gillnet (5½"), in Fig. 10-36, give an indication of catch rate change since inception of the Sentinel Survey in 1995. Gillnets show the narrowest range of selectivity of Sentinel survey gears, targeting fish in the 50 cm to 80 cm range. In general, catch rates from 5½" gillnets were lowest from 2001 to 2006, considerably lower than the best catch rates seen in 1996. Most sites in 2007 had low catch rates similar to those of recent years.

Small mesh gillnets (3¼") have been used in 3Ps since 1995 in order to get information on smaller size ranges of fish. Figures 37-57 summarize the results. One 3¼" gillnet (35 fathoms) was fished in combination with one 5½" Gillnet (50 fathoms) primarily on experimental sites. A strong bimodal peak in length frequency distribution results from this mesh size as the gear selects two size ranges of fish. The first and strongest peak, in most cases, is between 35 cm and 47 cm. Fish in this size range are meshed while the larger fish (52 cm to 65 cm) are caught by the lips and generally entangle as they twist around.

Overall mean catch rates in the small mesh gear have been lower since 2000 than those seen in 1996 through 1999. The last strong peak in the 35 cm to 47 cm range was in 1999 and in the second size range (52 cm to 65 cm), very few fish have been caught in this gear since 1999.

Figures 58-90 summarize the data from the linetrawl portion of the 3Ps Sentinel Survey. Linetrawl shows a much wider selectivity curve than gillnet and catches mainly fish between 29 cm and 83 cm. Linetrawl catch per unit effort declined consistently from 1995 through 2000. From 2000 to 2005, catches increased slightly and were composed of smaller fish. Catch rates were higher in 2006 than those in 2001-05, and preliminary results indicate 2007 catch rates remain high. Length frequencies in 2006 and 2007 included slightly larger fish compared to 2003.

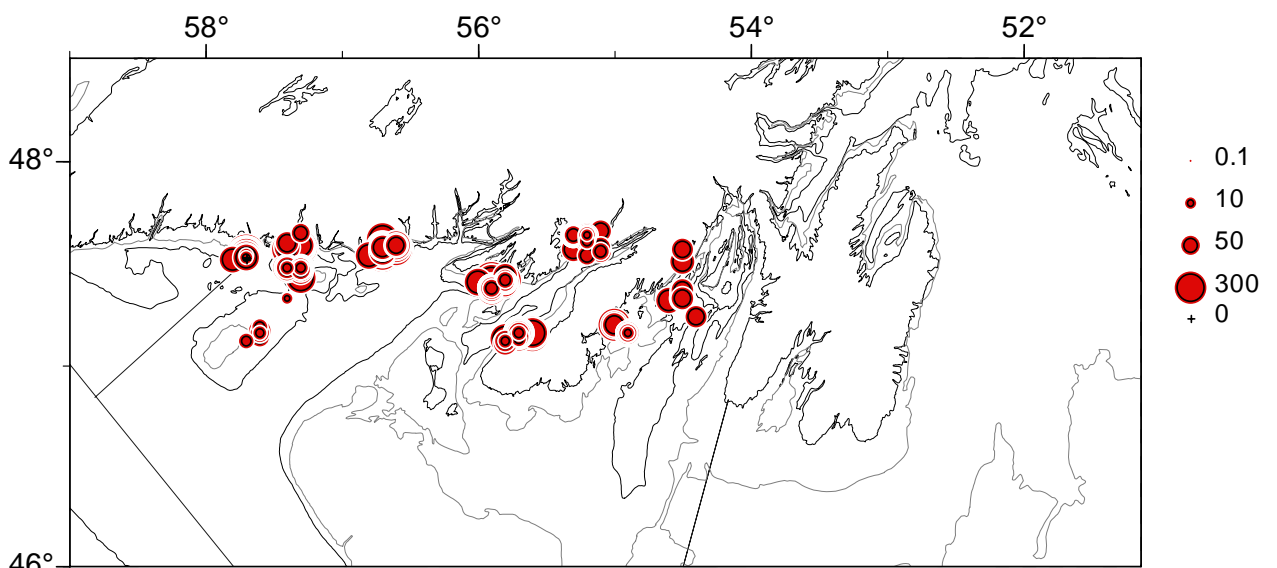
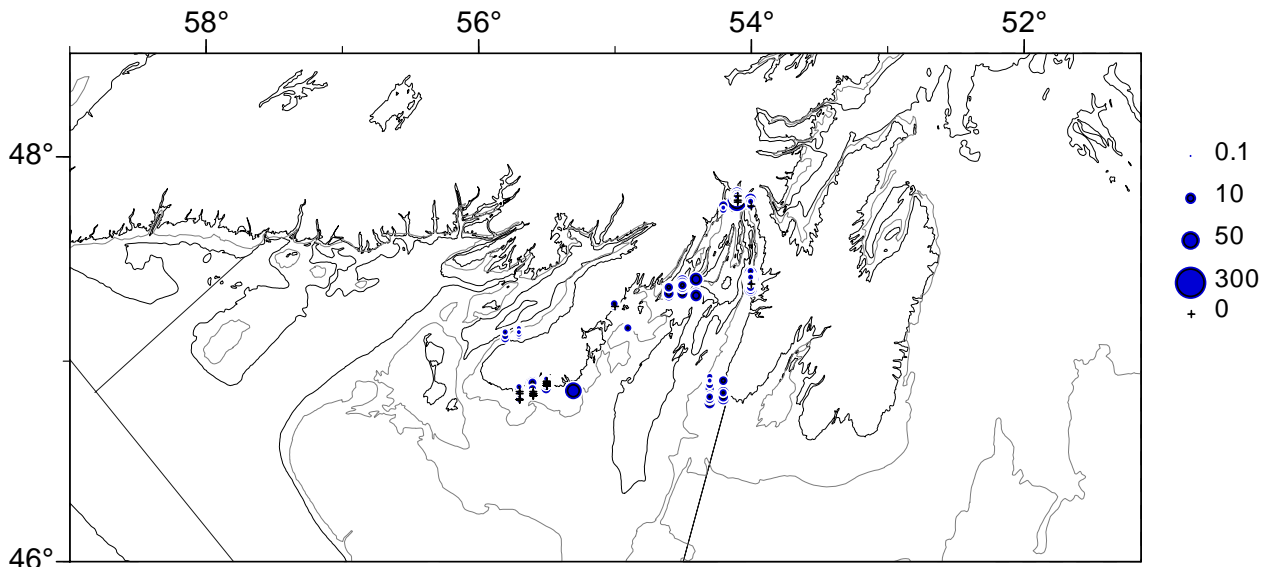


Table 1. Number of Sentinel sets (all gears) by community since 1995 and the weeks allocated for each year.

Community	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
St. Bride's	163	88	70	80	2	54	63	80	59	50	61	64	28
Placentia		41											
Fox Hr	146	88	72	72	36	48	60	60	48	54	54	54	
Little Hr East	163	36	57	48	10	46	67						
Fairhaven								73					
Arnold's Cove	153	63	69	27	8	42							
North Hr	118	74	70	50	20	54	55	43	46	30	57	52	15
Monkstown	148	69	72	72	36	51	60	60					
Little Paradise	52	38	44	39	35	44	63	64	42	58	52	56	34
Red Hr	31	30	29	31	21	29	30	61	22	33	36	34	6
Lawn		57	69	71	36	64	78	80	36	72	70	72	35
Lord's Cove	47	39	40	48	36	48	60	84	47	70	72	69	32
Grand Bank							60	60	38	44	44	42	18
Rencontre East	180	96	71	74	35	54	72	60	20	32	48	36	
Hr Breton	158	39	27	28	32	29	31	54	34	30	34	40	4
Seal Cove	204	71	44	42	33	54	46	48	9				
Francois	181	66	74	69	18	30	36	30	25	10	42	38	4
Ramea	206	46	96	60	38	82	92	82	46	36	44	44	22
Burgeo		46	60	62	26	32	64	46	36	24	32	44	2
Number of weeks allocated	30*	12	12	12	6	8	10	10	6	9	9	9	9

\* Includes 15 week pilot project

Note: In both 2005 and 2006 the sites at Francois were surveyed by new participants.



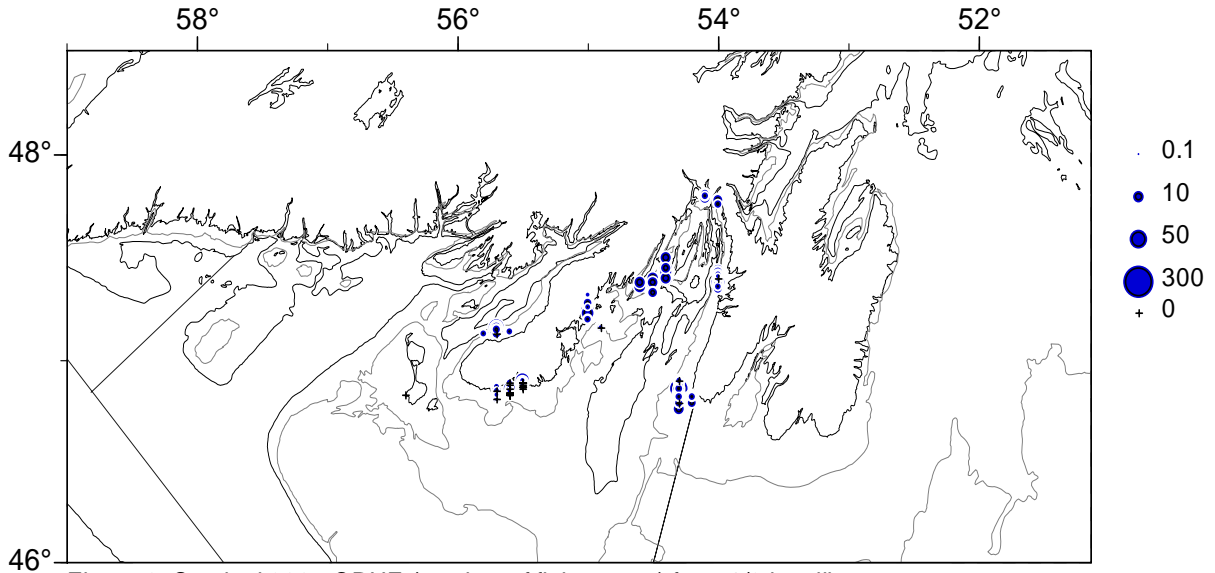


Figure 3: Sentinel 2007 CPUE (number of fish per net) for 5 1/2 in. gillnet.

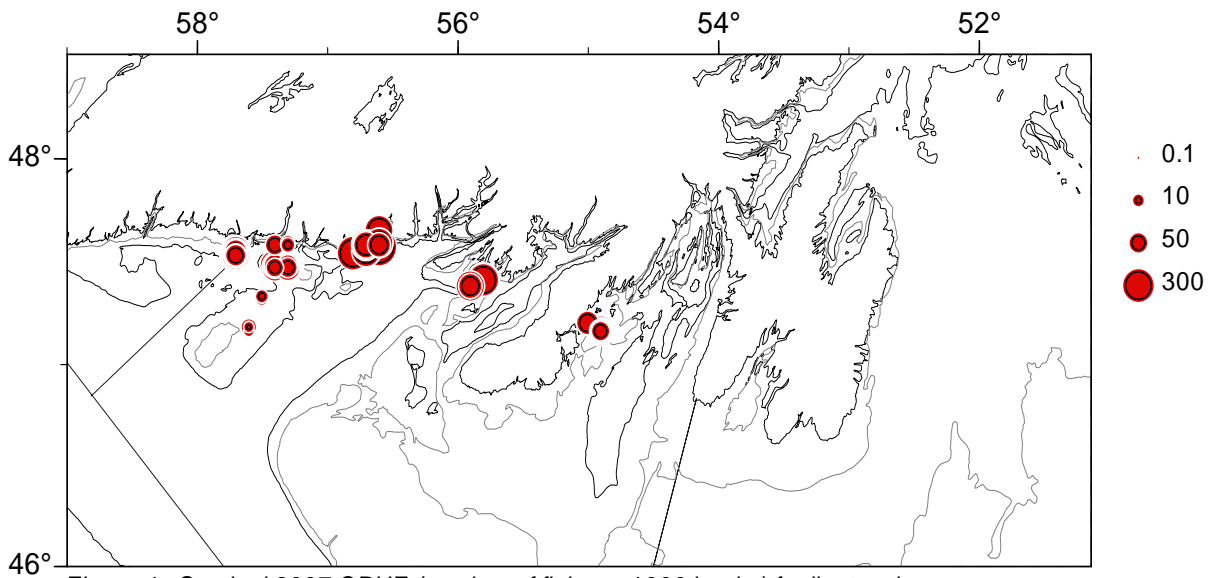


Figure 4: Sentinel 2007 CPUE (number of fish per 1000 hooks) for linetrawl.

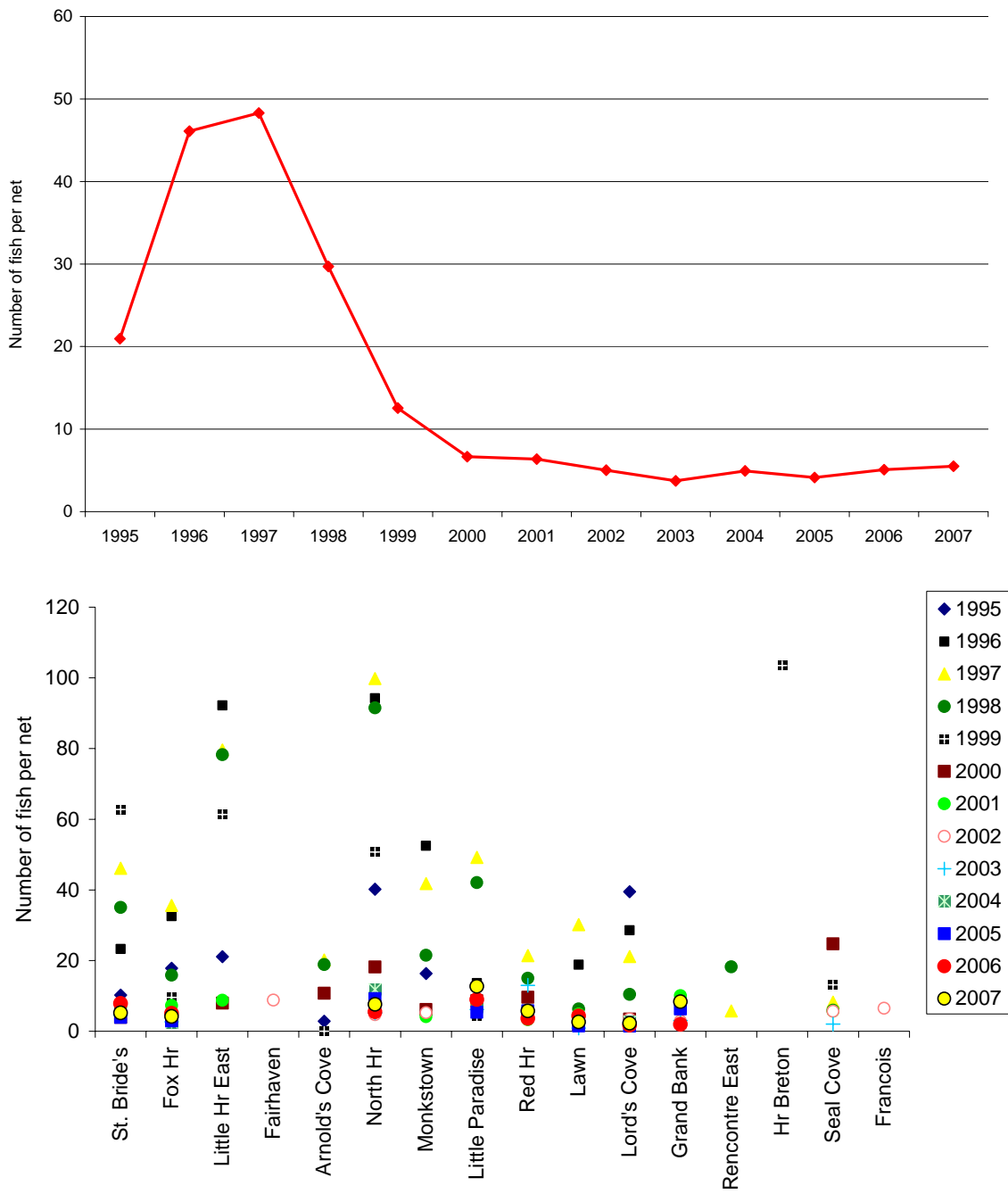


Figure 5. Overall mean CPUE (top panel) and mean CPUE by community (lower panel) for 5 1/2" gillnet 1995-2007.

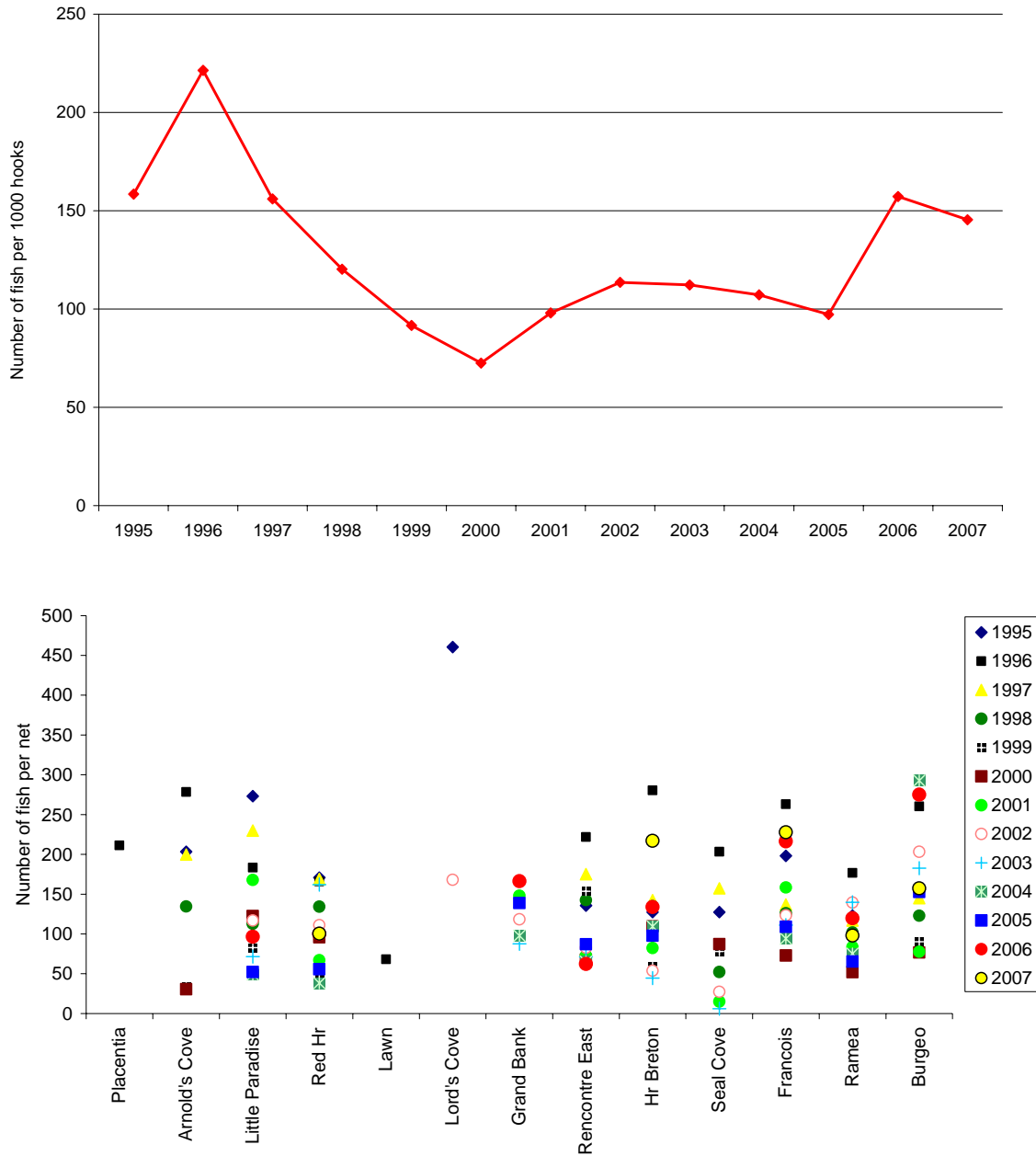


Figure 6. Overall mean CPUE (top panel) and mean CPUE by community (lower panel) for linetrawl 1995-2007.

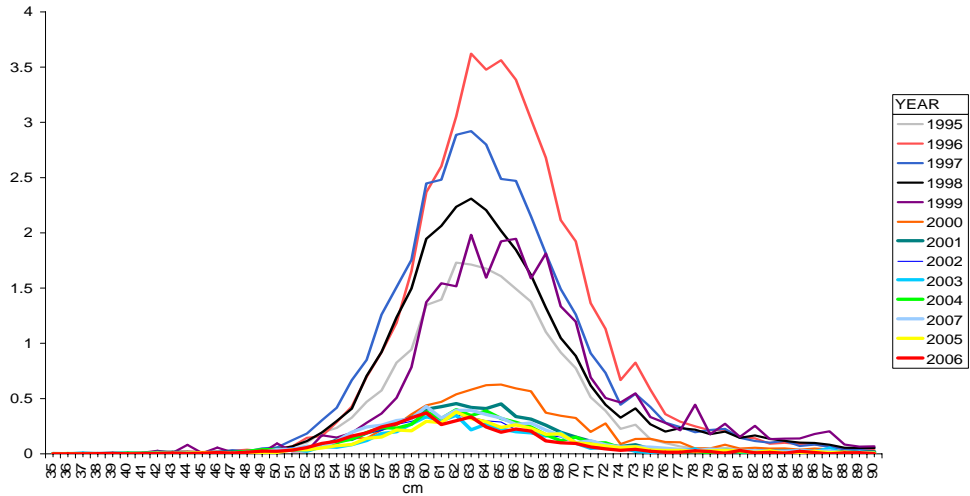


Figure 7. Mean relative length frequencies 3Ps Sentinel 1995-2006 for 5 1/2" gillnet.

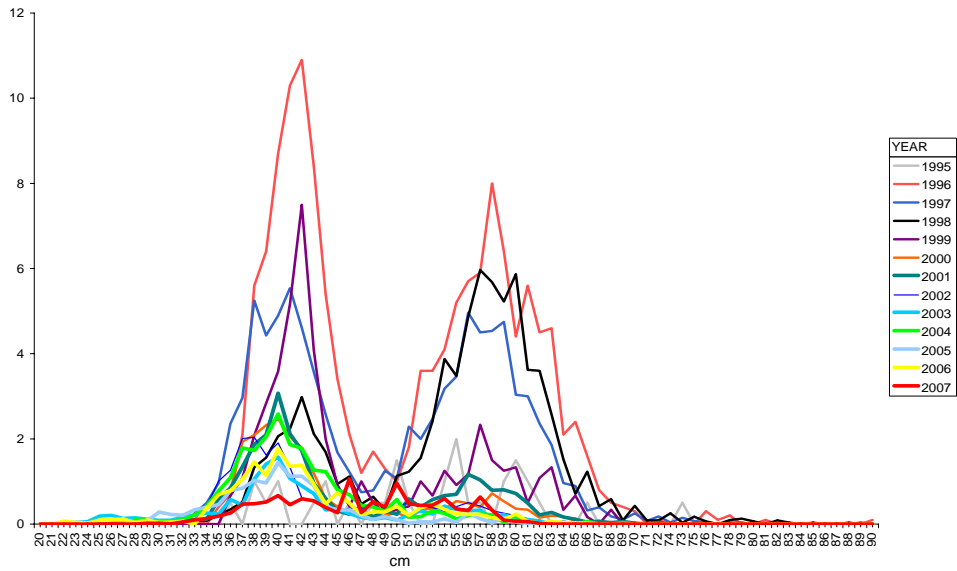


Figure 8. Mean relative length frequencies for 3Ps Sentinel 1995-2006 for 3 1/4" gillnet.

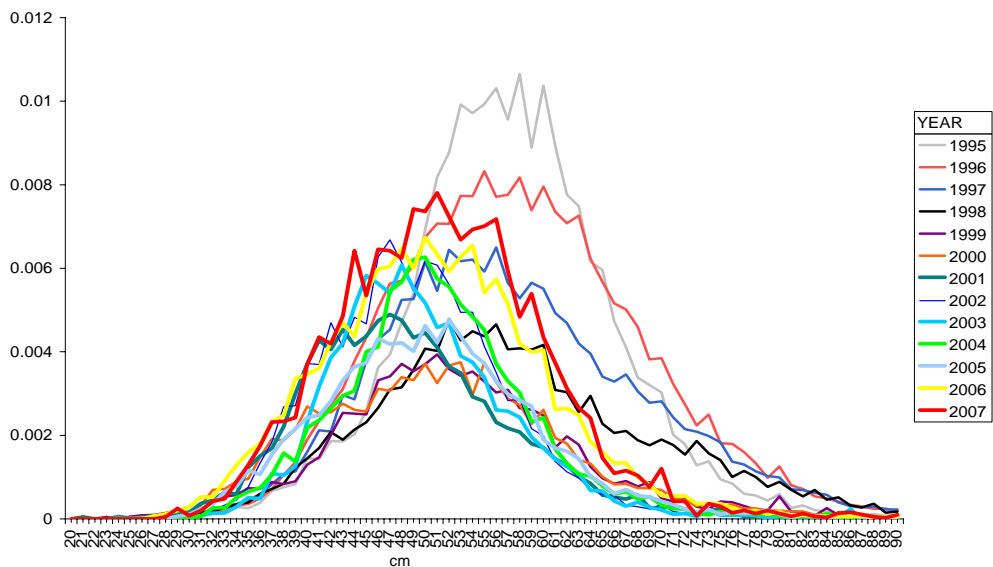


Figure 9. Mean relative length frequencies for 3Ps Sentinel 1995-2006 for linetrawl.

### 3Ps Gillnet 5 1/2 in

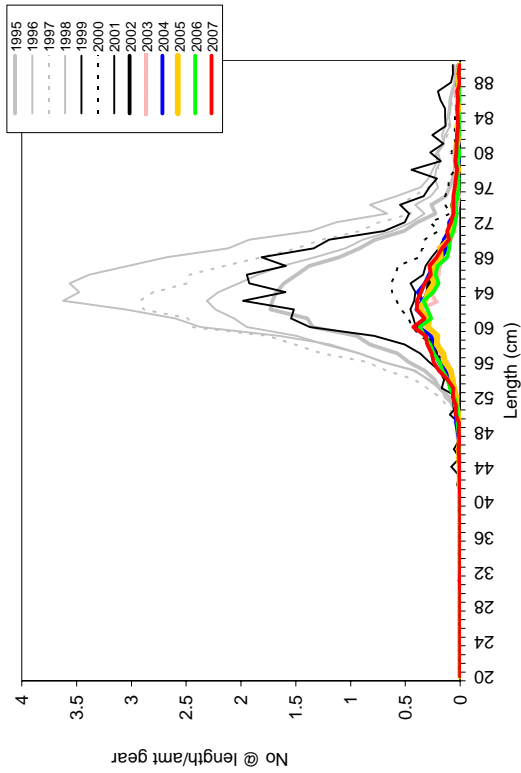
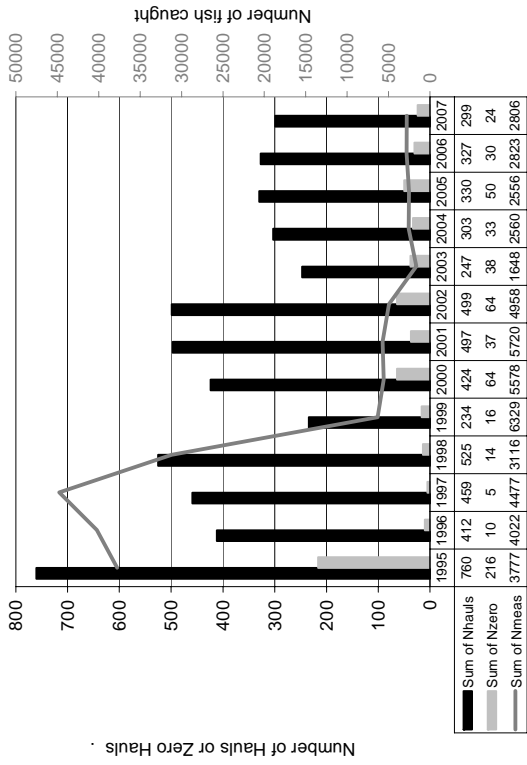


Figure 10. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3Ps Gillnet 5 1/2 in.

Figure 11. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3Ps Gillnet 5 1/2 in.

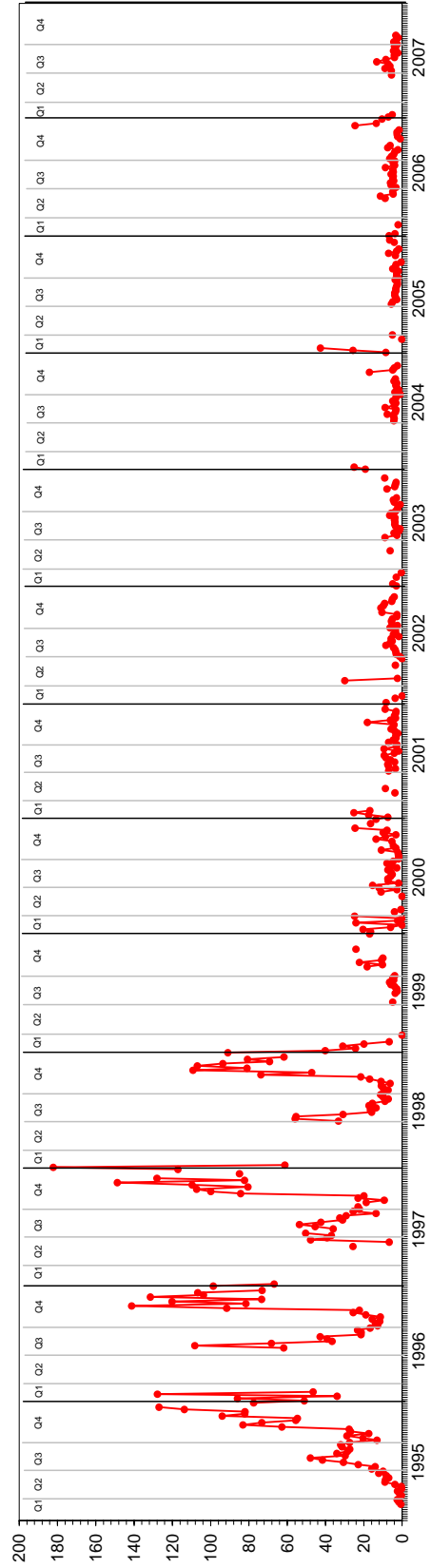


Figure 12. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 3Ps Gillnet 5 1/2 in.

# St. Bride's Gillnet 5 1/2 in

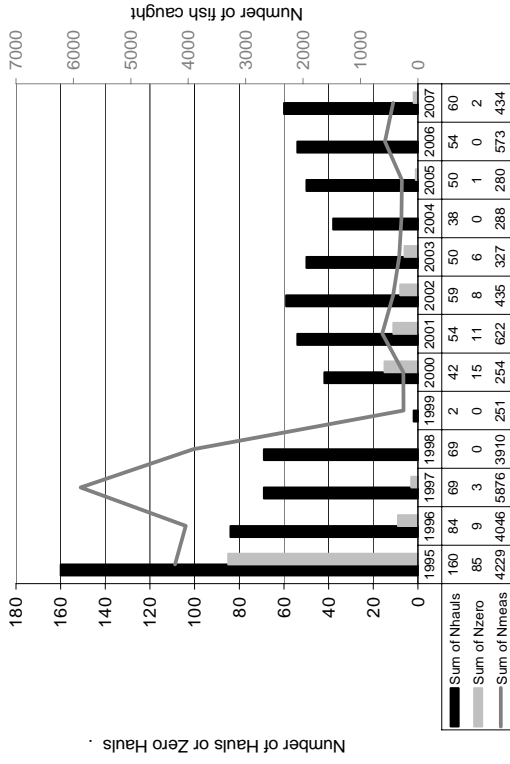


Figure 14. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, St. Bride's Gillnet 5 1/2 in.

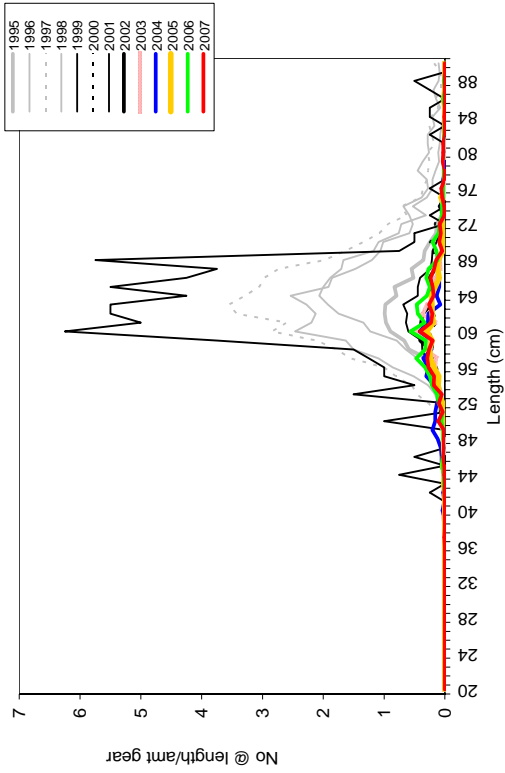


Figure 13. Relative length frequency (number at length / amount of gear) for control and experimental gears, St. Bride's Gillnet 5 1/2 in.

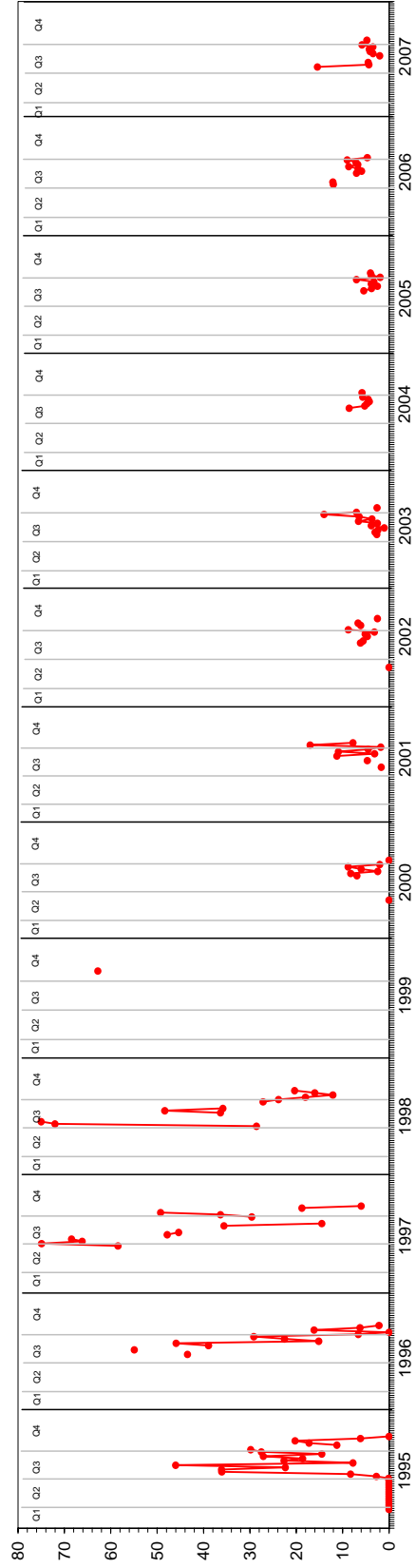


Figure 15. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, St. Bride's Gillnet 5 1/2 in.



# Fox Hr Gillnet 5 1/2 in

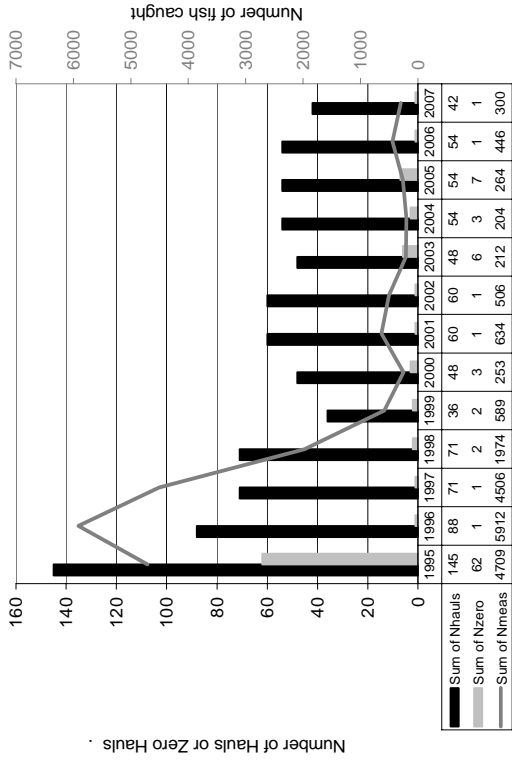


Figure 17. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Fox Hr Gillnet 5 1/2 in.

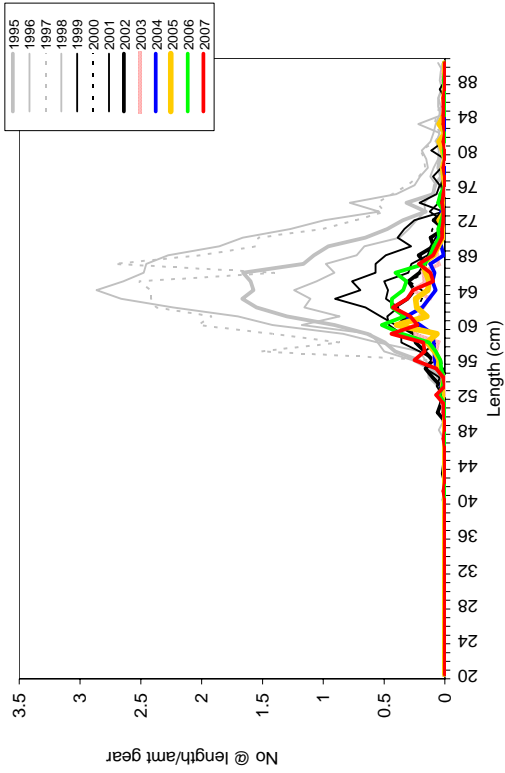


Figure 16. Relative length frequency (number at length / amount of gear) for control and experimental gears, Fox Hr Gillnet 5 1/2 in.

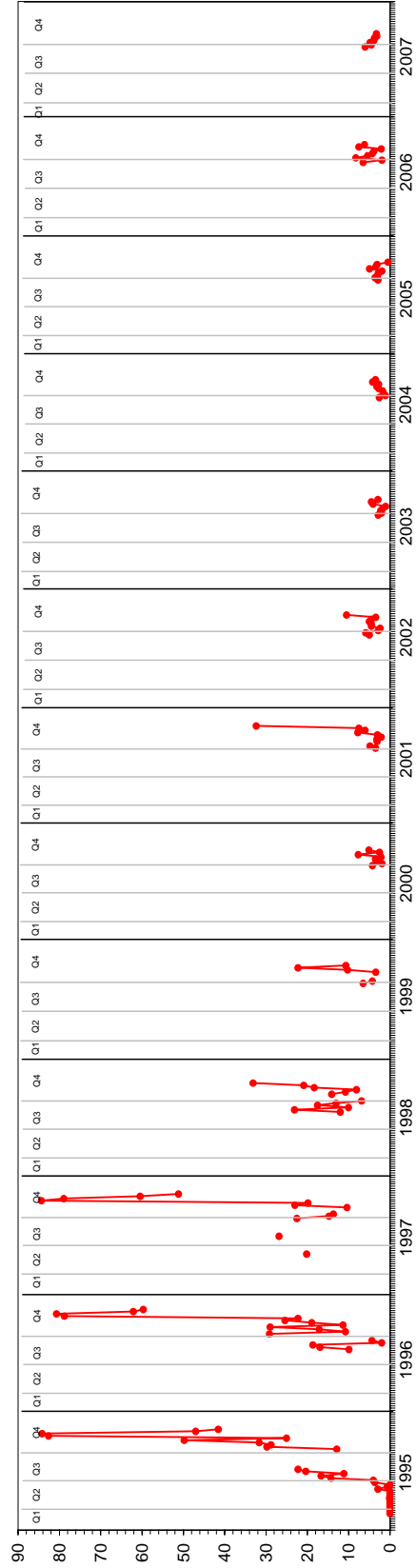


Figure 18. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Fox Hr Gillnet 5 1/2 in.

### North Hr Gillnet 5 1/2 in

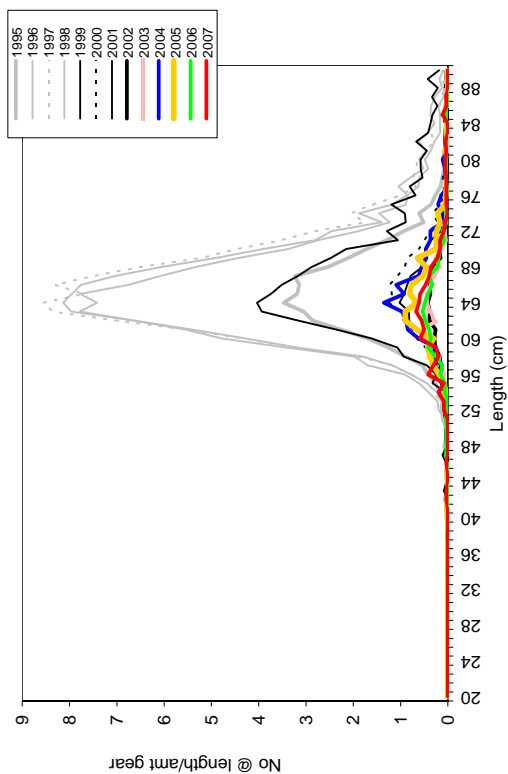
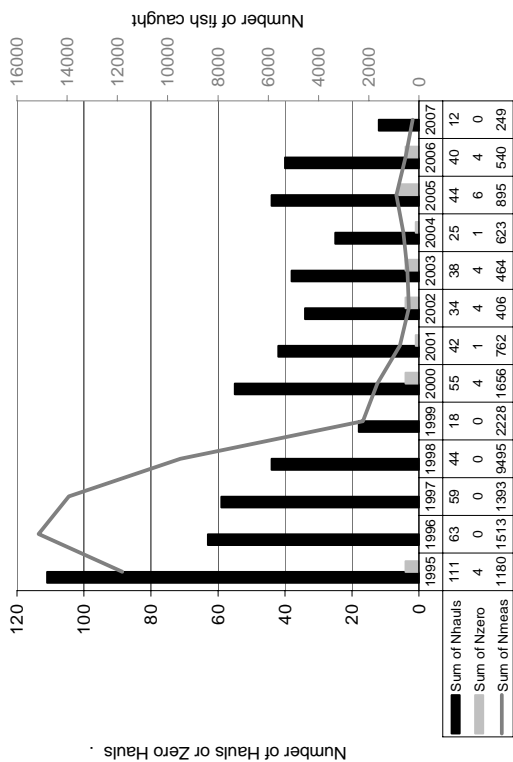


Figure 19. Relative length frequency (number at length / amount of gear) for control and experimental gears, North Hr Gillnet 5 1/2 in.

Figure 20. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, North Hr Gillnet 5 1/2 in.

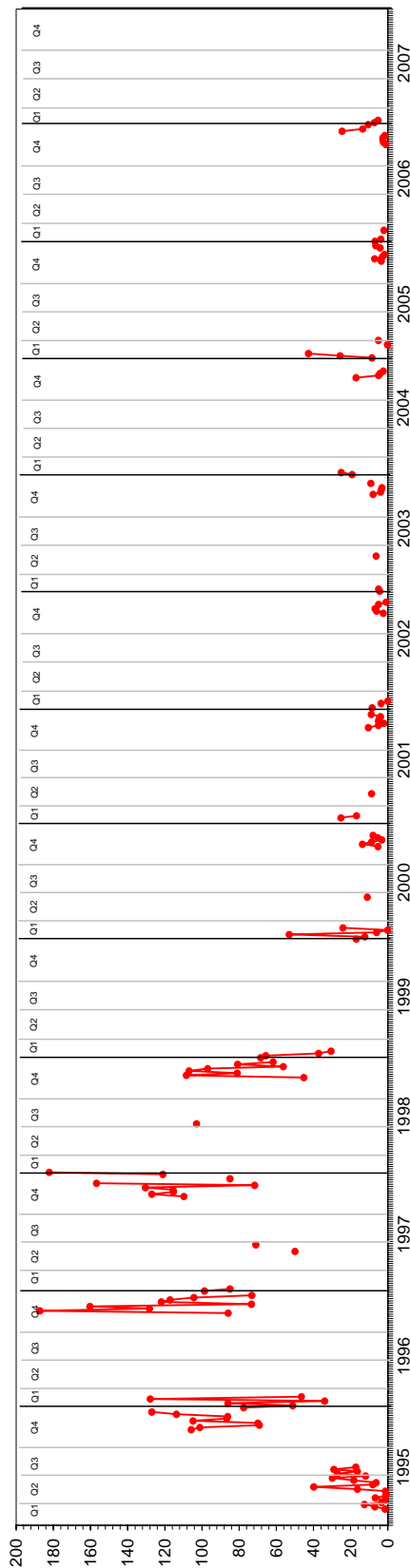


Figure 21. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, North Hr Gillnet 5 1/2 in.

# Little Paradise Gillnet 5 1/2 in

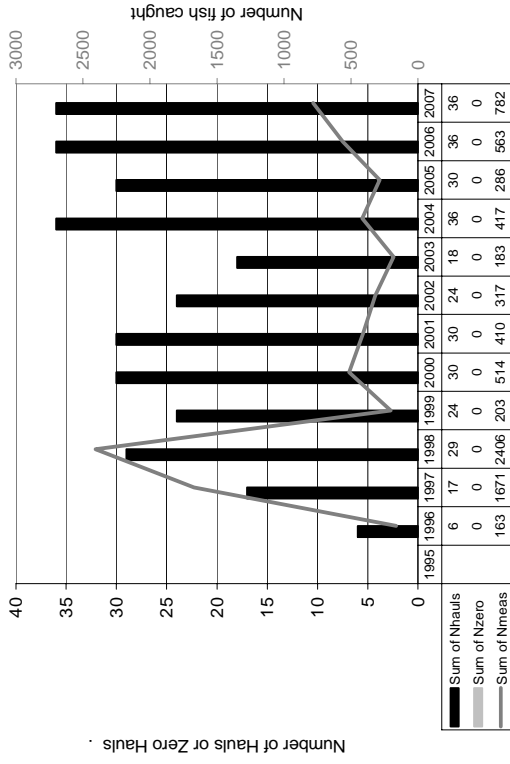


Figure 23. Number of hauls (Nhais), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Little Paradise Gillnet 5 1/2 in.

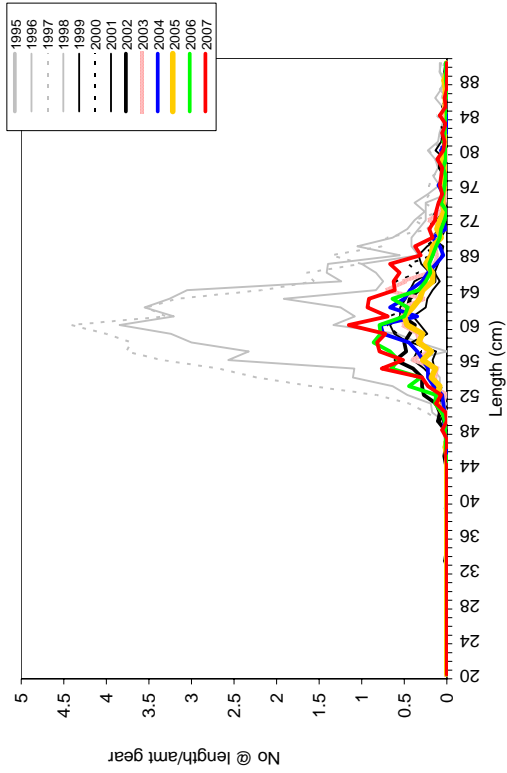


Figure 22. Relative length frequency (number at length / amount of gear) for control and experimental gears, Little Paradise Gillnet 5 1/2 in.

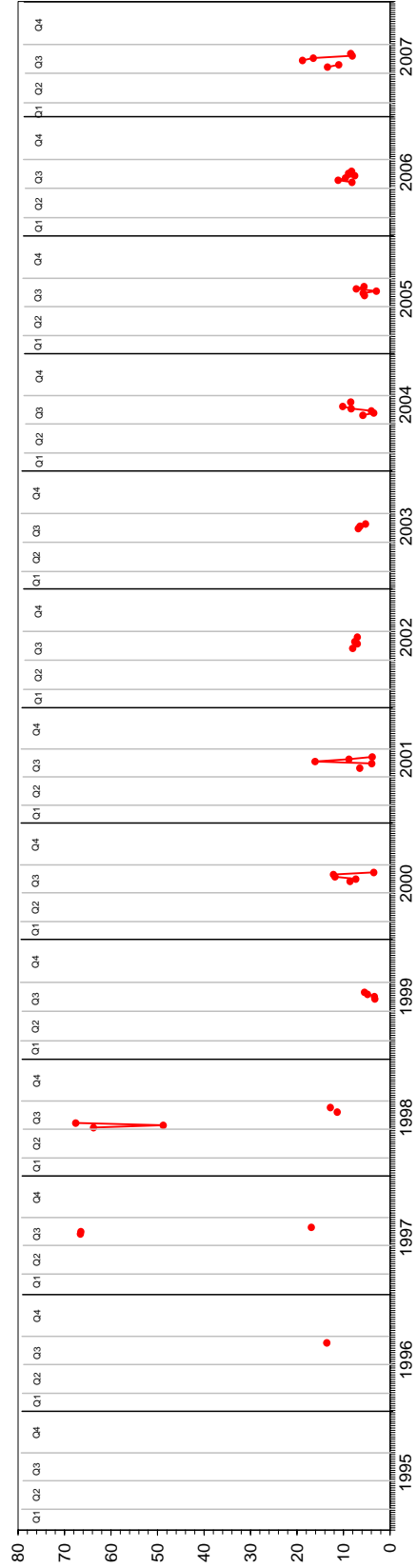


Figure 24. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Little Paradise Gillnet 5 1/2 in.

# Red Hr Gillnet 5 1/2 in

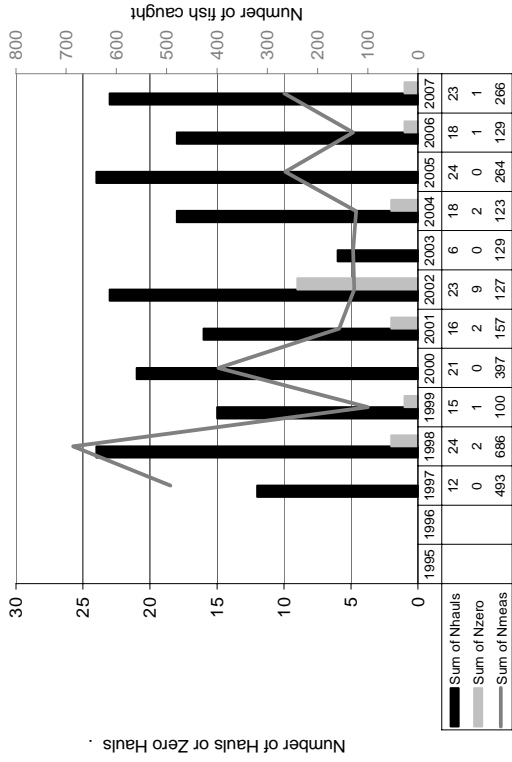


Figure 26. Number of hauls (Nhauts), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Red Hr Gillnet 5 1/2 in.

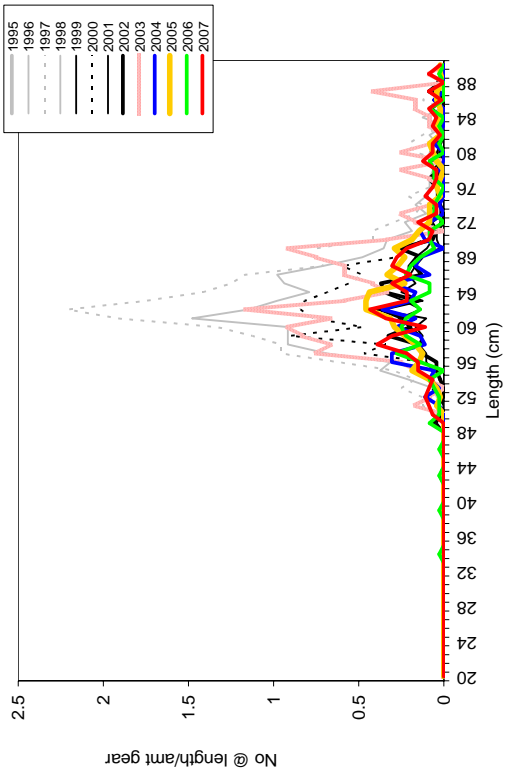


Figure 25. Relative length frequency (number at length / amount of gear) for control and experimental gears, Red Hr Gillnet 5 1/2 in.

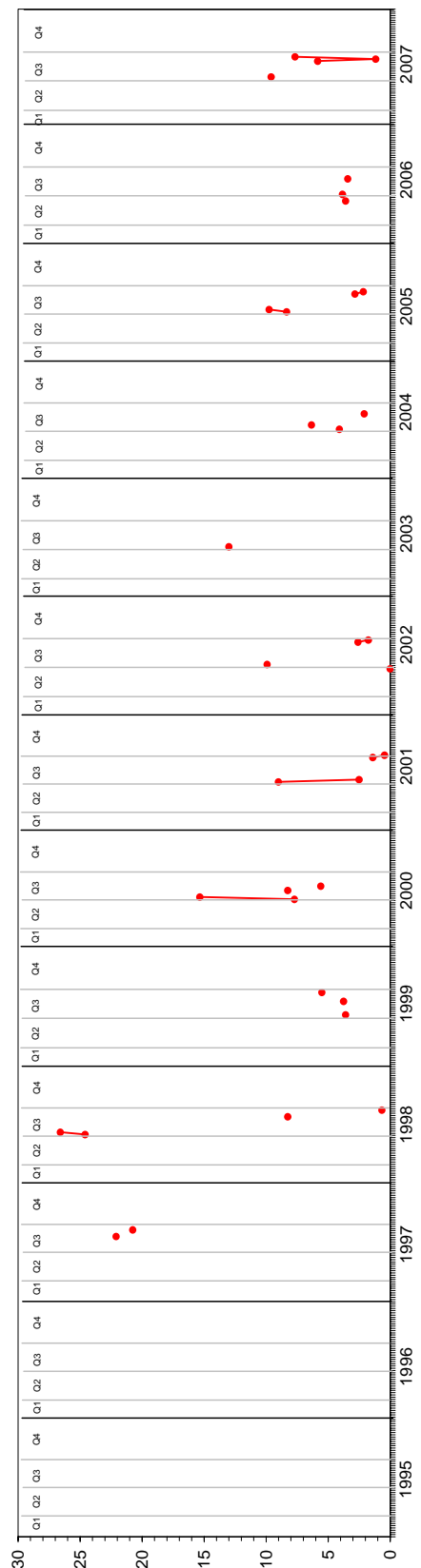


Figure 27. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Red Hr Gillnet 5 1/2 in.

### Lawn Gillnet 5 1/2 in

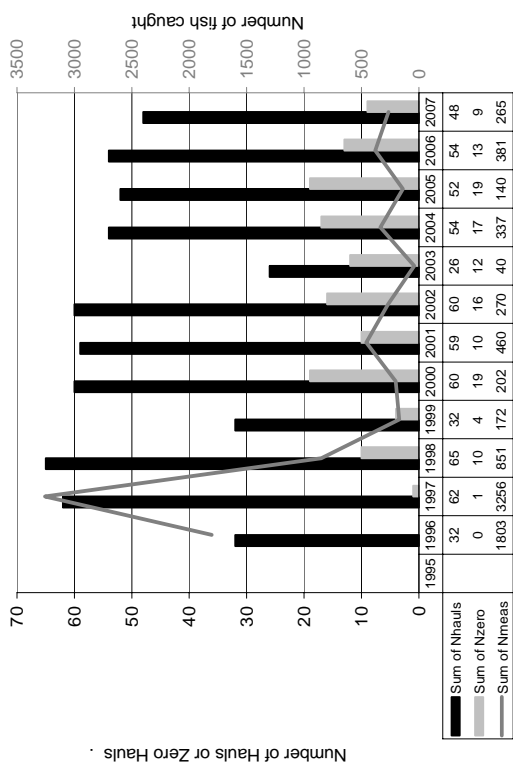


Figure 29. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Lawn Gillnet 5 1/2 in.

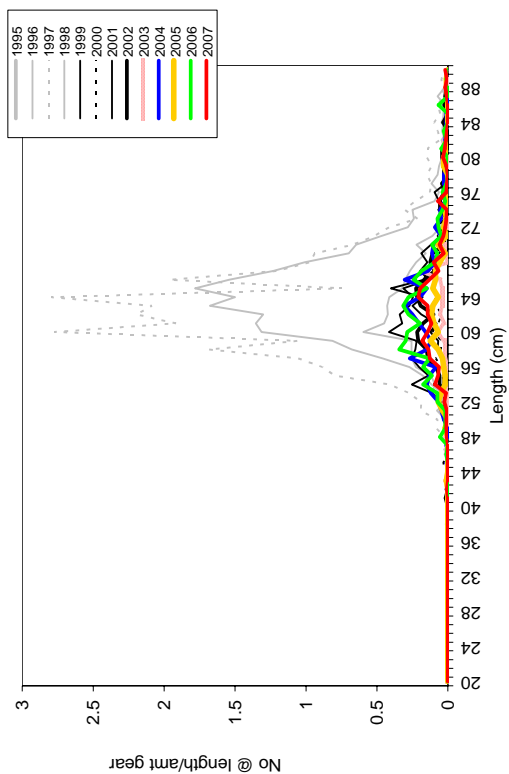


Figure 28. Relative length frequency (number at length / amount of gear) for control and experimental gears, Lawn Gillnet 5 1/2 in.



Figure 30. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Lawn Gillnet 5 1/2 in.

# Lord's Cove Gillnet 5 1/2 in

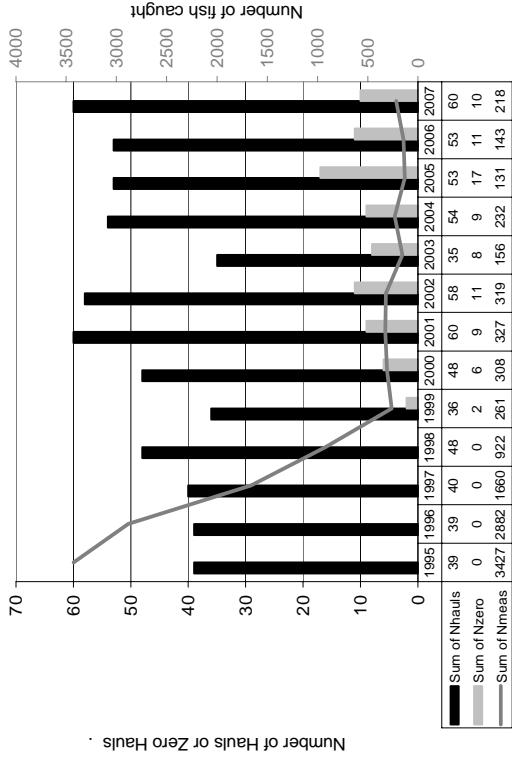


Figure 32. Number of hauls (Nhaulis), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Lord's Cove Gillnet 5 1/2 in.

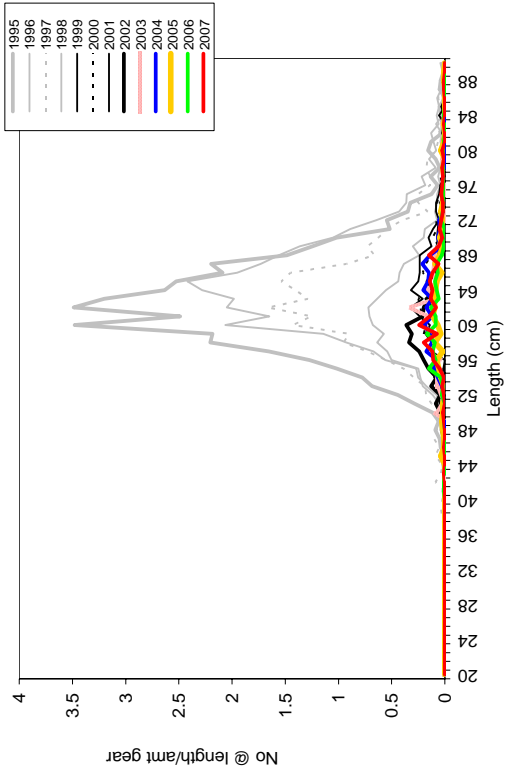


Figure 31. Relative length frequency (number at length / amount of gear) for control and experimental gears, Lord's Cove Gillnet 5 1/2 in.

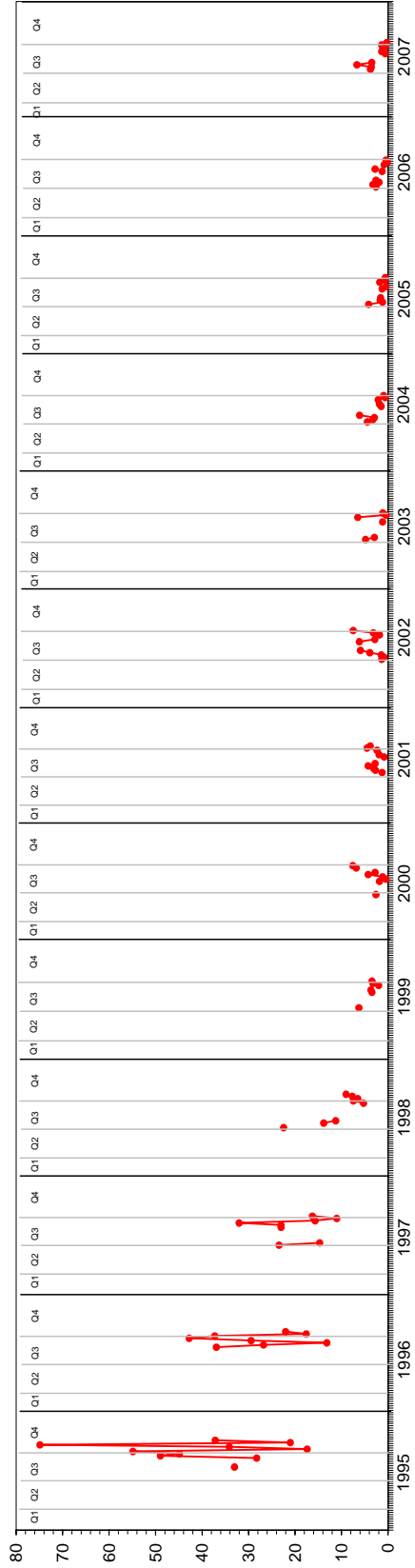


Figure 33. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Lord's Cove Gillnet 5 1/2 in.

# Grand Bank Gillnet 5 1/2 in

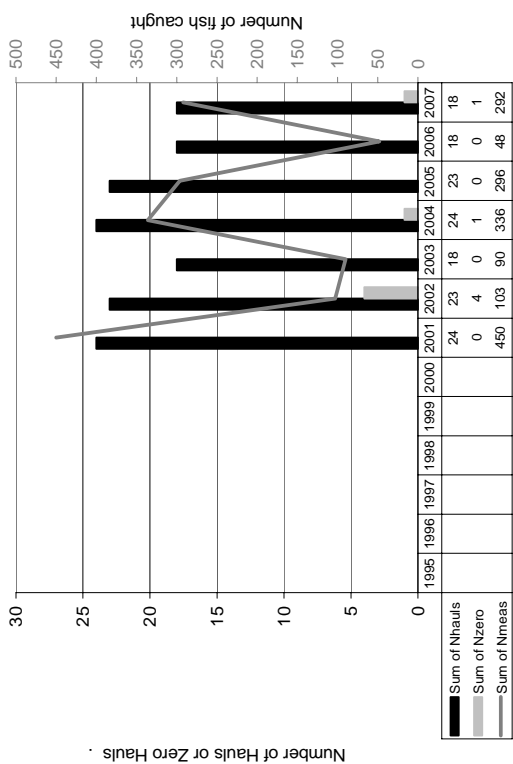


Figure 35. Number of hauls (Nhauts), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Grand Bank Gillnet 5 1/2 in.

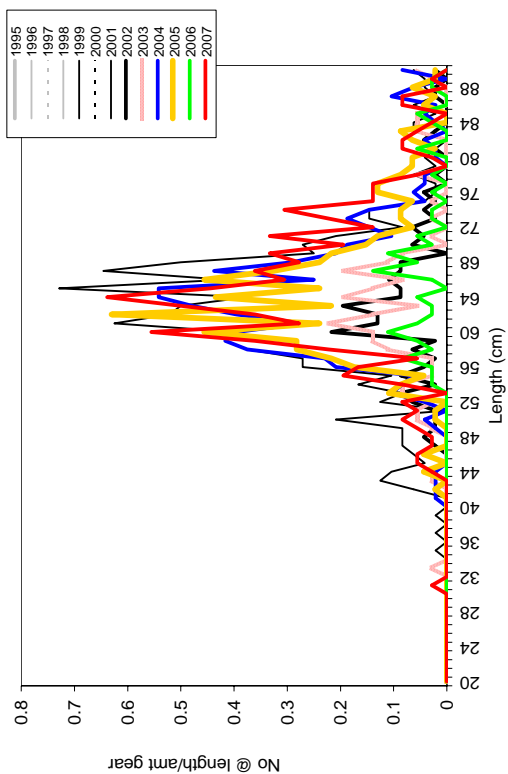


Figure 34. Relative length frequency (number at length / amount of gear) for control and experimental gears, Grand Bank Gillnet 5 1/2 in.

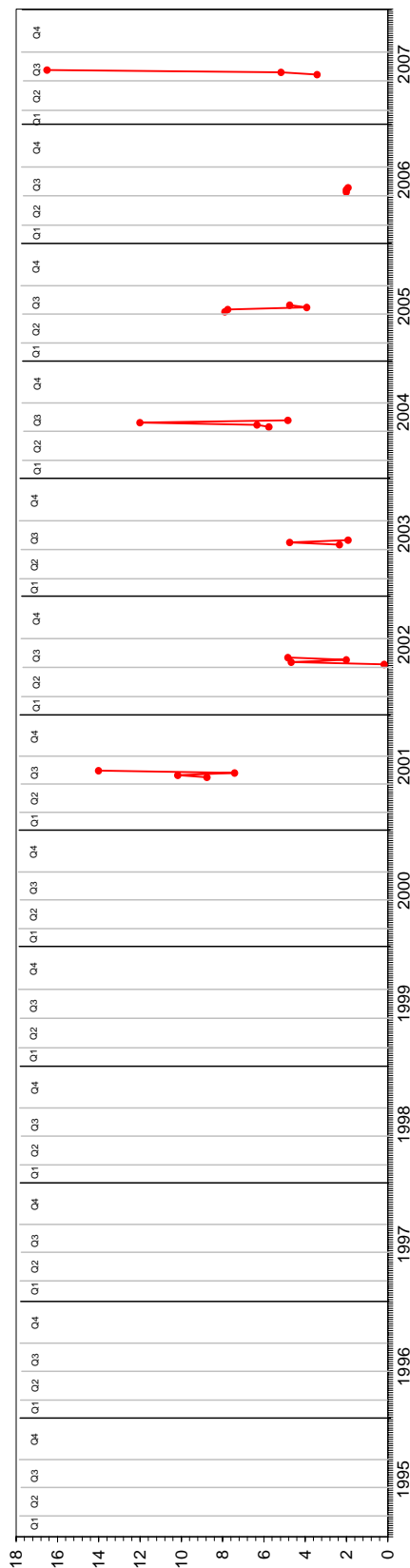


Figure 36. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Grand Bank Gillnet 5 1/2 in.

### 3Ps Gillnet 3 1/4 in

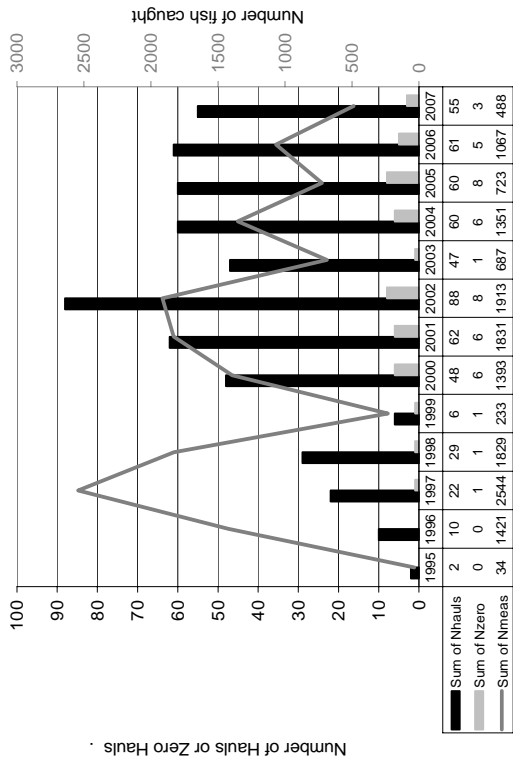


Figure 38. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3Ps Gillnet 3 1/4 in.

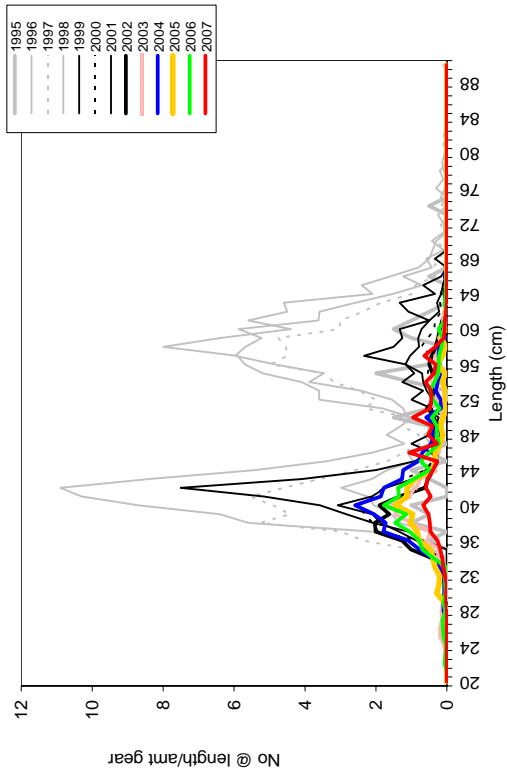


Figure 37. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3Ps Gillnet 3 1/4 in.

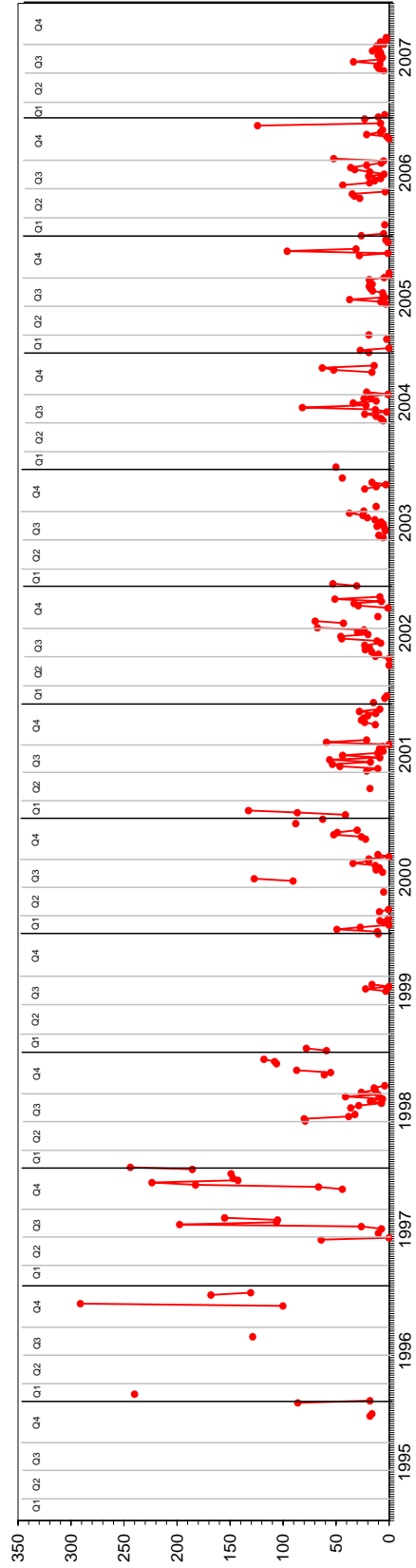


Figure 39. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, 3Ps Gillnet 3 1/4 in.



### St. Bride's Gillnet 3 1/4 in

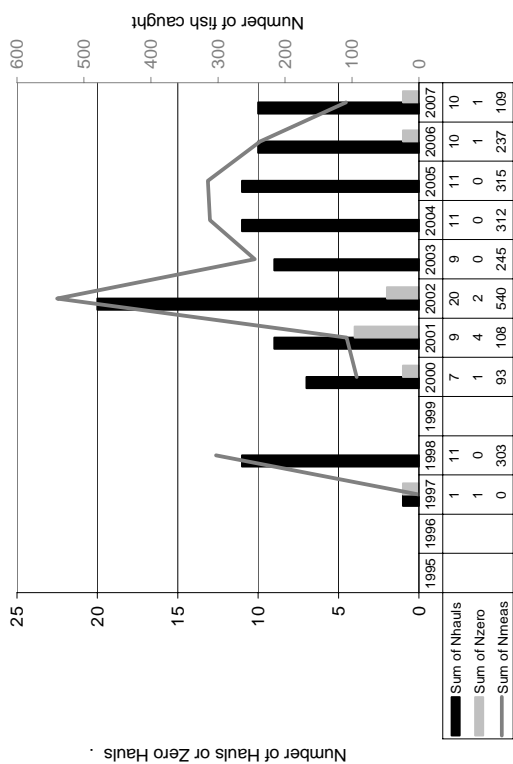


Figure 41. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, St. Bride's Gillnet 3 1/4 in.

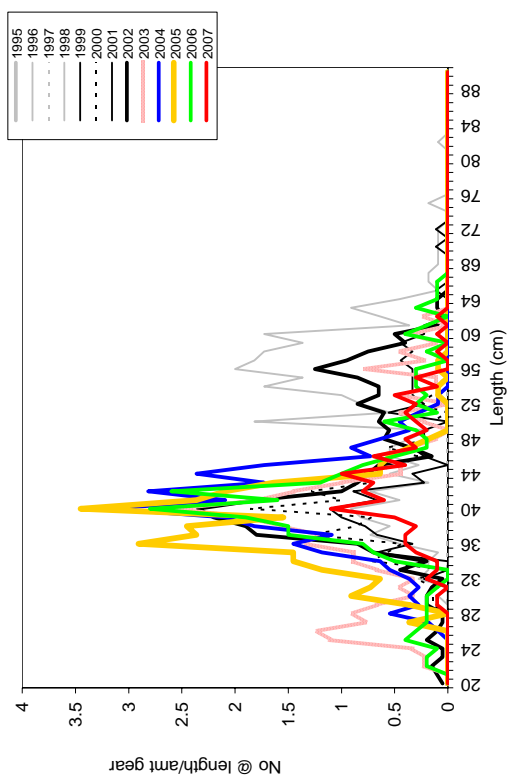


Figure 40. Relative length frequency (number at length / amount of gear) for control and experimental gears, St. Bride's Gillnet 3 1/4 in.

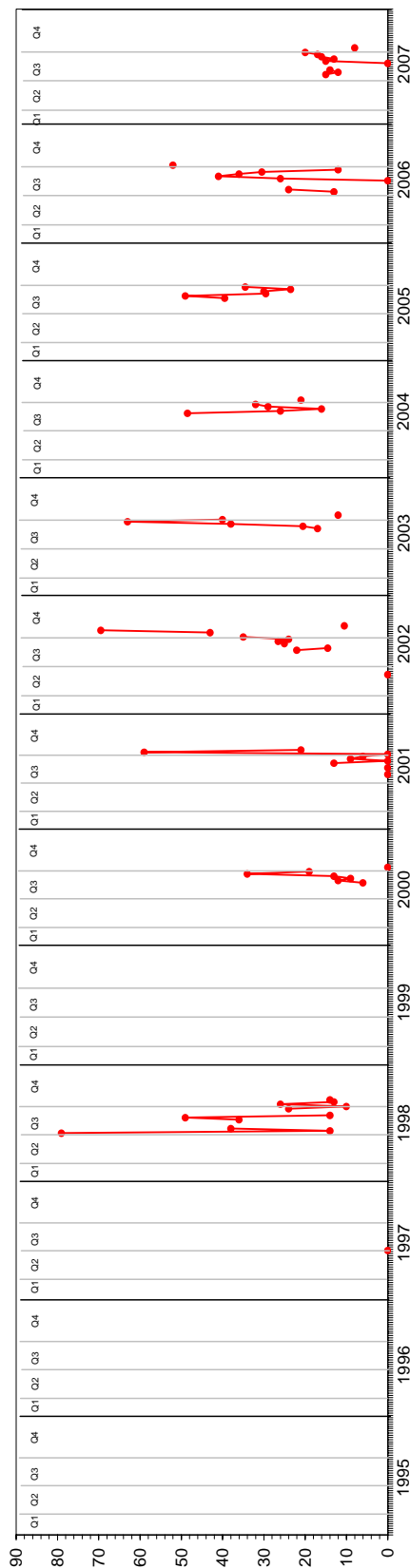


Figure 42. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, St. Bride's Gillnet 3 1/4 in.

### North Hr Gillnet 3 1/4 in

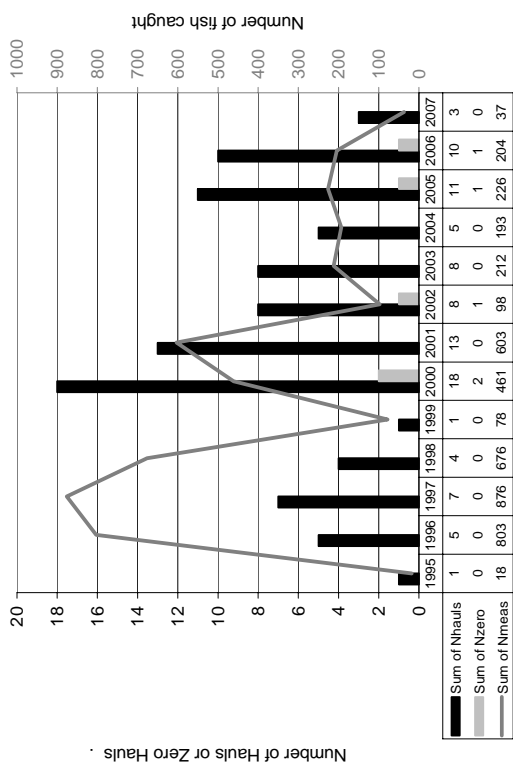


Figure 44. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, North Hr Gillnet 3 1/4 in.

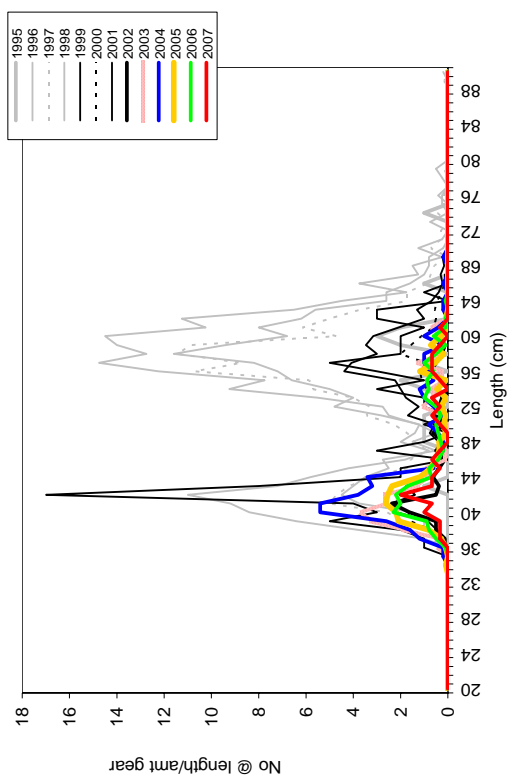


Figure 43. Relative length frequency (number at length / amount of gear) for control and experimental gears, North Hr Gillnet 3 1/4 in.

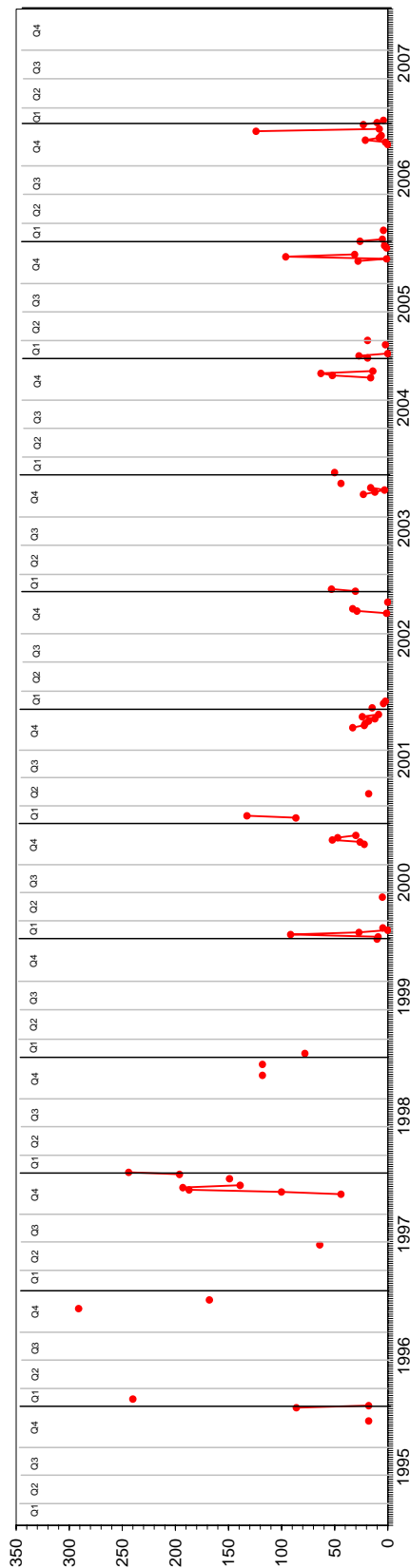


Figure 45. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, North Hr Gillnet 3 1/4 in.

# Little Paradise Gillnet 3 1/4 in

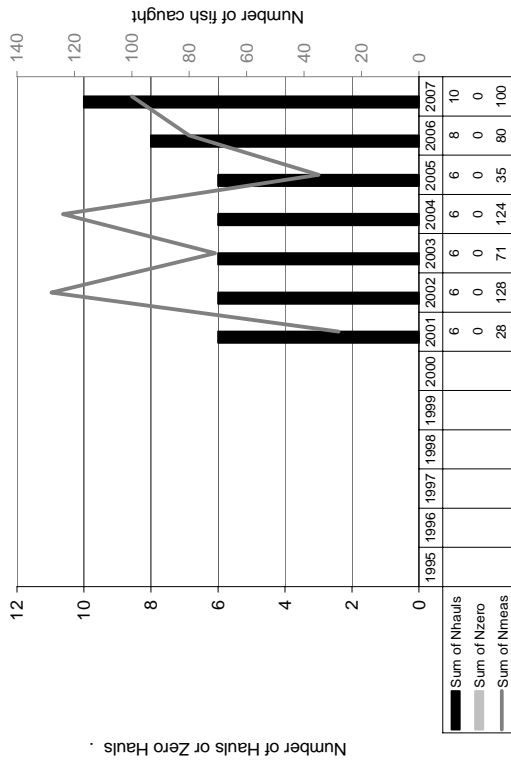


Figure 47. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Little Paradise Gillnet 3 1/4 in.

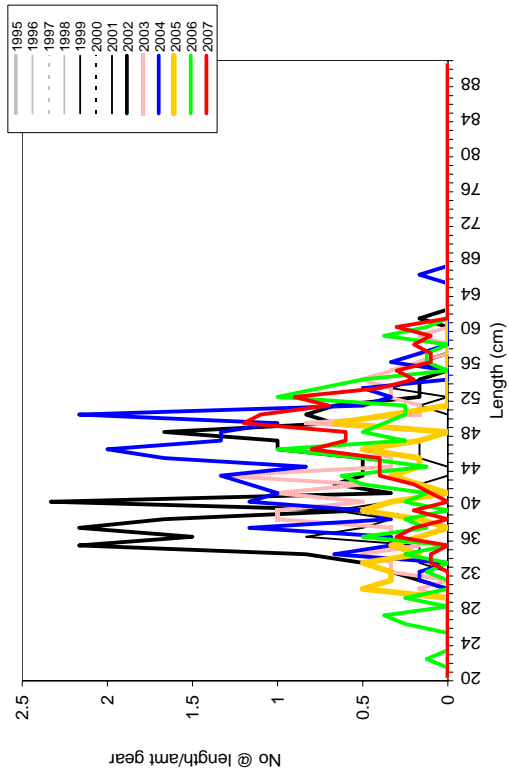


Figure 46. Relative length frequency (number at length / amount of gear) for control and experimental gears, Little Paradise Gillnet 3 1/4 in.

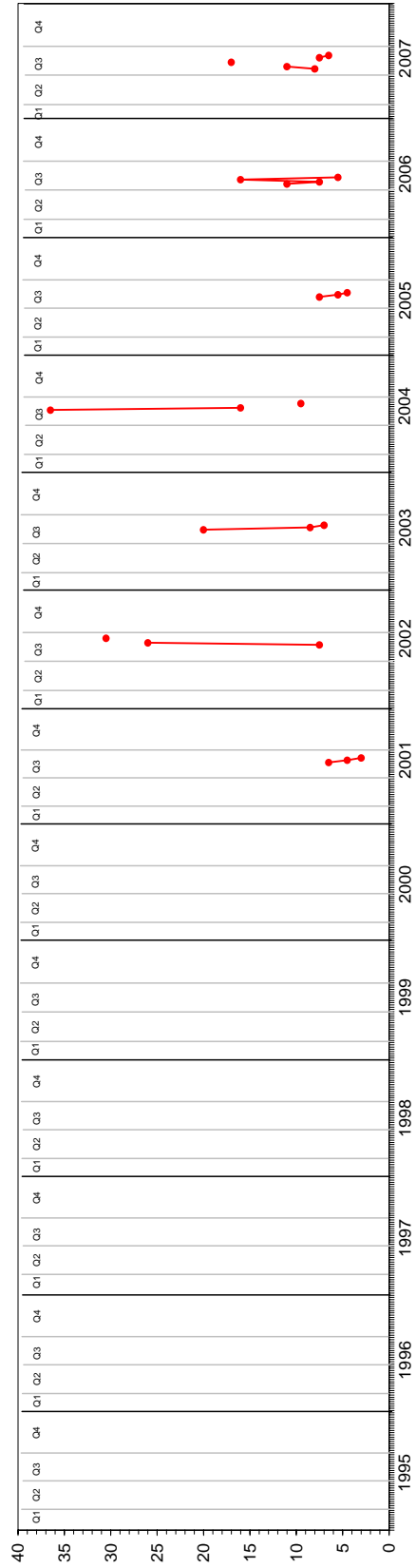


Figure 48. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Little Paradise Gillnet 3 1/4 in.

# Red Hr Gillnet 3 1/4 in

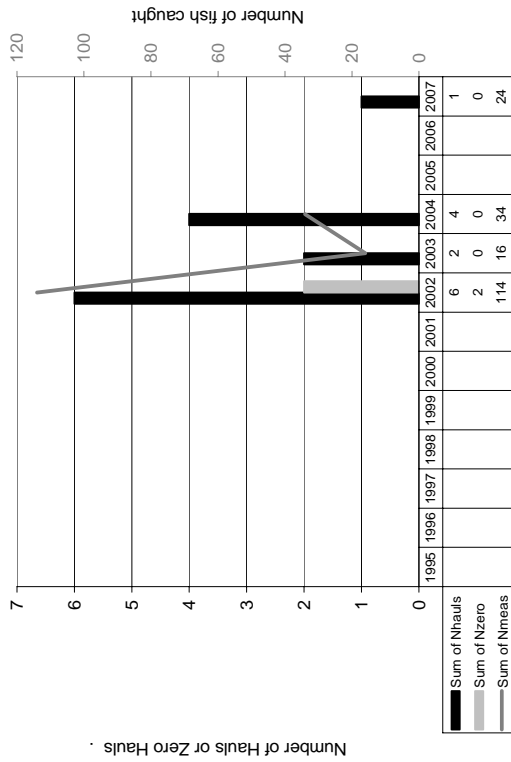


Figure 50. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Red Hr Gillnet 3 1/4 in.

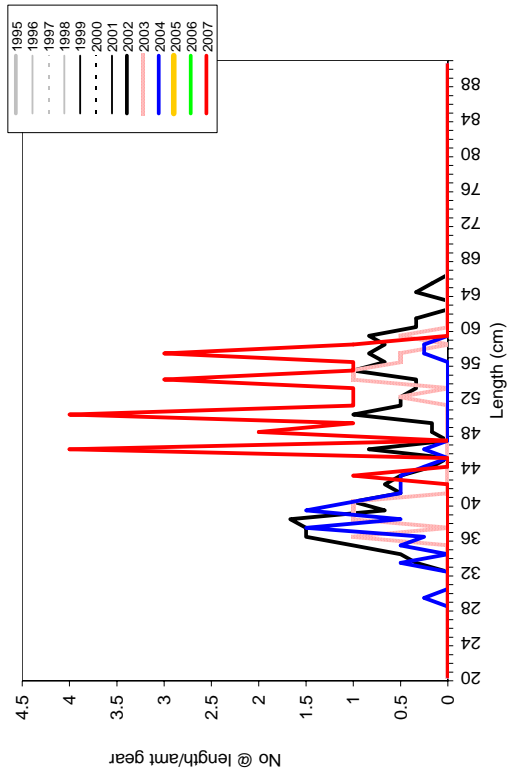


Figure 49. Relative length frequency (number at length / amount of gear) for control and experimental gears, Red Hr Gillnet 3 1/4 in.

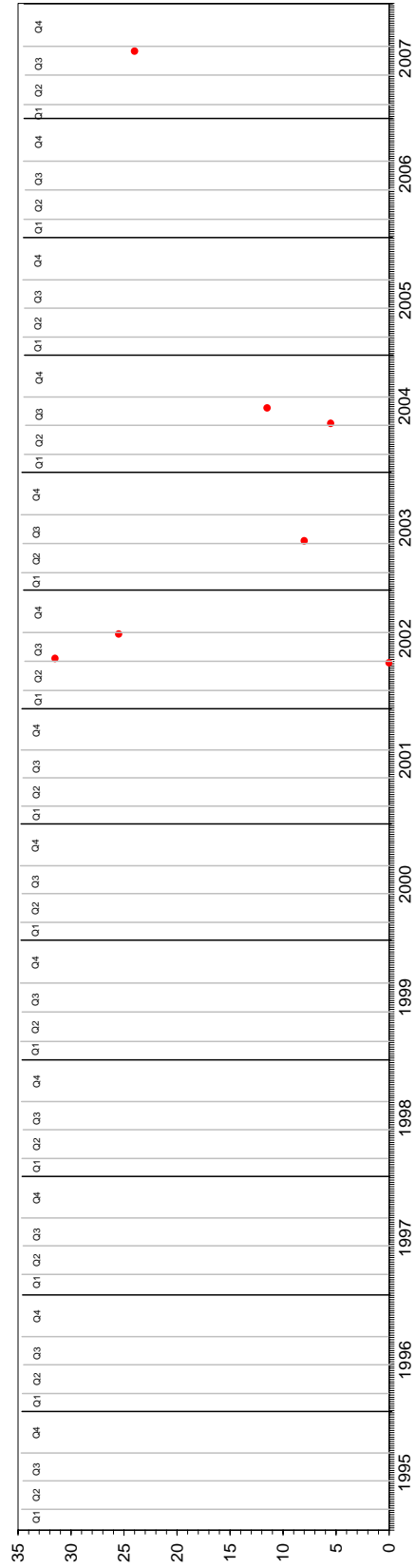


Figure 51. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Red Hr Gillnet 3 1/4 in.

### Lawn Gillnet 3 1/4 in

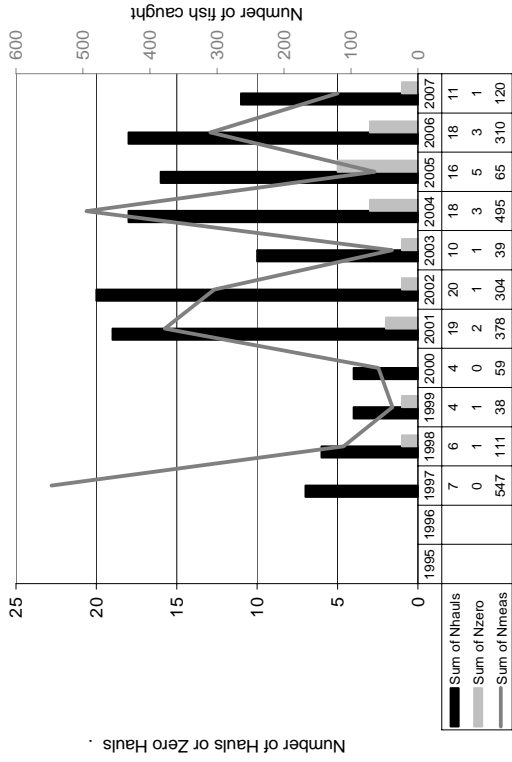


Figure 53. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Lawn Gillnet 3 1/4 in.

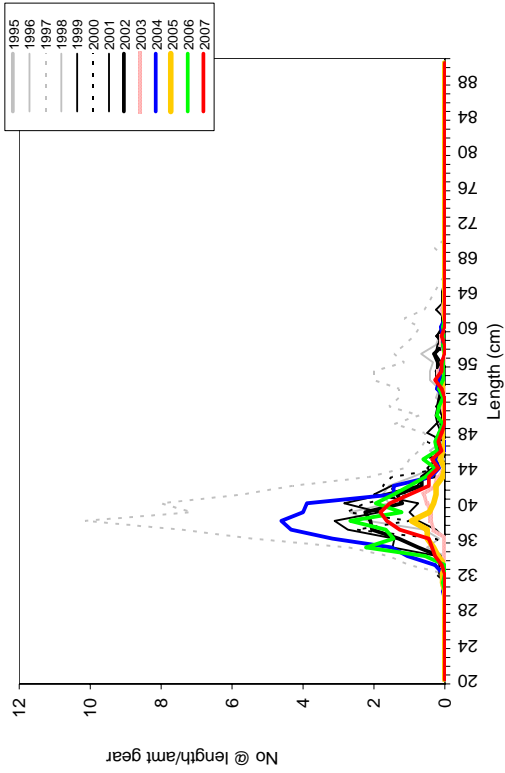


Figure 52. Relative length frequency (number at length / amount of gear) for control and experimental gears, Lawn Gillnet 3 1/4 in.

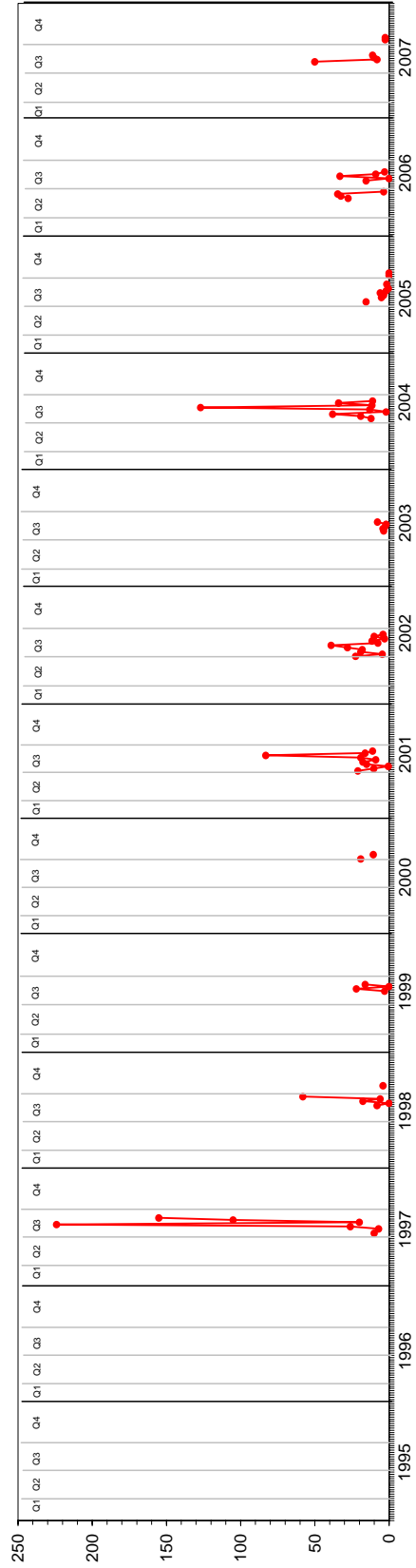


Figure 54. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Lawn Gillnet 3 1/4 in.

# Lord's Cove Gillnet 3 1/4 in

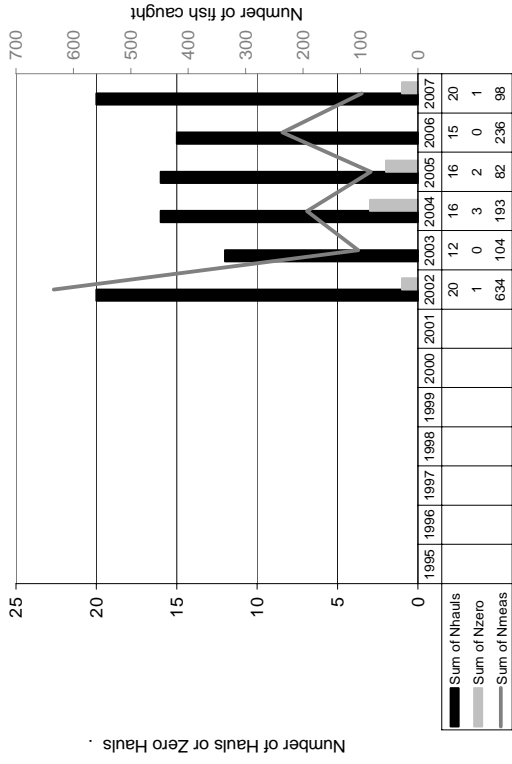


Figure 56. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Lord's Cove Gillnet 3 1/4 in.

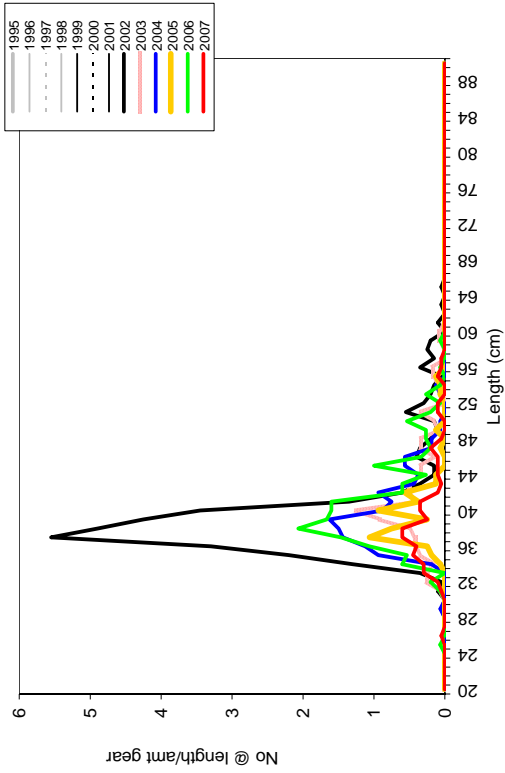


Figure 55. Relative length frequency (number at length / amount of gear) for control and experimental gears, Lord's Cove Gillnet 3 1/4 in.

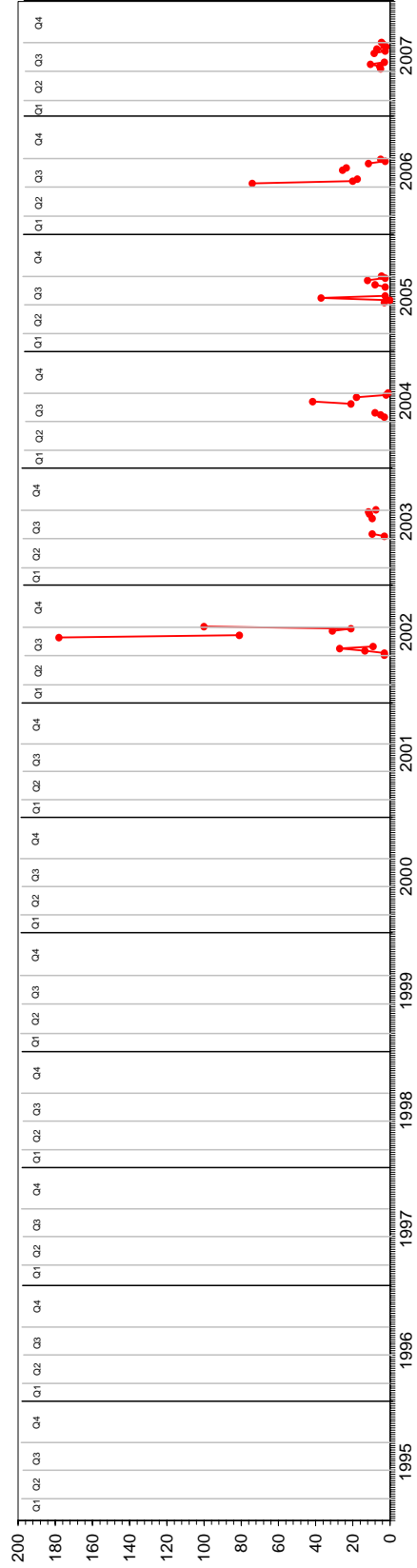


Figure 57. Catch per unit effort (in numbers of fish per net) for all sets (control and experimental) averaged for each week, Lord's Cove Gillnet 3 1/4 in.

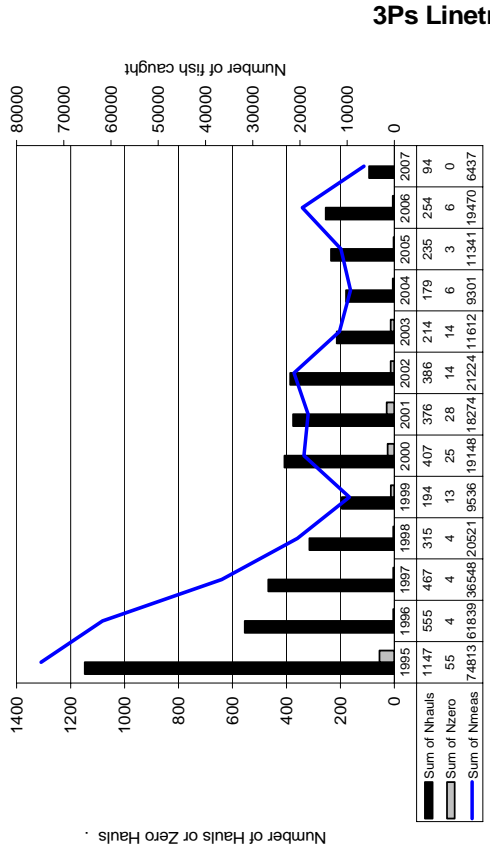


Figure 59. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, 3Ps Linetrawl .

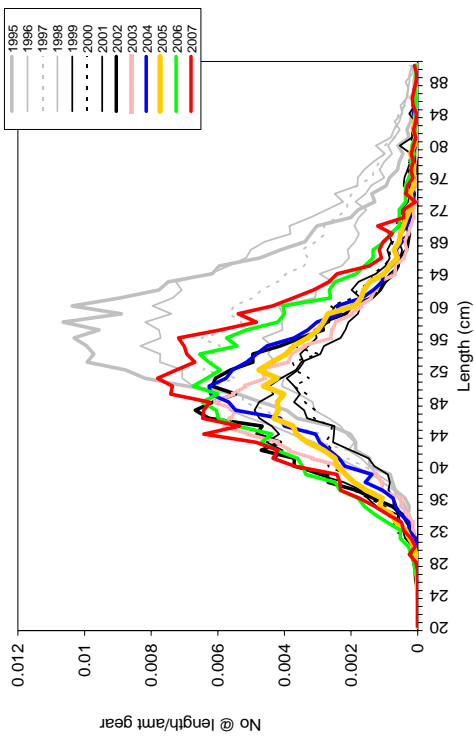


Figure 58. Relative length frequency (number at length / amount of gear) for control and experimental gears, 3Ps Linetrawl .

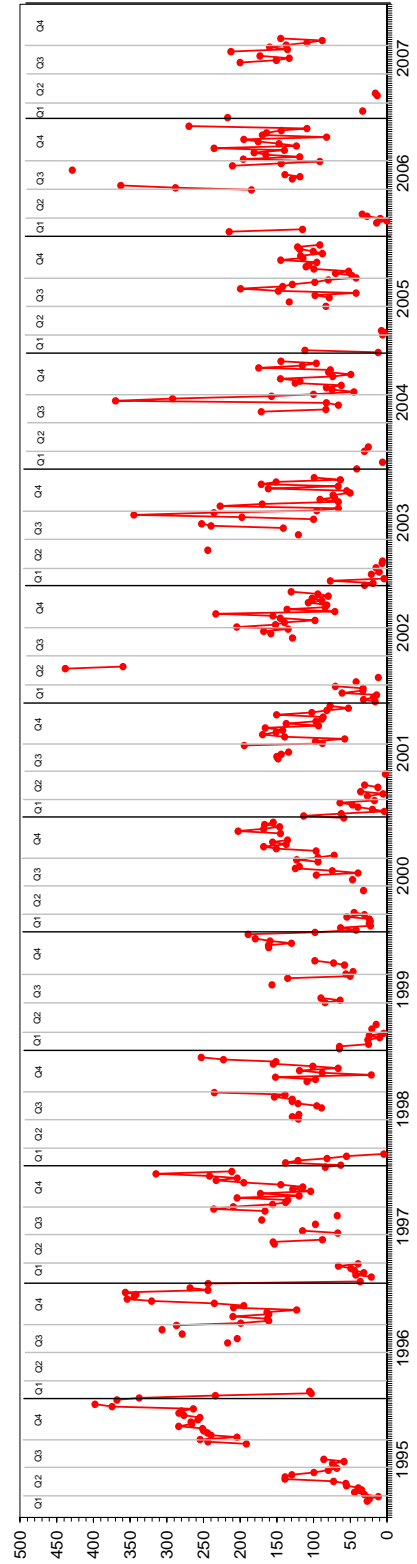


Figure 60. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, 3Ps Linetrawl .

# Little Paradise Linetrawl

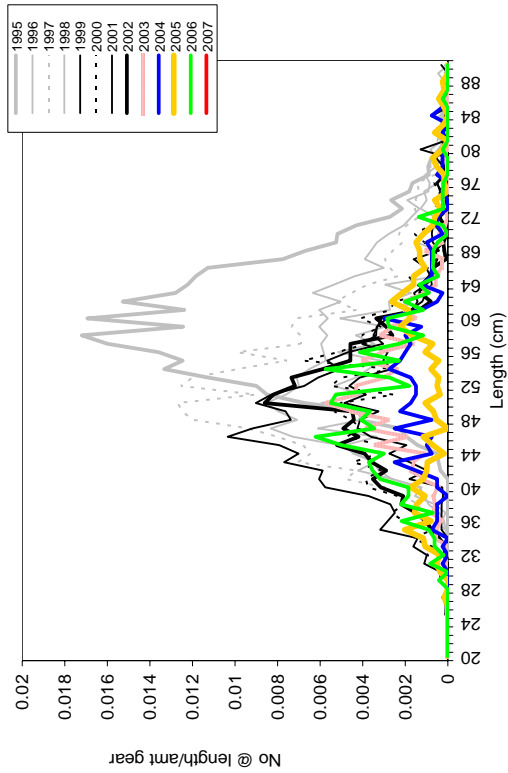
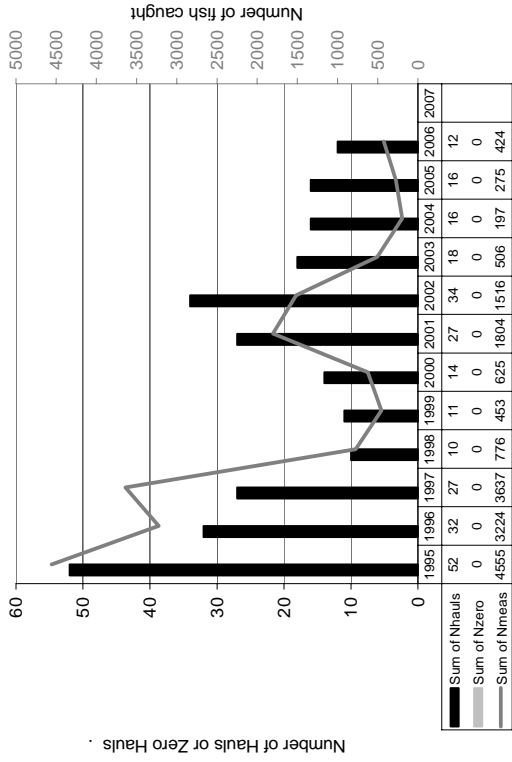


Figure 61. Relative length frequency (number at length / amount of gear) for control and experimental gears, Little Paradise Linetrawl .

Figure 62. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Little Paradise Linetrawl .

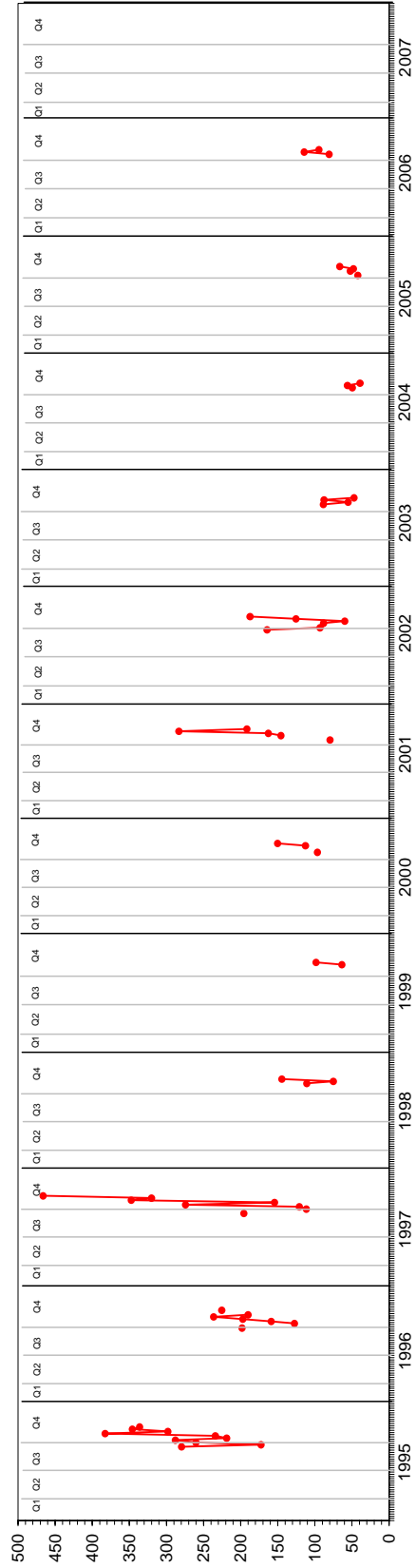


Figure 63. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Little Paradise Linetrawl .



# Red Hr Linetrawl

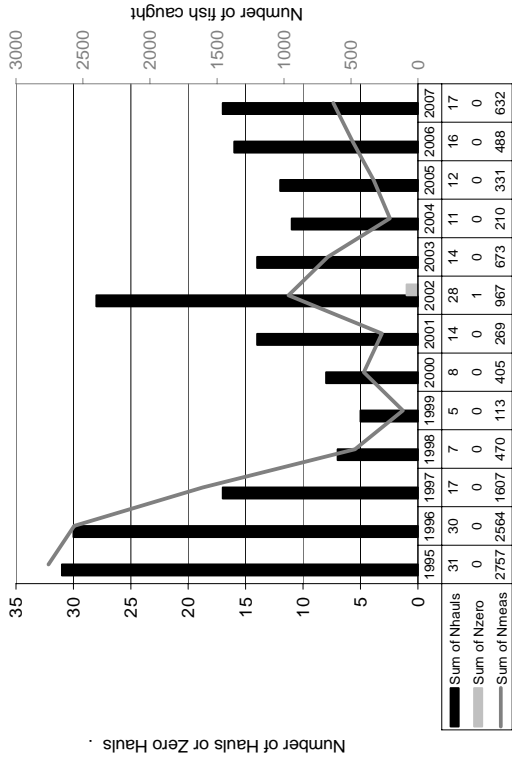


Figure 65. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Red Hr Linetrawl .

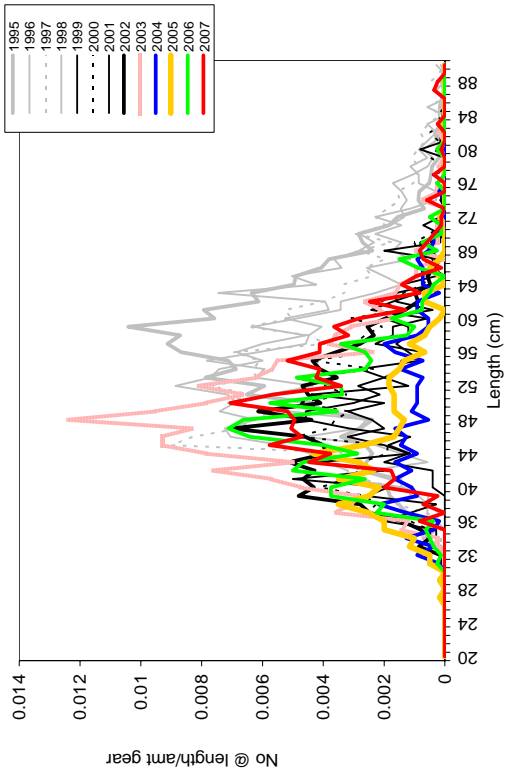


Figure 64. Relative length frequency (number at length / amount of gear) for control and experimental gears, Red Hr Linetrawl .

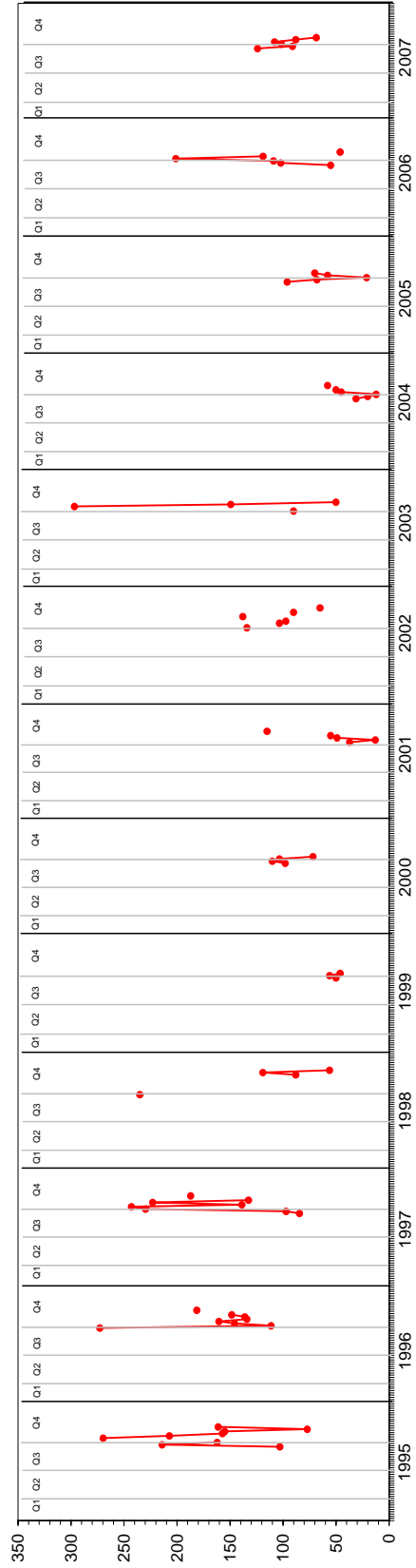


Figure 66. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Red Hr Linetrawl .

# Grand Bank Linetrawl

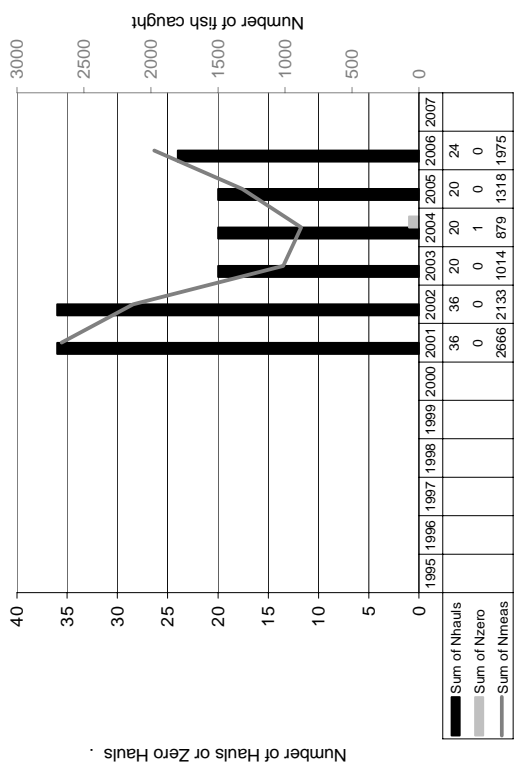


Figure 68. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Grand Bank Linetrawl.

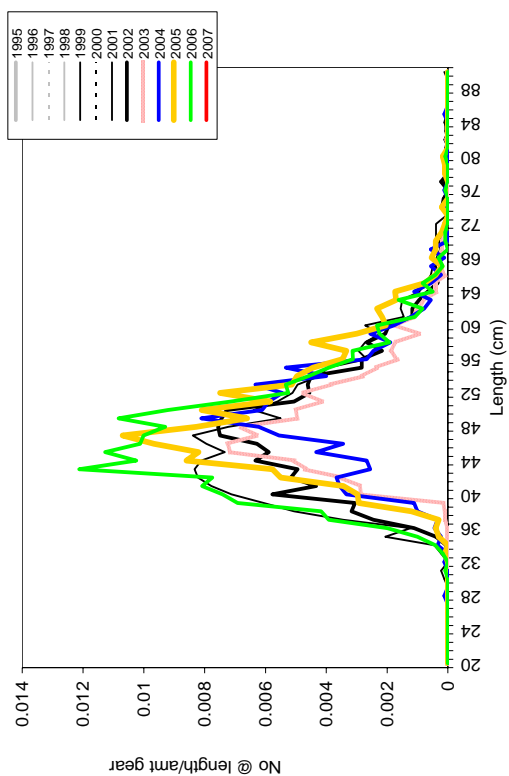


Figure 67. Relative length frequency (number at length / amount of gear) for control and experimental gears, Grand Bank Linetrawl.

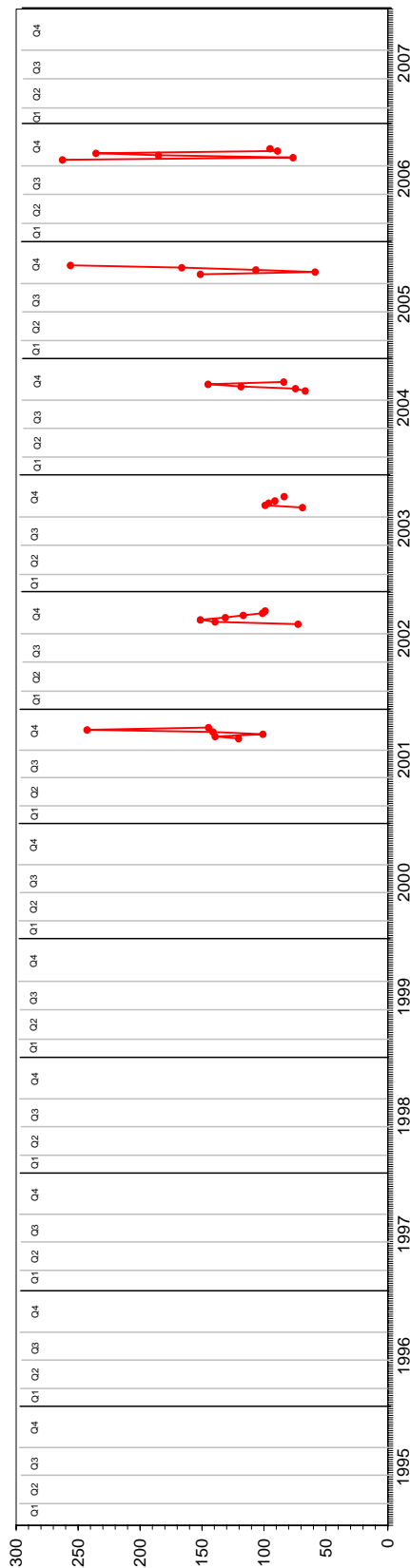


Figure 69. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Grand Bank Linetrawl.

# Rencontre East Linetrawl

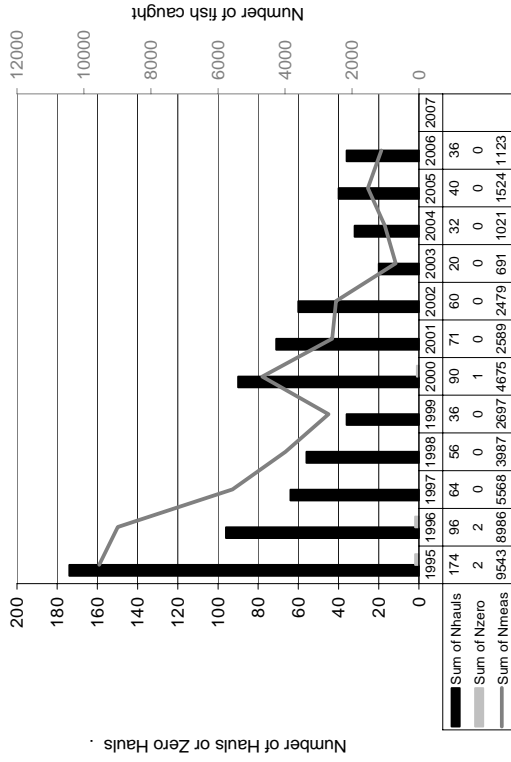


Figure 71. Number of hauls (Nhauts), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Rencontre East Linetrawl.

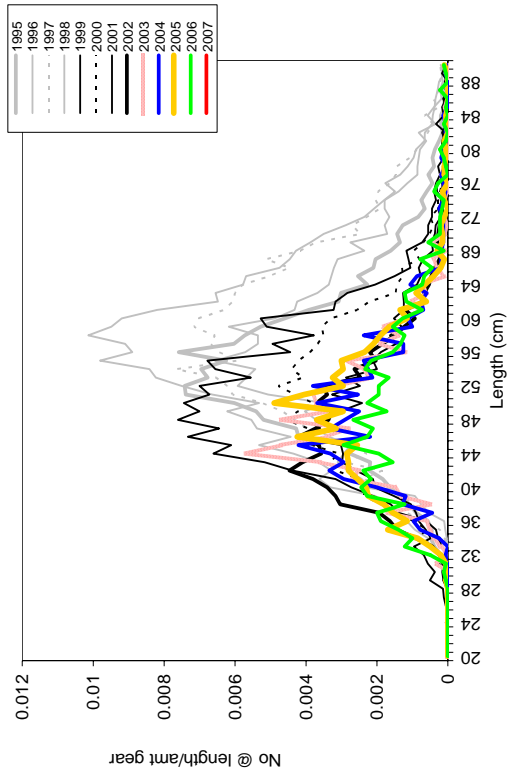


Figure 70. Relative length frequency (number at length / amount of gear) for control and experimental gears, Rencontre East Linetrawl.

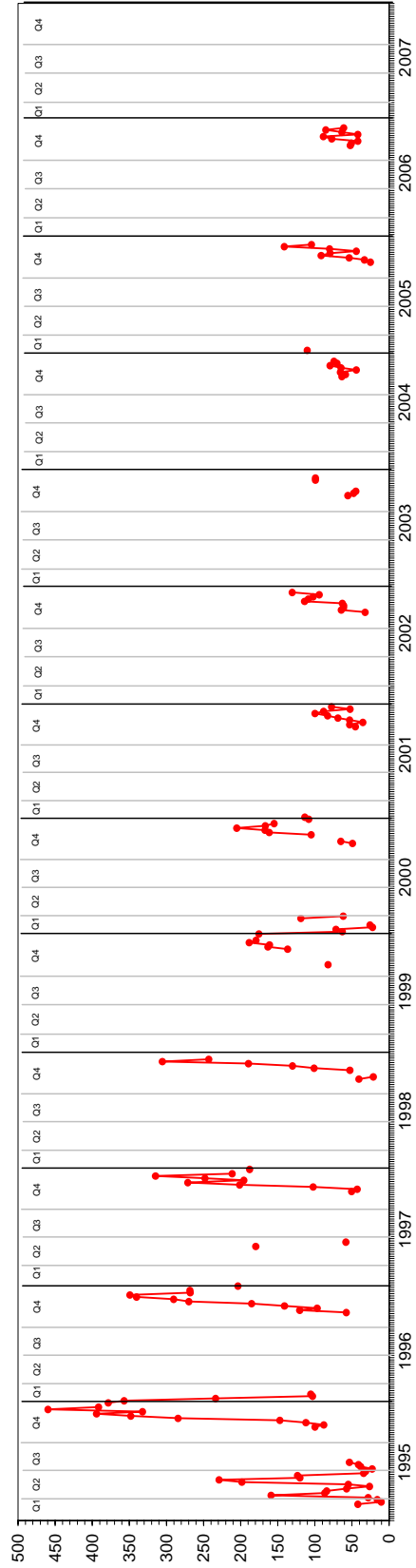


Figure 72. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Rencontre East Linetrawl.

# Hr Breton Linetrawl

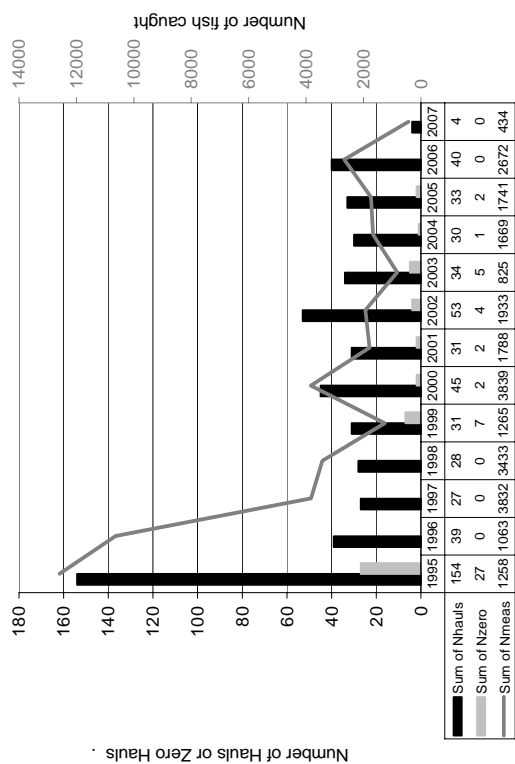


Figure 74. Number of hauls (Nhauts), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Hr Breton Linetrawl .

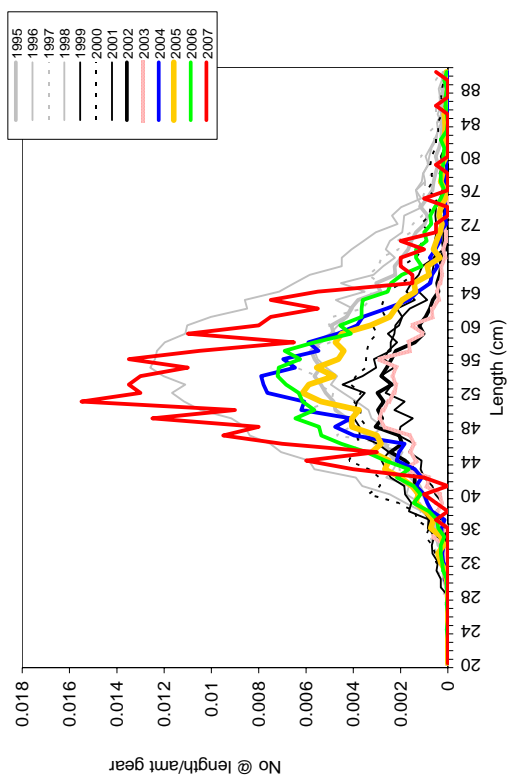


Figure 73. Relative length frequency (number at length / amount of gear) for control and experimental gears, Hr Breton Linetrawl .

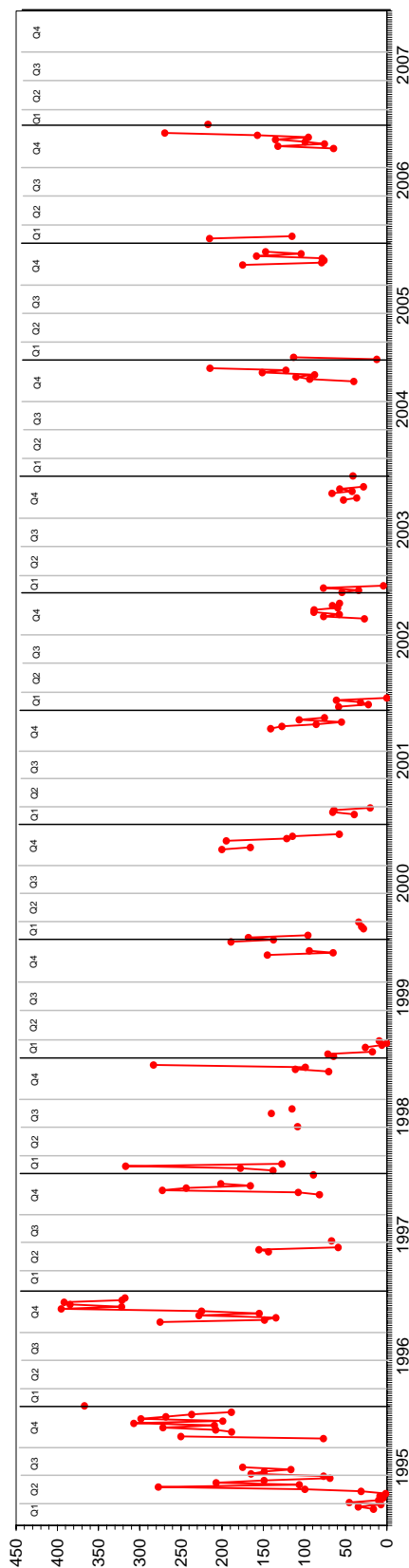


Figure 75. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Hr Breton Linetrawl .

# Francois Linetrawl

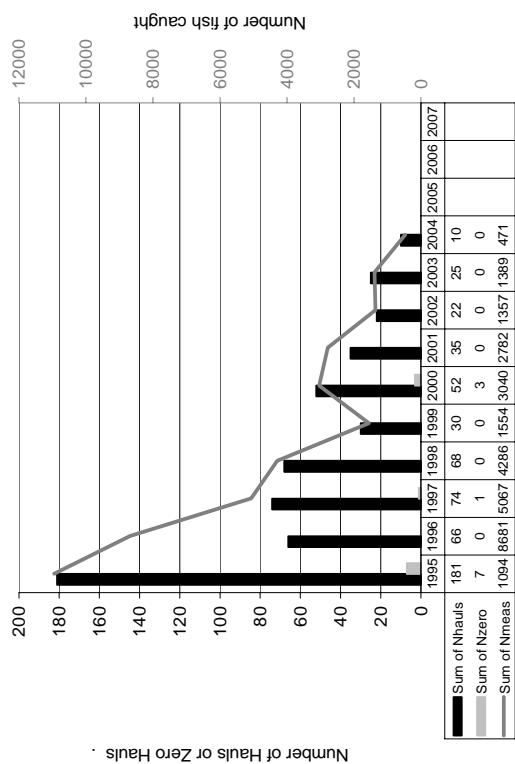


Figure 77. Number of hauls (Nhauts), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Francois Linetrawl .

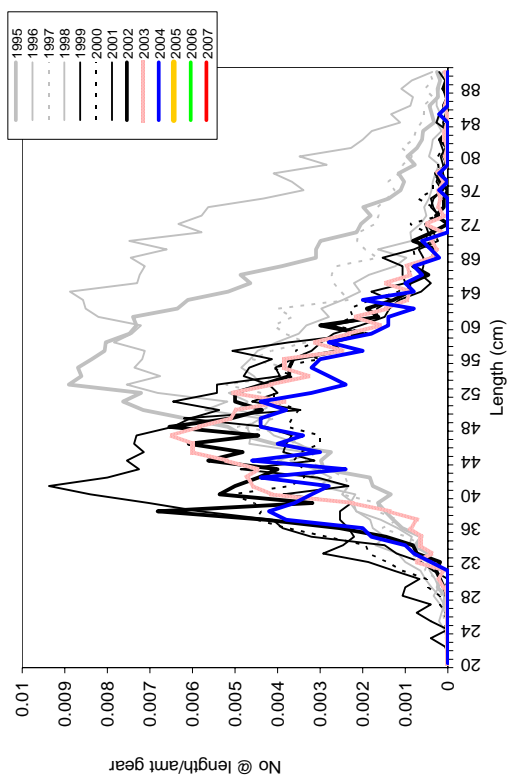


Figure 76. Relative length frequency (number at length / amount of gear) for control and experimental gears, Francois Linetrawl .

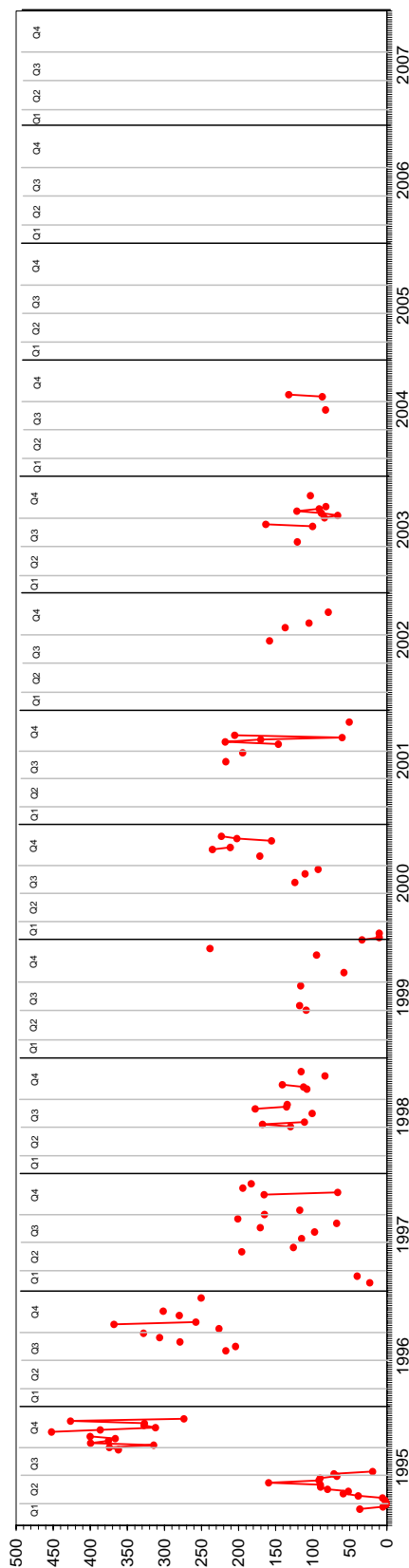


Figure 78. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Francois Linetrawl .

# Francois Linetrawl

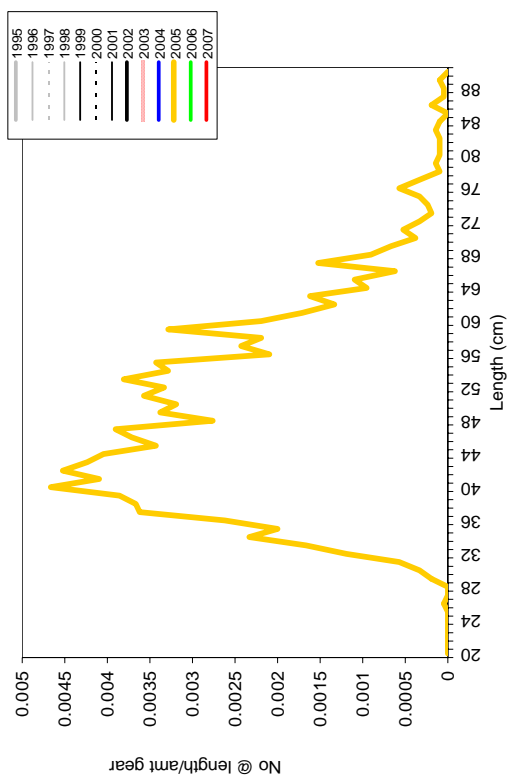
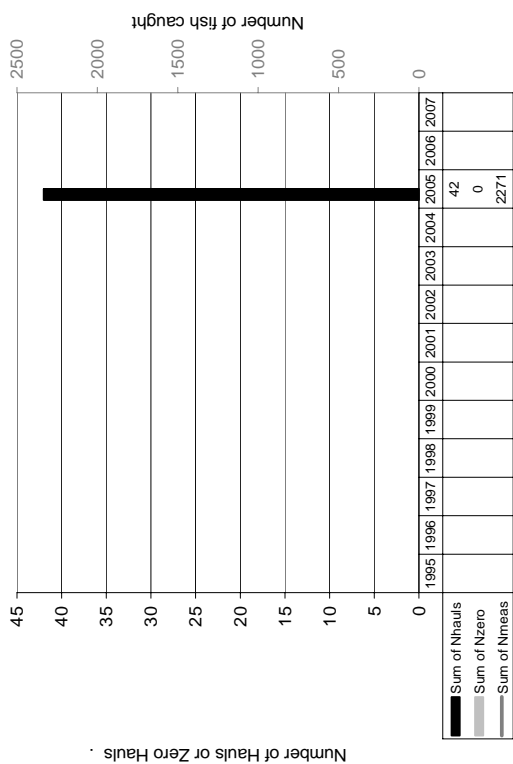


Figure 79. Relative length frequency (number at length / amount of gear) for control and experimental gears, Francois Linetrawl .

Figure 80. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Francois Linetrawl .

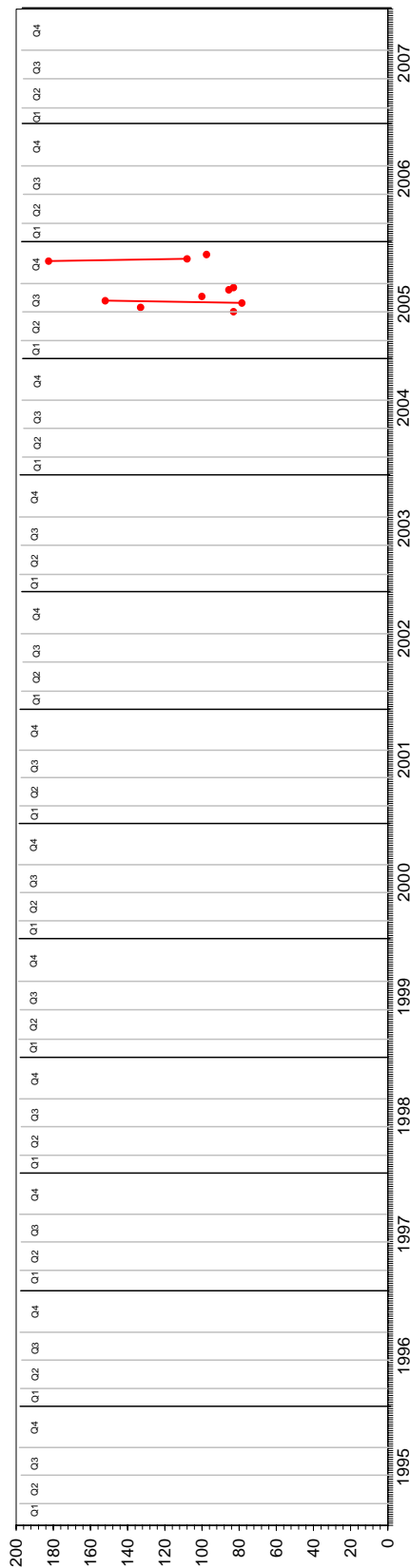


Figure 81. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Francois Linetrawl .

# Francois Linetrawl

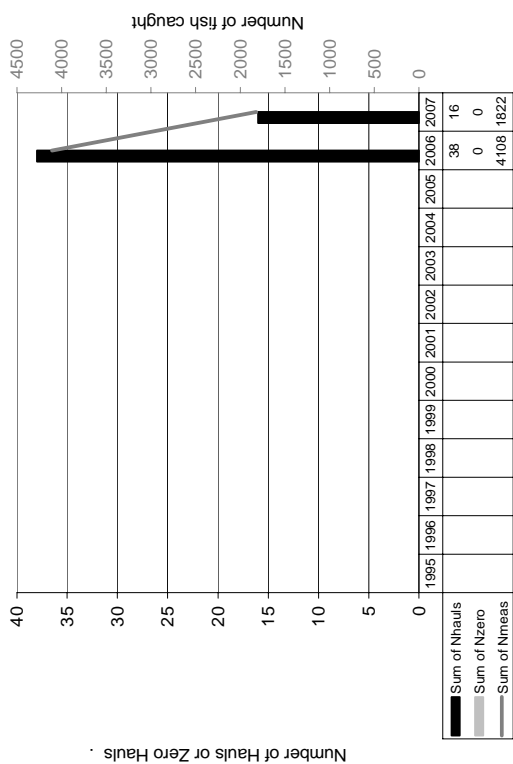


Figure 83. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Francois Linetrawl .

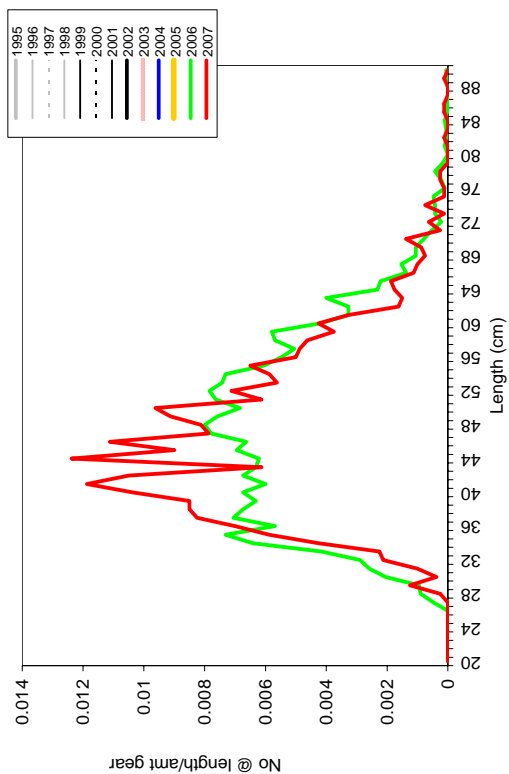


Figure 82. Relative length frequency (number at length / amount of gear) for control and experimental gears, Francois Linetrawl .

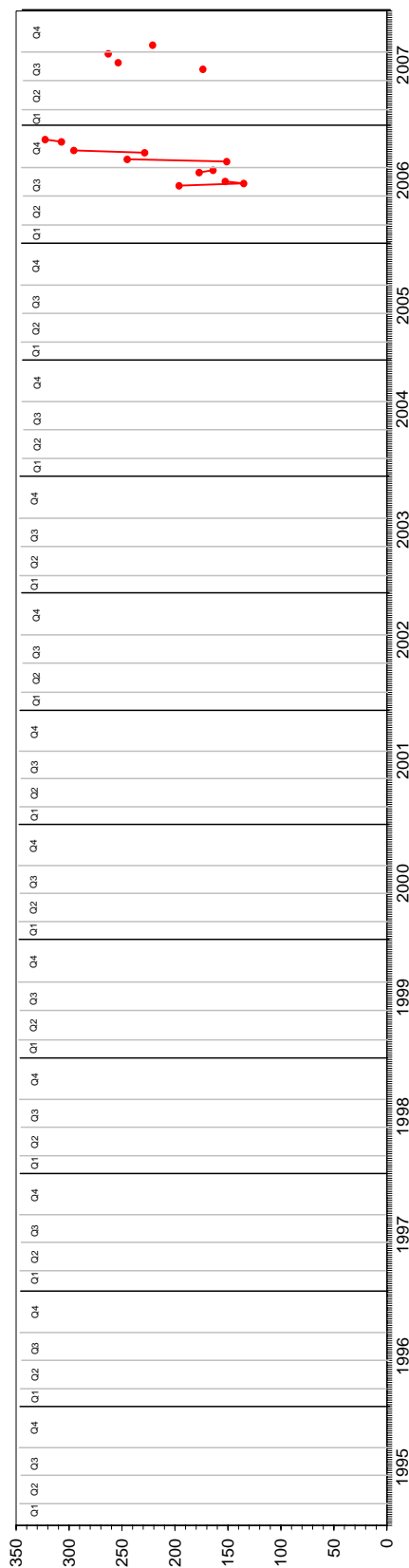


Figure 84. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Francois Linetrawl .

# Ramea Linetrawl

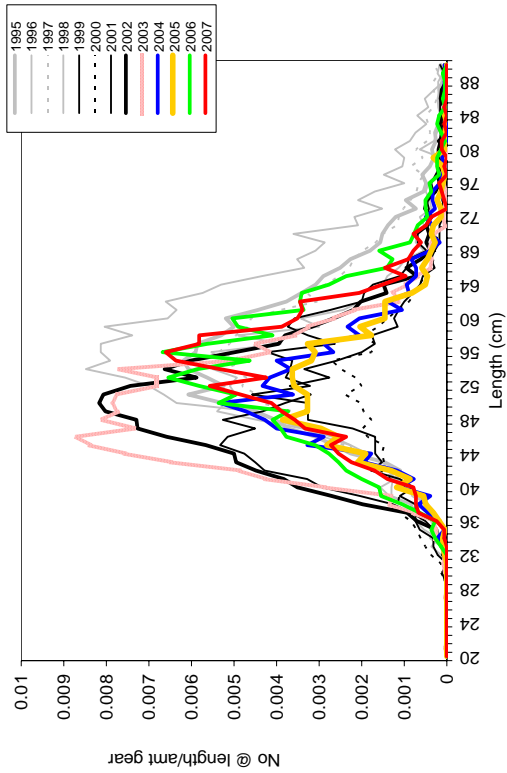
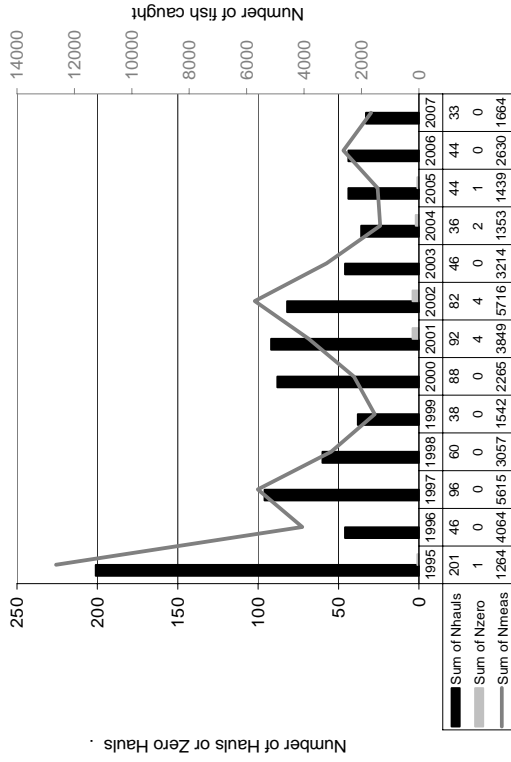


Figure 85. Relative length frequency (number at length / amount of gear) for control and experimental gears, Ramea Linetrawl .

Figure 86. Number of hauls (Nhauls), number of zero catch hauls (Nzero) and total number of fish caught (Nmeas), for control and experimental gears, Ramea Linetrawl .

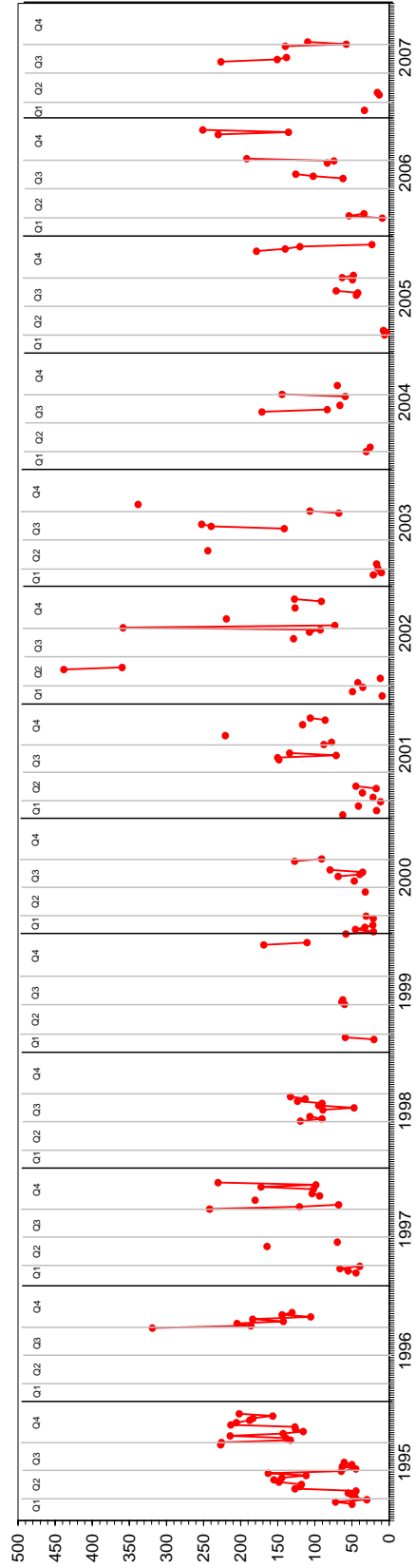


Figure 87. Catch per unit effort (in numbers of fish per 1000 hooks) for all sets (control and experimental) averaged for each week, Ramea Linetrawl .