

18127

Annex

Marine Ecology Laboratory
 JAN 4 1978
 Bedford Institute
 St. John's, N. S.

⁵
1977
Northumberland Strait Project,
Part II:
Commercial Shellfish Data

A.B. Stasko, T. Amaratunga, and J.F. Caddy

Biological Station,
 St. Andrews, N.B., EOG 2XO.

October, 1977

JAN 11 1978
 LIBRARY
 BEDFORD INSTITUTE
 OF OCEANOGRAPHY

Canada

Fisheries and Marine Service
Manuscript Report No. 1432

#2



Fisheries and Environment
 Canada

Pêches et Environnement
 Canada

Fisheries
 and Marine Service

Service des pêches
 et de la mer

Fisheries and Marine Service

Manuscript Reports

These reports contain scientific and technical information that represents an important contribution to existing knowledge but which for some reason may not be appropriate for primary scientific (i.e. *Journal*) publication. They differ from Technical Reports in terms of subject scope and potential audience: Manuscript Reports deal primarily with national or regional problems and distribution is generally restricted to institutions or individuals located in particular regions of Canada. No restriction is placed on subject matter and the series reflects the broad interests and policies of the Fisheries and Marine Service, namely, fisheries management, technology and development, ocean sciences and aquatic environments relevant to Canada.

Manuscript Reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report will be abstracted by *Aquatic Sciences and Fisheries Abstracts* and will be indexed annually in the Service's index to scientific and technical publications.

Numbers 1-900 in this series were issued as Manuscript Reports (Biological Series) of the Biological Board of Canada, and subsequent to 1937 when the name of the Board was changed by Act of Parliament, as Manuscript Reports (Biological Series) of the Fisheries Research Board of Canada. Numbers 901-1425 were issued as Manuscript Reports of the Fisheries Research Board of Canada. The series name was changed with report number 1426.

Details on the availability of Manuscript Reports in hard copy may be obtained from the issuing establishment indicated on the front cover.

Service des pêches et des sciences de la mer

Manuscrits

Ces rapports contiennent des renseignements scientifiques et techniques qui constituent une contribution importante aux connaissances actuelles mais qui, pour une raison ou pour une autre, ne semblent pas appropriés pour la publication dans un journal scientifique. Ils se distinguent des Rapports techniques par la portée du sujet et le lecteur visé; en effet, ils s'attachent principalement à des problèmes d'ordre national ou régional et la distribution en est généralement limitée aux organismes et aux personnes de régions particulières du Canada. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques du Service des pêches et de la mer, notamment gestion des pêches; techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

Les Manuscrits peuvent être considérés comme des publications complètes. Le titre exact paraît au haut du résumé de chaque rapport, qui sera publié dans la revue *Aquatic Sciences and Fisheries Abstracts* et qui figurera dans l'index annuel des publications scientifiques et techniques du Service.

Les numéros de 1 à 900 de cette série ont été publiés à titre de manuscrits (Série biologique) de l'Office de biologie du Canada, et après le changement de la désignation de cet organisme par décret du Parlement, en 1937, ont été classés en tant que manuscrits (Série biologique) de l'Office des recherches sur les pêcheries du Canada. Les numéros allant de 901 à 1425 ont été publiés à titre de manuscrits de l'Office des recherches sur les pêcheries du Canada. Le nom de la série a été changé à partir du rapport numéro 1426.

La page couverture porte le nom de l'établissement auteur où l'on peut se procurer les rapports sous couverture cartonnée.

Fisheries and Marine Service
Manuscript Report 1432

October 1977

1975 NORTHUMBERLAND STRAIT PROJECT, PART II: COMMERCIAL SHELLFISH DATA

by

A. B. Stasko, T. Amaratunga, and J. F. Caddy

Invertebrates and Plants
Resource Branch
Fisheries Management - Maritimes
Department of Fisheries and Environment
Fisheries and Marine Service
Biological Station
St. Andrews, New Brunswick E0G 2X0

This is the second Manuscript Report in this series from
the Biological Station, St. Andrews, N.B.

ABSTRACT

Stasko, A. B., T. Amaratunga, and J. F. Caddy. 1977. 1975 Northumberland Strait Project, Part II: Commercial shellfish data. Fish. Mar. Serv. MS Rep. 1432, 29 p.

This is the second of two data-repository reports from 1975 Northumberland Strait Project. It presents data on lobsters (*Homarus americanus*), scallops (*Placopecten magellanicus*), rock crabs (*Cancer irroratus*), and sea urchins (*Strongylocentrotus droehbachiensis*). Numbers of animals caught in the beam trawl and scallop dredge are listed by station with relevant environmental data. Also listed for each station are average test diameter of sea urchins and subtotals of lobster catch by shorts-canners-markets categories.

From the lobster and rock crab survey with lobster traps, catch data are listed by station and date and are subdivided by sex. Individual lobsters were examined for carapace length, sex, width of female second abdominal segment, intermoult stage, claw loss, regeneration, and external eggs. Individual rock crabs were examined for carapace width, sex, intermoult stage, external eggs, condition of vas deferens and ovary, and presence of external sperm plugs in female.

Key words: baseline survey, Northumberland Strait, shellfish, fisheries, lobsters, rock crabs, substrate, scallops, sea urchins

RÉSUMÉ

Stasko, A. B., T. Amaratunga, and J. F. Caddy. 1977. 1975 Northumberland Strait Project, Part II: Commercial shellfish data. Fish. Mar. Serv. MS Rep. 1432, 29 p.

Le présent rapport fait suite au premier rapport sur l'expérience menée dans le détroit de Northumberland, en 1975. Les observations faites sur les homards (*Homarus americanus*), les pétoncles (*Placopecten magellanicus*), les crabes communs (*Cancer irroratus*), et les oursins (*Strongylocentrotus droehbachiensis*) y sont exposées. Le classement d'animaux capturés dans le chalut à perche ou la drague à pétoncles a été établi d'après les lieux de prise, sur lesquels sont fournies des données relatives au milieu. En outre, pour chaque lieu de prise, le diamètre moyen des oursins a été déterminé et les homards ont été classés en trois catégories: taille non réglementaire, pour la conserverie ou pour la vente au marché.

En ce qui concerne les homards et les crabes capturés dans des casiers, ils ont été classés selon le jour et l'endroit de la prise et selon le sexe. Les observations faites sur des spécimens d'homards ont porté sur les points suivants: longueur de la carapace, sexe, largeur du deuxième segment abdominal de la femelle, phase précédant la mue, perte de pince, régénération et ponte fixée à l'extérieur; pour les crabes, ce sont les points ci-après qui ont été étudiés: largeur de la carapace, sexe, phase précédant la mue, ponte fixée à l'extérieur, état du canal déférent et des ovaires, ainsi que la présence de dépôts de sperme chez la femelle.

FOREWORD

The Northumberland Strait Project was conceived in the winter of 1974-75 as a 2-yr, jointly funded, Federal-Provincial study of the shellfish resources of Northumberland Strait. The main purpose of the first year of the study was to provide a baseline description of the physical and biological environment of the scallop and lobster grounds in the Strait. In the second year it was planned to carry out more specific experiments, observations and detailed through-season measurements of selected parameters identified during the first year as being of particular importance to understanding shellfish distribution and abundance. Unfortunately, due to financial considerations and other priorities, the second year of the study was largely occupied in description, tabulation, and analysis of the voluminous data collected during the first year of the project. Analysis of selected aspects of the data base is in progress. Because of its immediate relevance to environmental impact studies in the Strait, the raw data are presented in two reports, in this one and in Caddy et al. (1977).

The original conception of the joint study by Federal, Provincial, and University groups was to carry out standard observations on a variety of parameters at a fixed number of stations throughout the Strait during the summer months, placing particular emphasis on:

- a) commercial shellfish and fish abundance (trapping, trawling and dredging),
- b) benthic fauna (grab sampling, beam trawling),
- c) sedimentary regime (grab sampling and coring).

In selecting parameters to measure at each station, relatively little emphasis was placed on those variables (in particular the properties of the overlying water masses) which are subject to wide variations on a seasonal, tidal, or diurnal basis. Inevitably, however, there are periodic components in many of the variables measured, e.g. water temperature, vulnerability to trapping of crustacea, benthic biomass and species composition. This is further complicated by the fact that the survey spanned more than 3 mo during which time there were progressive changes in seasonally linked variables such as bottom temperature. The geographical impact of this potential source of bias was compensated for as much as possible by randomizing the sequence of stations occupied and, in the case of the trap fishing, by repeating the observations at most stations. However, it may still be necessary in some cases, when comparing subsets of data, to take into account the sampling dates. The methods of sampling were not always ideally suited to the wide range of material collected, as was evidently the case for marine algae taken incidentally in

the beam trawl. In general, it may be safer to regard the beam trawl data more as an indicator of presence of a particular species on a given station or perhaps as a measure of the ranked abundance, rather than as fully quantitative data.

ACKNOWLEDGMENTS

The authors wish to express their appreciation to the Provincial Departments of Fisheries of New Brunswick, Prince Edward Island, and Nova Scotia for cooperation and financial assistance, to Huntsman Marine Laboratory, and to the Universities of New Brunswick and Moncton for cooperation in the course of the study. The Department of Fisheries and Environment provided a significant part of the funding and manpower for this study.

Many individuals contributed to the group effort, but major accreditation for sections of the data included in the two reports is given in the following section.

PARTICIPATION IN THE STUDY

Mr. E. M. Gorman, Department of Fisheries and Environment, chaired the steering committee consisting of the three Deputy Ministers of Fisheries of the three maritime provinces, J. Mullaly, L. Chenard, and L. D. Johnston. Overall scientific coordination was the responsibility of J. F. Caddy, St. Andrews Biological Station, with A. B. Stasko acting as coordinator for crustacean studies. T. Amaratunga coordinated data compilation for the two reports. B. R. McMullin was field geologist and R. A.

Chandler, D. E. Graham, and C. A. Dickson were responsible for faunal sampling aboard the *M. V. HARENGUS* (E. H. Benham, master). E. I. Lord, C. D. Burnett, and J. Talbot assisted in faunal sorting and identification, much of which was carried out at the Prince Edward Island Fisheries Training Center and the Pictou School of Fisheries. Capts. K. Merriam and R. Hemphill, directors of these establishments offered valuable cooperation and assistance to the field team.

Special scientific accreditation for sections of the data is as follows:

<u>Subject</u>	<u>Individuals</u>	<u>Organization</u>
Algal studies	T. Edelstein	National Research Council, Halifax
	L. Marks	" " " "
	J. McLachlan	" " " "
Benthic studies Amphipod identification Polychaete identification	T. Amaratunga	Huntsman Marine Laboratory, St. Andrews
	M. J. Dadswell	" " " "
	L. E. Linkletter	" " " "
Fish studies	T. Amaratunga	" " " "
	M. J. Dadswell	" " " "
	L. E. Linkletter	" " " "
Scallop studies	L. E. Linkletter	" " " "
Sediment analysis	H. W. van de Poll	Dept. of Geology, University of New Brunswick
	B. R. McMullin	
Commercial crustacea	A. B. Stasko	DFE, Biological Station, St. Andrews
	L. Marks	Dept. of Fisheries, Nova Scotia
	C. Stewart	" " " "
Computer analysis Fauna	A. Sreedharan	DFE, Biological Station, St. Andrews
	G. Fawkes	" " " "
	G. A. P. Black	" " " "
	C. Stewart	Dept. of Fisheries, Nova Scotia
Geology	B. R. McMullin	Dept. of Geology, University of New Brunswick
Algae	A. Taylor	National Research Council, Halifax
Coordination with GURBA	J. S. S. Lakshminarayana	Université de Moncton
Gear (beam trawl) design	T. J. Foulkes	DFE, Biological Station, St. Andrews

INTRODUCTION

Northumberland Strait in the southern Gulf of St. Lawrence (Fig. 1) has supported a wide variety of fisheries (Caddy and Chandler 1976). During the last two decades there has been a drastic decline in the shellfish landings (Fig. 2 and 3), notably lobster and scallop (Amaratunga et al. 1976). Concern for the future of the shellfish fisheries led to the 1975 Northumberland Strait Project, a broad-scope, interdisciplinary survey of the Northumberland Strait designed to collect information on physical and biological parameters related to the life history and production of shellfish, especially lobsters, scallops and crabs.

Data on the physical environment and benthic flora and fauna resulting from this project will be presented in a report by Caddy et al. (1977). The present report pertains to some of the commercially important shellfish: lobsters, scallops, rock crabs, and sea urchins. A more detailed analysis of catch data from sampling with lobster traps was reported by Stasko (1976).

SAMPLING STATIONS

Northumberland Strait was divided into two parts along the boundary between lobster districts 8 (areas A and B) and 7B (areas C and D) with a total of 96 sampling stations (Fig. 1). In areas A and B (sta. 1-48) sampling was

done before the fall lobster season. In areas C and D (sta. 49-96) sampling was done after the spring lobster season had closed (Amaratunga et al. 1976). The 96 stations were first occupied once by the *M. V. HARENGUS* fishing with a beam trawl and a scallop dredge, then twice by chartered lobster boats fishing standard 3-bow lobster traps. The *HARENGUS* sampled stations 1-48 (lobster district 8) from June 2 to July 13, and stations 49-96 (lobster district 7B) from July 15 to August 1 (Caddy et al. 1977).

The same stations were occupied by the lobster boats twice (Stasko 1976). Stations 1-48 were sampled from June 17 to July 25, with approximately 3 wk between the two collections at each station. Two lobster boats fished from opposite sides of the Strait, each boat generally alternating transects between areas A and B. A similar plan was followed for stations 49-96 from July 23 to September 18. Ten of the 96 stations were sampled only once, resulting in a total of 182 collections.

There were nine other principal stations off St. Edouard-de-Kent, N. B. (Fig. 4) that were occupied by the lobster boats at intervals from mid May to late October. These stations were grouped into three depth ranges (also conforming to three distances offshore), each depth range having three types of substrate as determined by grab samples (Table 1).

Stations - Northumberland Strait Project

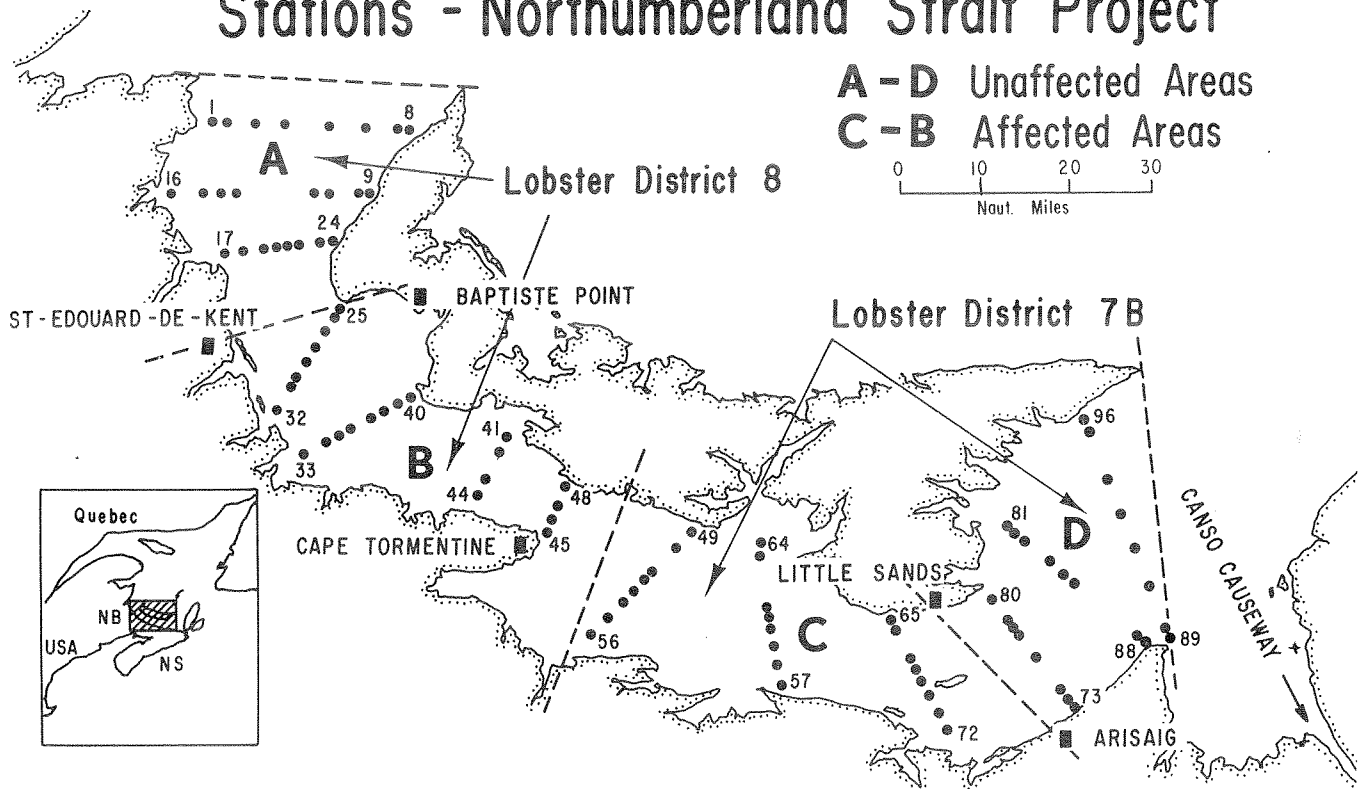


Fig. 1. Study area in Northumberland Strait showing boundaries of the four areas and location of sampling stations 1-96.

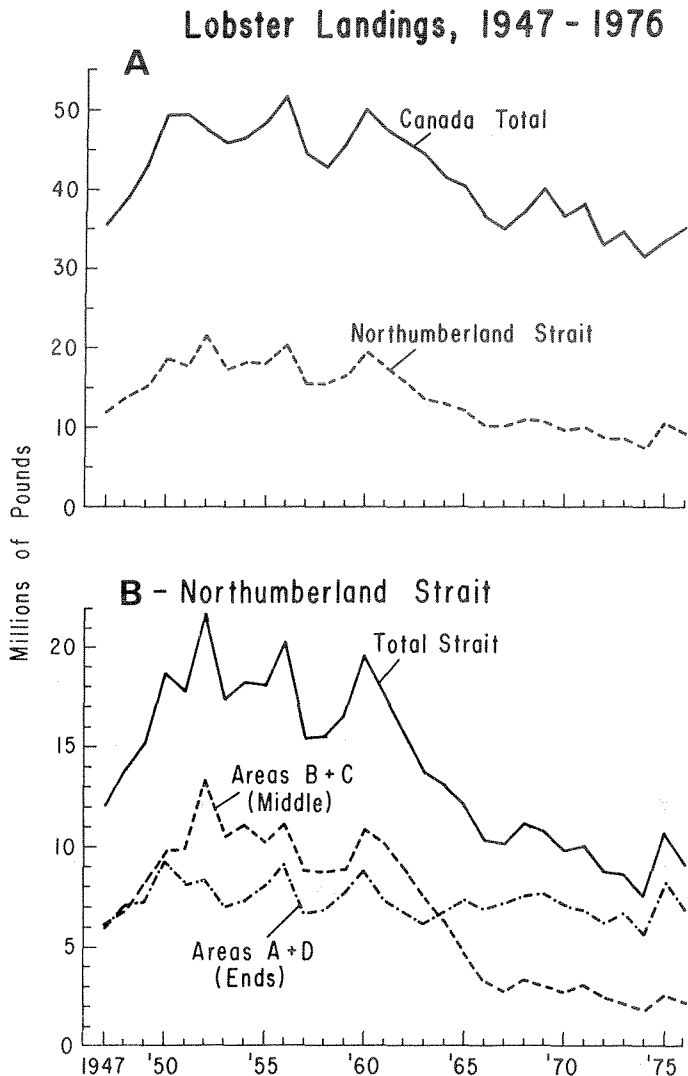


Fig. 2. Annual lobster landings from 1947 to 1976 for Canada and Northumberland Strait.

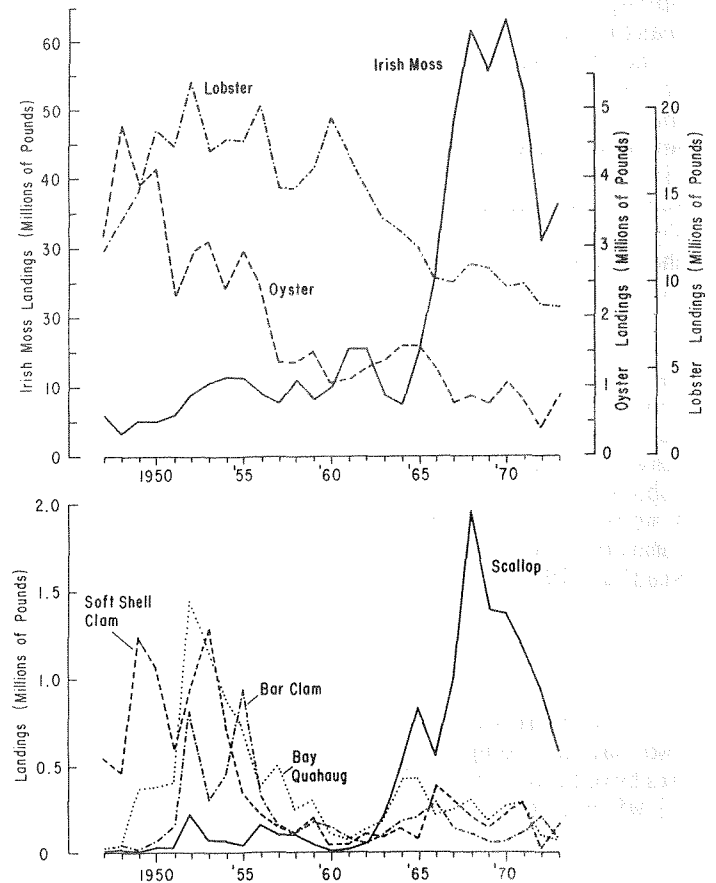


Fig. 3. Annual landings of some major fisheries in Northumberland Strait 1947-1973.

M. V. HARENGUS

Sampling procedure

Commercial shellfish were sampled from the *HARENGUS* (Caddy et al. 1977) with a beam trawl or a scallop dredge towed twice at each station over a distance of 0.5 mile (0.9 km). The beam trawl, used when the substratum was not rocky, was 3 m wide with a 2.5-cm mesh codend and two 1-cm diameter tickler chains. The scallop drag, used on rough bottom, was a gang of four 0.8-m wide steel frames with a 2.5-cm mesh liner. Catch volume was estimated using 50-l (approx.) tubs. No cross calibrations of the beam trawl and scallop dredge were made.

Species of interest for this report were sorted and studied on deck as follows.

Scallops (*Placopecten magellanicus*): animals were counted and shell height measured; a sample of upper shells of a range of sizes was retained for growth measurements.

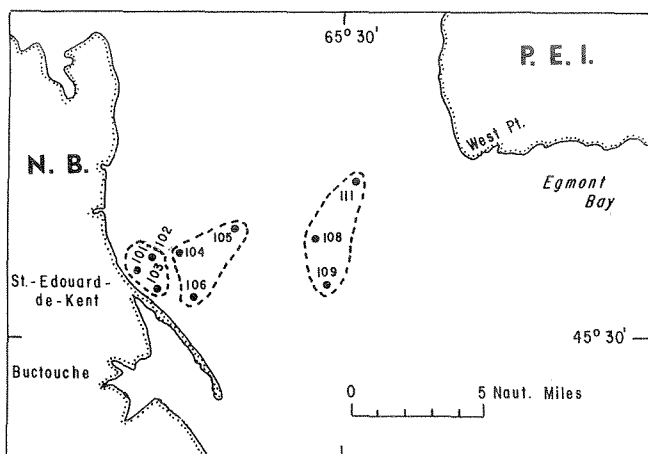


Fig. 4. Nine additional sampling stations off St. Edouard-de-Kent, N. B.

Lobsters (*Homarus americanus*): the entire catch was counted and sexed, and carapace length was measured; all specimens were released on station.

Rock crabs (*Cancer irroratus*): the entire catch was counted and sexed, and carapace width was measured; a representative sample was retained for further study.

Sea urchins (*Strongylocentrotus droehbachiensis*): numbers were estimated by subsampling and urchin test diameter was measured for up to 100 specimens.

Catch data

Station locations, sampling dates, and physical data for the 96 stations are given in Table 2. Station locations (Fig. 1), depth contours (Fig. 5), and substrate type (Fig. 6) are pertinent to both *HARENGUS* and lobster boat samples, while gear type, bottom temperature, and current velocity apply only to the *HARENGUS* collections.

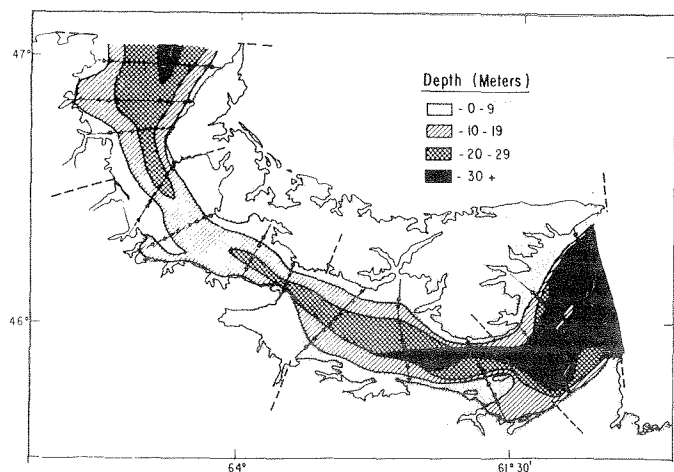


Fig. 5. Depth contours from *HARENGUS* survey data.

Counts of the commercially important species in the beam trawl and scallop dredge catches are listed by station in Table 3. Individual species are discussed below.

Scallops - Length-frequency data for all specimens caught are stored on computer tape (computer card code #7). All shells retained for growth determination were aged by taking annulus counts; shell depth, shell height, shell thickness, shell weight, and adductor muscle volume were measured. These data are reported by Linkletter (1976).

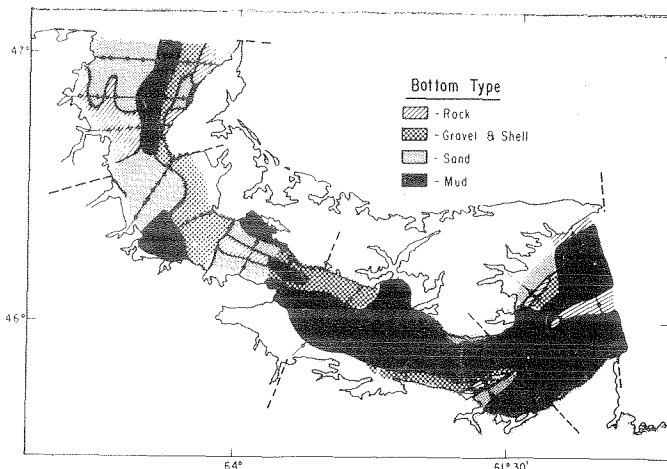


Fig. 6. Substrate type based on grab samples at the 96 stations, with some confirmation from echosounder traces and contents of beam trawl and scallop drag samples.

Lobsters - Catch data are summarized in Table 4 showing the number of animals in each of three size categories. Length-sex-frequency data are stored on computer cards (card code #909).

Sea urchins - Catch data and mean test diameter are summarized in Table 4.

LOBSTER BOATS

Sampling procedure

Standard 3-bow commercial lobster traps with two opposing entrances and one parlour were used. At stations 1-96, 10 traps were set spaced at least 20 m apart. Traps were baited with three salted gaspereaux that were completely replaced at each rebaiting. Stations were located by marker buoys set by the *M. V. HARENGUS*. Traps were hauled after a 1-day soak time, except in a few cases when storms prevented hauling. All lobsters caught were sexed, measured, examined, tagged, and released. All rock crabs were sexed and counted; up to about 100 crabs per station were also checked for intermoult stage and external eggs. Thirty crabs (15 males and 15 females, where possible) were tagged and released. At each station, when traps were set and again when lifted, measurements were taken of bottom temperature (reversing thermometer), surface temperature (hand-held thermometer in a bucket), and water turbidity (20-cm secchi disc).

At the nine principal stations (101-125, Table 1) off St. Edouard-de-Kent, 3-5 traps were set per station. Stations were occupied one to three times per sampling week. All animals collected at one station during one

week were considered as one collection for that week. Procedures for taking temperature and turbidity measurements and for sampling lobsters and crabs were similar to those described for stations 1-96. In addition, all untagged rock crabs were taken ashore for detailed examination. Salinity profiles were determined on each sampling day (with a Beckman RS-5 induction salinometer) at one inshore, one intermediate, and one offshore station.

Coding of physical factors

In computer printout Tables 5-8 the physical factors are listed in columns A-M, and biological data in columns P-Z. The physical factors are as follows:

- A) Card and boat identification code, two or three digits.
- B) Station number, three digits. Station locations are shown in Fig. 1 and 4. Locations of stations 112 and 113 and 120-125 are described in Table 1.
- C) Collection number, one digit. Two ten-trap collections, at approximately 3-wk intervals, were made at stations 1-96. At stations 1-24 collections were made during nine 1-wk periods; all samples taken at one station during one week are considered as part of one collection.
- D) Date of catch, six digits: day-month-year.
- E) Depth in meters, two digits.
- F) Substrate (bottom) type, one digit. Code 1 - rock; code 2 - gravel and shell; code 3 - mostly sand; code 4 - mud.
- G) Bottom temperature in $^{\circ}\text{C} \times 10^{-1}$, three digits, average of readings at setting and at lifting of traps (Tables 5 and 7). G' is a single reading at lifting of traps (Tables 6 and 8). In Tables 5 and 7 a few unavailable temperature readings were interpolated from readings at adjacent stations. The interpolated temperatures are identified as follows:

2.4 when temperature was between 0 and 4.9°C ; 7.4 for $5.0-9.9^{\circ}\text{C}$; 12.4 for $10.0-14.9^{\circ}\text{C}$; 17.4 for 15.0 or more.
- H) Surface temperature in $^{\circ}\text{C} \times 10^{-1}$, three digits, readings taken when traps were set. H' readings taken when traps were lifted.
- I) Secchi disc extinction depth in $\text{m} \times 10^{-1}$, two digits, measured when traps were set. I' measured when traps were lifted.

- J) Illumination or sun-cloud condition, one digit, estimated when traps were set (J) and when traps were lifted (J'). This was recorded as an aid for interpreting secchi extinction depth. Code 1 - sunny; code 2 - bright overcast; code 3 - dark overcast.
- K) Soak time or number of nights the traps were on bottom, one digit.
- L) Number of traps set per station during each sampling week, two digits.
- M) Number of traps set per station each day, one digit.

Coding of biological data

- P) Number of male lobsters caught, two digits (P' - male rock crabs, three digits).
- Q) Number of female lobsters caught, two digits (Q' - female rock crabs, three digits).
- R) Total number of lobsters caught, three digits (R' - total rock crabs, three digits).
- S) Number of berried lobsters caught, two digits (S' - berried rock crabs, two digits).
- T) Carapace length in millimeters of lobster (three digits) measured from rear edge of eye socket to rear edge of carapace along a line parallel to longitudinal axis of body.
- U) Sex, one digit. Code 1 - male; code 2 - female.
- V) Width in millimeters of second abdominal segment (two digits) of female lobsters measured from side to side across widest part at anterior of abdomen.
- W) Intermoult stage of lobsters (one digit) determined by testing carapace hardness at three positions (Fig. 7). Intermoult stages A, B, C, and D are those of Drach (1939) as modified by Aiken (1973). Code 1 - soft, rubbery, freshly moulted (Stage A); code 2 - carapace still flexible, including area 3, but no longer rubbery (Stage B and C₁); code 3 - carapace still flexible at area 1 and 2 but not at 3 (Stage C₂); code 4 - carapace still flexible at 1 but not at 2 and 3 (Stage C₃); codes 5 and 6 - carapace hard throughout (Stage C₄ to intermediate D); code 7 - carapace splits down midline of the back when pressed, membranes at outer joint of claw and lower edge of carapace are bright blue, top side of segment of

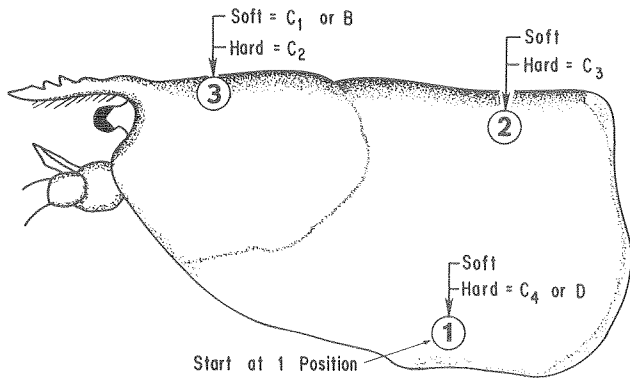


Fig. 7. Pressure points for testing carapace hardness when determining intermoult stage (after Aiken 1973).

claw next to body is dark blue and soft, animal is ready to moult.

- X) Claw loss, one digit. Code 0 - no claws lost; code 1 - one claw lost; code 2 - both claws lost.
- Y) Regenerating claws, one digit. Claw distinctly smaller than expected for the size of animal; soft limb bud indicates recent limb loss and is counted as claw loss rather than regeneration. Code 0 - no claws regenerating; code 1 - one claw regenerating; code 2 - both claws regenerating.
- Z) External eggs of lobster, one digit. Code 0 - no external eggs; code 1 - external eggs dark green to black, fresh, without eyespots; code 2 - eggs pale brownish, old, eyespots visible; code 3 - egg remnants only present.

Catch data

Four sets of data (Tables 5, 6, 7, and 8) on lobsters and rock crabs caught by lobster traps are presented. Three additional data sets on rock crabs are described.

The catch of lobsters and crabs from stations 1-96 (card code 31-34), along with data on physical factors, is listed in Table 5 in sequence of station number. Within each station the two collections are in a time sequence. At 10 stations only single collections were obtained. These stations are marked with an asterisk. The number of animals caught is subdivided by sex. Berried females are included in the female count. In a few cases where some traps were damaged or lost the catch has been prorated to represent the catch in 10 traps.

The catch of lobsters and crabs from stations 101-125 (card code 37), along with data on physical factors, is listed in Table 6 in sequence of collection week. Within each week the sequence is by station number. Within each station number the sequence is by date. The nine collection weeks were those starting May 12, May 26, June 9, June 23, July 10, July 28, August 25, September 22, and October 27.

Biological data on individual lobsters from stations 1-96 (card code 900) and stations 101-125 (card code 904) along with data on physical factors, are listed in Tables 7 and 8. Each line represents one animal. Table 7 is in sequence of station numbers. Table 8 is in sequence of dates. Only external characteristics were examined.

Biological data on individual rock crabs are not reproduced in this report. Three sets of data, however, are on file at the Biological Station in St. Andrews: card code 903 for stations 1-96 and card code 905 for stations 101-125 (trap catch), and card code 909 for stations 1-96 (beam trawl catch and scallop dredge catch).

REFERENCES

- Aiken, D. E. 1973. Proecdysis, setal development, and molt prediction in the American lobster (*Homarus americanus*). J. Fish. Res. Board Can. 30: 1337-1344.
- Amaratunga, T., J. F. Caddy, and A. B. Stasko. 1976. Northumberland Strait Project: an interdisciplinary study of the declining shellfish resources. ICES Doc. C.M.1976/K:26, 17 p.
- Caddy, J. F., T. Amaratunga, M. J. Dadswell, T. Edelstein, L. E. Linkletter, B. R. McMullin, A. B. Stasko, and H. W. van de Poll. 1977. 1975 Northumberland Strait Project, Part I: Records of benthic fauna, flora, demersal fish, and sedimentary data. Fish. Mar. Serv. MS Rep. 1431: 46 p.
- Caddy, J. F., and R. A. Chandler. 1976. Historical statistics of landing of inshore species in the maritime provinces 1947-73. Fish. Mar. Serv. Res. Dev. Tech. Rep. 639, 240 p.
- Drach, P. 1939. Mue et cycle d'intermue chez les Crustacés Décapodes. Ann. Inst. Océanogr. 19: 103-392.
- Linkletter, L. E. 1976. Scallop shell analysis. DOE Contract OSA-76-0053 Final Report Vol. III, 90 p.
- Stasko, A. B. 1976. Northumberland Strait Project: lobster and crab abundance in relation to environmental factors. ICES Doc. C.M.1976/K:25, 13 p.

Table 1. Nine principal stations off St. Edouard-de-Kent. The numbers in brackets indicate exploratory stations in the vicinity of the principal stations having similar depths and bottom types.

	<u>Station</u>	<u>Depth (m)</u>	<u>Substrate</u>
Nearshore	101 (120)	4-9	sand
	102	8-9	mud
	103	4-9	rock
Intermediate	104 (121)	10-12	mud
	105 (122,123,124)	11-14	sand
	106	12	rock
Offshore	108 (125)	13-17	sand
	109	9-14	rock
	111 (112,113)	18-21	mixed

TABLE 2. Characteristics of the 96 stations in Northumberland Strait sampled by the Harengus in 1975.
 Current velocity (Kranck 1972): 1) 0-.25 knot 2) .25-.5 3) .5-.75
 4) .75-1.0 5) 1.0+ Dredge Gear: S-Scallop Drag, B-Beam Trawl.

STATION	LATITUDE			LONGITUDE			DATE			DREDGE GEAR	DEPTH (m)	BOTTOM TEMP °C	CURRENT VEL.
	D	H	S	D	H	S	D	M	YR				
1	46	57	0	64	47	10	2	6	75	S	9	11.6	2
2	46	57	45	64	45	15	1	6	75	B	13	11.0	3
3	46	57	45	64	39	10	1	6	75	B	22	13.0	3
4	46	57	45	64	33	40	1	6	75	B	23	6.7	3
5	46	57	45	64	25	15	2	6	75	B	36	6.6	2
6	46	57	45	64	17	35	2	6	75	S	29	10.0	1
7	46	58	15	64	10	30	2	6	75	S	14	13.1	1
8	46	57	20	64	10	20	8	6	75	S	7	13.1	1
9	46	52	45	64	15	0	8	6	75	S	9	12.4	1
10	46	52	40	64	16	15	8	6	75	B	16	9.8	2
11	46	52	20	64	22	15	8	6	75	B	29	2.5	2
12	46	52	15	64	24	45	2	7	75	B	29	9.0	2
13	46	51	30	64	39	50	2	7	75	B	25	10.5	3
14	46	51	20	64	42	40	2	7	75	B	18	12.6	3
15	46	51	15	64	46	25	2	7	75	B	13	13.5	3
16	46	51	0	64	51	5	3	7	75	B	11	13.6	2
17	46	43	30	64	43	55	3	7	75	B	9	12.5	3
18	46	43	40	64	40	0	3	7	75	S	18	11.7	4
19	46	43	50	64	36	5	3	7	75	S	14	14.7	4
20	46	43	55	64	34	5	4	7	75	S	20	13.3	4
21	46	44	0	64	32	30	4	7	75	S	22	12.2	4
22	46	44	10	64	30	10	4	7	75	S	25	12.0	4
23	46	44	20	64	25	35	4	7	75	S	14	15.0	3
24	46	44	30	64	23	30	4	7	75	S	11	15.5	3
25	46	36	20	64	23	25	4	7	75	S	7	17.0	5
26	46	35	35	64	24	0	1	7	75	B	13	14.2	5
27	46	33	30	64	25	30	10	6	75	B	22	9.3	5
28	46	31	20	64	27	10	6	6	75	B	22	6.1	5
29	46	29	35	64	28	25	1	7	75	B	13	14.6	5
30	46	27	25	64	30	5	26	6	75	B	9	14.1	4
31	46	26	30	64	30	55	26	6	75	B	9	15.3	4
32	46	23	10	64	33	20	26	6	75	S	5	16.2	3
33	46	17	15	64	29	0	25	6	75	B	22	16.8	3
34	46	18	35	64	25	0	13	6	75	B	9	10.7	4
35	46	19	20	64	22	30	13	6	75	B	14	11.4	4
36	46	20	15	64	20	0	13	6	75	B	14	11.4	5
37	46	21	30	64	15	50	10	6	75	B	13	10.9	5
38	46	22	5	64	14	5	10	6	75	B	13	10.8	5
39	46	23	15	64	10	45	5	6	75	B	11	11.5	5
40	46	24	0	64	8	35	5	6	75	B	7	14.5	5
41	46	19	40	63	51	45	3	6	75	B	9	15.0	4
42	46	18	0	63	52	30	3	6	75	B	14	11.5	4
43	46	14	10	63	54	15	3	6	75	B	22	11.4	4
44	46	11	45	63	55	15	4	6	75	B	11	11.6	4
45	46	7	45	63	45	10	24	6	75	B	9	15.1	3
46	46	9	30	63	45	30	24	6	75	S	29	13.5	4
47	46	13	30	63	43	30	24	6	75	B	14	14.2	5
48	46	15	0	63	43	0	24	6	75	B	9	14.6	5

TABLE 2. (cont'd)

STATION	LATITUDE			LONGITUDE			DATE			DREDGE GEAR	DEPTH (m)	BOTTOM TEMP °C	CURRENT VEL.
	D	M	S	D	M	S	D	M	YR				
49	46	8	5	63	19	15	10	7	75	B	9	14.8	2
50	46	6	0	63	22	10	10	7	75	B	18	15.8	2
51	46	2	10	63	27	20	9	7	75	B	20	16.4	2
52	46	1	45	63	27	50	9	7	75	B	22	11.0	2
53	46	0	5	63	30	0	9	7	75	B	20	14.0	2
54	45	58	30	63	32	10	8	7	75	B	18	17.5	2
55	45	56	30	63	34	55	8	7	75	B	14	16.6	2
56	45	54	5	63	38	15	8	7	75	B	9	17.5	2
57	45	48	25	63	3	0	16	7	75	S	5	19.0	2
58	45	51	30	63	3	50	16	7	75	B	18	10.4	2
59	45	54	10	63	4	40	16	7	75	B	31	10.9	3
60	45	56	30	63	5	15	18	7	75	B	27	10.8	3
61	45	58	30	63	5	14	18	7	75	B	22	14.5	3
62	45	59	5	63	5	50	18	7	75	B	22	13.5	3
63	46	3	45	63	56	45	17	7	75	B	16	15.5	2
64	46	6	45	63	9	0	17	7	75	B	9	17.3	2
65	45	56	50	62	44	30	30	7	75	B	9	12.3	5
66	45	55	45	62	43	50	30	7	75	B	31	7.6	5
67	45	55	15	62	40	40	30	7	75	S	29	10.9	4
68	45	49	30	62	39	30	30	7	75	S	20	12.8	3
69	45	47	40	62	38	30	24	7	75	S	7	17.5	3
70	45	46	40	62	37	30	29	7	75	S	7	15.5	3
71	45	43	40	62	35	40	24	7	75	B	9	16.2	3
72	45	43	0	62	35	0	24	7	75	S	14	17.0	3
73	45	46	15	62	10	45	1	8	75	B	14	14.6	2
74	45	47	0	62	11	40	1	8	75	B	29	7.6	2
75	45	48	10	62	13	0	1	8	75	B	32	6.2	2
76	45	52	45	62	18	40	31	7	75	B	31	5.3	2
77	45	56	15	62	22	40	31	7	75	B	40	2.6	4
78	45	56	45	62	23	30	31	7	75	B	36	6.1	4
79	45	57	15	62	24	0	31	7	75	B	36	3.4	4
80	45	59	40	62	27	15	31	7	75	B	14	11.6	4
81	46	10	45	62	25	0	23	7	75	S	9	19.5	2
82	46	8	5	62	23	15	23	7	75	S	16	19.0	2
83	46	7	0	62	21	35	23	7	75	S	22	16.5	2
84	46	3	45	62	16	45	24	7	75	B	34	13.5	2
85	46	2	10	62	14	10	24	7	75	S	14	15.5	2
86	46	1	0	62	12	20	24	7	75	B	34	14.0	2
87	45	51	30	62	50	30	21	7	75	B	25	19.0	2
88	45	53	30	61	58	30	21	7	75	B	14	18.9	2
89	45	54	0	61	53	5	21	7	75	S	14	19.5	1
90	45	54	30	61	53	5	22	7	75	S	32	15.0	1
91	46	0	5	61	57	30	22	7	75	B	49	10.0	2
92	46	4	45	62	0	0	22	7	75	S	32	12.0	2
93	46	9	15	62	4	10	22	7	75	B	40	12.3	2
94	46	13	40	62	6	40	22	7	75	B	43	14.0	2
95	46	19	20	62	10	10	23	7	75	B	34	13.5	2
96	46	21	40	62	10	50	23	7	75	S	7	18.6	2

Table 3. Catch data for commercial shellfish species in beam trawl and scallop dredge. Number of specimens is the total of both tows.

Species	Area	Station no. (no. of specimens)
<i>Placopecten magellanicus</i>	A	3(21), 4(7), 6(18), 10(11), 12(15), 13(17), 15(19)
	B	46(8)
	C	56(5), 59(11), 68(19), 69(31)
	D	79(6), 82(10), 83(38)
<i>Homarus americanus</i>	A	1(5), 2(6), 3(2), 7(6), 8(7), 15(8), 16(33), 17(22), 18(29), 19(11), 20(1), 23(4), 24(3)
	B	26(4), 27(2), 29(1), 30(13), 31(21), 32(9), 33(13), 35(9), 37(1), 38(1), 39(4), 40(1), 48(2)
	C	56(1), 57(1), 65(3), 66(1), 67(2), 69(1), 70(2), 71(1), 72(1)
	D	73(3), 74(1), 80(21), 81(4), 82(17), 83(2), 85(2), 87(2), 88(15), 89(7), 96(21)
<i>Cancer irroratus</i>	A	1(348), 2(20), 5(4), 8(30), 10(240), 11(10), 13(7), 14(1), 15(16), 18(120), 19(10), 20(86), 21(102), 22(141), 24(16)
	B	25(34), 26(34), 27(21), 29(18), 31(6), 32(15), 33(7), 34(18), 35(33), 36(13), 37(36), 38(52), 39(14), 41(3), 42(1), 43(3), 44(2), 45(3), 46(16), 47(6), 48(24)
	C	49(3), 50(24), 51(2), 52(1), 53(14), 54(3), 55(11), 56(1), 57(60), 58(58), 59(192), 60(12), 61(21), 62(56), 63(10), 64(16), 66(109), 68(34), 69(32), 71(6), 72(152)
	D	74(4), 75(1), 76(48), 77(2), 79(5), 80(11), 81(22), 82(90), 84(10), 85(2), 88(3), 95(8), 96(24)
<i>Strongylocentrotus droehbachiensis</i>	A	2(44), 3(30), 4(10), 5(577), 6(324), 7(864), 8(790), 9(366), 11(270), 12(211), 14(1), 15(3), 16(91), 17(259), 18(182), 19(566), 20(24), 22(1536), 24(24)
	B	25(179), 26(77), 27(5), 32(5), 34(4), 35(11), 36(4), 37(6), 45(5), 47(12), 48(16)
	C	54(5), 60(2), 67(518), 68(353), 69(1348), 70(168)
	D	76(8), 78(4), 79(46), 80(312), 82(72), 83(1), 84(2), 85(64), 88(1), 89(3), 90(3), 91(8), 94(6), 95(16), 96(88)

Table 4. Size (mm) and number of sea urchins (*Strongylocentrotus droehbachiensis*) and lobsters (*Homarus americanus*) in beam trawl and scallop dredge samples.

Station number	Sea Urchins			Lobsters			Station number	Sea urchins			Lobsters		
	mean size	N	Sht	Cnr	Mkt	mean size		N	Sht	Cnr	Mkt		
1	-	0	4	1	0	49	49.0	0	0	0	0		
2	25.8	44	3	3	0	50	-	0	0	0	0		
3	23.0	30	0	2	0	51	-	0	0	0	0		
4	24.6	10	0	0	0	52	-	0	0	0	0		
5	40.7	577	0	0	0	53	-	0	0	0	0		
6	33.1	324	0	0	0	54	x	5	0	0	0		
7	48.4	864	4	2	0	55	-	0	0	0	0		
8	47.1	790	6	1	0	56	-	0	0	1	0		
9	41.8	366	0	0	0	57	-	0	0	1	0		
10	-	0	0	0	0	58	-	0	0	0	0		
11	25.6	270	0	0	0	59	-	0	0	0	0		
12	45.8	211	0	0	0	60	x	2	0	0	0		
13	-	0	0	0	0	61	-	0	0	0	0		
14	29.8	1	0	0	0	62	45.0	0	0	0	0		
15	28.7	3	7	1	0	63	-	0	0	0	0		
16	54.4	91	31	2	0	64	-	0	0	0	0		
17	41.2	259	19	3	0	65	32.2	0	1	1	1		
18	44.0	182	18	11	0	66	24.5	0	0	0	1		
19	38.5	566	5	6	0	67	23.8	518	2	0	0		
20	31.2	24	0	0	1	68	35.5	353	0	0	0		
21	-	0	0	0	0	69	42.5	1348	0	1	0		
22	x	1536	0	0	0	70	42.0	168	1	1	0		
23	-	0	4	0	0	71	-	0	0	1	0		
24	x	24	3	0	0	72	40.0	0	0	1	0		
25	x	179	0	0	0	73	60.0	0	2	1	0		
26	x	77	2	2	0	74	-	0	0	1	0		
27	x	5	1	1	0	75	-	0	0	0	0		
28	-	0	0	0	0	76	47.3	8	0	0	0		
29	-	0	0	1	0	77	50.0	0	0	0	0		
30	-	0	8	4	1	78	49.4	4	0	0	0		
31	-	0	20	1	0	79	47.1	46	0	0	0		
32	22.5	5	9	0	0	80	47.2	312	13	6	2		
33	12.5	0	12	1	0	81	17.5	0	3	0	1		
34	22.5	4	0	0	0	82	58.6	72	11	6	0		
35	30.8	11	8	1	0	83	44.2	1	2	0	0		
36	x	4	0	0	0	84	38.6	2	0	0	0		
37	x	6	0	1	0	85	36.4	64	2	0	0		
38	-	0	0	1	0	86	-	0	0	0	0		
39	-	0	1	3	0	87	47.5	0	1	1	0		
40	-	0	0	1	0	88	42.5	1	8	2	5		
41	17.5	0	0	0	0	89	49.0	3	5	1	1		
42	-	0	0	0	0	90	52.2	3	0	0	0		
43	-	0	0	0	0	91	57.5	8	0	0	0		
44	-	0	0	0	0	92	17.5	0	0	0	0		
45	35.5	5	0	0	0	93	57.5	0	0	0	0		
46	-	0	0	0	0	94	50.8	6	0	0	0		
47	12.5	12	0	0	0	95	x	16	0	0	0		
48	24.2	16	0	1	1	96	49.1	88	18	3	0		

Sht = Shorts, carapace length - 63.5 mm
 Cnr = Cannery, carapace length - 63.5-80.0 mm
 Mkt = Markets, carapace length 81+ mm
 x = No measurements taken

Table 5. Catch of lobsters and rock crabs in lobster traps at stations 1-96, in sequence of station numbers. Each line represents 10 traps. At the ten stations marked with an asterisk (*) one collection only was obtained.

A	B	C	D	G	F	E	H	H'	I	I'	JJ	K	P	Q	R	S	P'	Q'	R'	S'
32	0011	170675	074	5	09	110140	5550	12	1	010000100	05402908301									
32	0012	120775	086	5	09	180160	4560	33	1	060701300	01900001900									
32	0021	180675	074	5	13	110120	5050	21	1	030100400	06703310000									
32	0022	120775	086	5	13	172160	4560	31	1	000000000	05305410700									
32	0031	180675	074	5	22	120130	5550	11	1	010000100	00400000400									
32	0032	210775	061	5	22	160115	5040	13	1	000000000	05403208601									
*32	0042	210775	060	5	23	160140	5040	13	1	000000000	06301007300									
31	0051	260675	024	6	36	170170	7570	11	1	000000000	00000000000									
31	0052	170775	037	6	36	180185	6060	12	1	000000000	00000000000									
31	0061	260675	074	2	29	170170	7075	11	1	000000000	00000000000									
31	0062	170775	151	2	29	185183	6070	12	1	000000000	00200000200									
*31	0072	170775	176	1	14	190185	6060	12	1	040500900	00000000000									
*31	0082	170775	183	1	07	190185	6055	12	1	040300700	00000000000									
31	0091	200675	124	2	09	140140	7045	11	1	040000400	03000203200									
31	0092	080775	167	2	09	180180	7565	13	1	040300700	01000001000									
31	0101	200675	074	5	16	145130	7570	11	1	000000000	00900101000									
31	0102	080775	087	5	16	180185	7580	12	1	000000000	03500303800									
31	0111	210675	024	3	29	135140	6580	11	1	000000000	00100200300									
31	0112	080775	045	3	29	185190	8080	11	1	000000000	00200100300									
31	0121	210675	024	7	29	135135	6580	11	1	000000000	00000100100									
31	0122	080775	047	7	29	190190	8080	11	1	000000000	00100100200									
32	0131	050775	117		25	162160	6060	13	1	000000000	02610713300									
32	0132	170775	063		25	150150	6060	11	1	000000000	01606207800									
32	0141	050775	112	1	18	160161	7060	11	1	000000000	01322123400									
32	0142	170775	057	1	18	150150	6060	11	1	000000000	03802005800									
32	0151	040775	122	5	13	160160	6080	21	1	010000100	00603904500									
32	0152	170775	062	5	13	150160	6060	11	1	000000000	05302808100									
32	0161	040775	131	1	11	160160	5060	33	1	080401200	06905212103									
32	0162	170775	071	1	11	120140	6060	11	1	000000000	10007117103									
*32	0172	230775	069	1	09	160150	4500	10	1	000200200	01900502400									
*32	0182	230775	066	1	18	160150	5000	10	1	010300400	02500302800									
*32	0191	100775	171	1	14	185180	6050	11	1	000000000	13001514500									
*32	0201	100775	169	1	20	183180	6050	13	1	000000000	09900810700									
31	0211	010775	067	7	22	170170	7080	11	1	000000000	19007626600									
31	0212	120775	057	7	22	160140	4040	32	1	000000000	12305617900									
31	0221	010775	082	7	25	165170	6075	11	1	000000000	12007119101									
31	0222	120775	090	7	25	160160	6060	32	1	000000000	08804513303									
31	0231	010775	120	2	14	170150	4070	11	1	000000000	17202820000									
31	0232	120775	125	2	14	170155	5050	33	1	020100300	10600611200									
31	0241	070775	130	1	11	160140	2535	11	1	000400400	05300105400									
31	0242	120775	152	1	11	170160	5050	32	1	030200500	03400003400									
31	0251	270675	168	2	07	155170	3530	12	1	000000000	16701217902									
31	0252	090775	177	2	07	190185	6040	11	1	030000300	13301414707									
31	0261	270675	148	4	13	155155	4045	11	1	000100100	20800721501									
31	0262	090775	165	4	13	185180	6060	11	1	000100100	13601615203									
31	0271	280675	135	5	22	145150	5560	11	1	000100100	13901515401									
31	0272	100775	136	5	22	180160	5060	13	1	000000000	21201622800									
31	0281	280675	135	4	22	160150	6050	11	1	000000000	10802613403									
31	0282	100775	145	4	22	160160	4555	12	1	000000000	14503518003									
32	0291	070775	162	5	13	170175	4050	11	1	020300500	16107924000									
32	0292	180775	193	5	13	205200	6060	13	1	221603800	11103314400									
32	0301	080775	166	5	09	170190	5050	11	1	152303800	14103317400									
32	0302	180775	195	5	09	205200	6060	13	1	242104500	07602410001									
32	0311	080775	170	5	09	180180	5050	12	1	030300600	18205323500									
32	0312	180775	199	5	09	200205	6050	13	1	201503500	08405213600									
32	0321	080775	179	5	05	190190	5050	13	1	120802000	07600007600									
32	0322	180775	195	5	05	210205	6050	13	1	151703200	06000006000									
32	0331	240675	156	6	22	200170	5560	11	1	020000200	22000322300									
32	0332	240775	198	6	22	205200	0000	00	1	050601100	00000900900									

Table 5. (cont'd)

A	B	C	D	G	F	E	H	H'	I	I'	JJ'	K	P	Q	R	S	P'	Q'	R'	S'
32	0341	240675	138	6	09	160170	5050	21	1	000000000	19201620801									
32	0342	240775	191	6	09	200190	0000	00	1	080501300	18902020900									
32	0351	260675	134	6	14	160160	6070	11	2	010000100	21100421500									
32	0352	240775	195	6	14	210200	0000	00	1	190802700	01800101900									
*32	0362	240775	196	4	14	200200	0000	00	1	271404100	01700101800									
31	0371	240675	124	4	13	140140	6065	21	1	000000000	16100116200									
31	0372	050775	159	4	13	160160	7065	23	1	000000000	15000015000									
31	0381	240675	124	4	13	145140	6065	21	1	000000000	16400016400									
31	0382	050775	167	4	13	170165	7055	13	1	000000000	18600218600									
31	0391	230675	124	3	11	160150	5055	11	2	000000000	12900012900									
31	0392	040775	172	3	11	180175	5565	21	1	000000000	14800114900									
31	0401	230675	174	4	7	170165	3045	11	2	000100100	20700020700									
31	0402	040775	170	4	07	170175	5070	21	1	000000000	18200018200									
31	0411	170675	127	6	09	142137	7870	12	1	000000000	22702124800									
31	0412	190775	191	6	09	200200	3040	31	1	000200200	21000121100									
31	0421	180675	120	5	14	140130	7570	11	1	000000000	15604019600									
31	0422	190775	183	5	14	190195	6045	31	1	060200800	18300218500									
32	0431	280675	130	1	22	160999	6000	10	2	000000000	33803136900									
32	0432	250775	186	1	22	190191	0000	00	1	000000000	04900305200									
32	0441	270675	142	5	11	170160	6050	12	1	000000000	31205136303									
32	0442	250775	184	5	11	200200	0000	00	1	000000000	02101503600									
32	0451	010775	156	6	09	170180	5065	11	1	000200200	16000416400									
32	0452	250775	186	6	09	190191	0000	00	1	000000000	16508324800									
*32	0461	010775	111	4	29	150160	6075	11	1	000000000	17200517700									
31	0471	030775	122	6	14	180167	7560	12	1	000000000	22400122500									
31	0472	150775	144	6	14	160145	5050	11	1	000000000	17700117800									
31	0481	030775	150	4	09	170170	7065	12	1	000000000	16800016800									
31	0482	150775	157	4	09	170170	4040	11	1	010000100	23500023500									
31	0491	230775	140	2	09	180190	3030	31	1	000000000	17600117700									
31	0492	130875	207	2	09	220210	2530	22	1	010000100	14200114300									
31	0501	230775	117	2	18	180190	4070	31	1	000000000	24600024600									
31	0502	130875	179	2	18	220205	3540	22	1	010000100	08100108200									
31	0511	230775	126	7	20	180200	5070	21	1	000000000	18500018500									
33	0512	130875	157	7	20	210205	4045	32	1	000000000	14200114301									
31	0521	230775	119	7	22	180200	5070	21	1	000000000	20500020500									
33	0522	130875	154	7	22	230205	5560	22	1	000000000	13300213500									
34	0531	300775	107	7	20	210180	7050	11	6	000000000	08500008500									
34	0532	030975	161	7	20	185179	4040	13	1	000000000	13300213500									
34	0541	260775	107	7	18	210200	7060	11	2	000000000	14300214500									
34	0542	030975	168	7	18	195178	3540	13	1	000000000	14600415000									
34	0551	260775	103	7	14	210190	7050	12	2	000000000	15300716000									
34	0552	030975	174	7	14	192180	3530	13	1	000000000	13402616000									
34	0561	260775	178	1	09	210190	7050	12	2	000000000	17302219500									
34	0562	030975	116	1	09	189185	3530	13	1	010400501	09200509700									
34	0571	310775	172	2	05	180179	4040	11	1	070701400	04300004300									
34	0572	300875	177	2	05	182183	4050	12	1	070401101	06000006000									
34	0581	310775	161	7	18	175179	5050	21	1	020300501	05700005700									
34	0582	300875	154	7	18	172175	4540	22	1	090000900	02700002700									
34	0591	310775	140		31	175185	5050	21	1	000000000	07600107700									
34	0592	300875	132		31	175179	4045	12	1	000000000	07600508100									
34	0601	310775	160	7	27	179179	5050	11	1	000000000	12300012300									
34	0602	300875	134	7	27	175175	5045	12	1	000000000	07400708101									
31	0611	250775	130	7	22	190190	4050	13	1	000000000	16700016700									
33	0612	120875	144	7	22	195185	4030	12	1	000000000	11900512400									
31	0621	250775	132	7	22	190190	4050	13	1	000000000	20800120900									
33	0622	120875	148	7	22	205195	3030	12	1	000000000	10900211100									
31	0631	250775	145	7	16	190190	4040	13	1	000000000	19000019000									
33	0632	120875	161	7	16	200200	3030	12	1	000000000	19300019300									
31	0641	250775	154	7	09	200195	3040	13	1	000000000	22800323100									
33	0642	120875	175	7	09	220220	3030	12	1	000000000	12214026201									
33	0651	050875	170	5	09	180180	4045	32	1	081001802	05300305600									
33	0652	210875	156	5	09	180180	5030	11	1	190902800	07100107200									
*33	0661	050875	102	7	31	175180	5055	32	1	000000000	06816022811									
33	0671	050875	104	7	29	170185	4055	32	1	000000000	09301010301									

0
2
0
8
0
0
0
2
0
0
0
1

Table 5 (cont'd)

A	B	C	D	G	F	E	H	H'	I	I'	JJ'	K	P	Q	R	S	P'	Q'	R'	S'
33	0672	220875	114	7	29	180175	4055	13	1	010200301	05600706300									
33	0681	050875	106	7	20	165180	4045	32	1	000000000	06702509200									
33	0682	220875	148	7	20	180170	4050	13	1	010000100	05804210006									
34	0691	280875	121	2	07	170169	3545	21	1	171603300	02100002100									
34	0692	050975	167	2	07	173169	5040	32	1	190802701	04100004100									
34	0701	280875	174	1	07	172170	4045	21	1	221303504	05800005800									
34	0702	050975	166	1	07	173165	5040	22	1	100801802	07300007300									
34	0711	280875	169	5	09	178170	4050	21	1	190302200	06600206800									
34	0712	050975	167	5	09	174168	5040	11	1	060300901	08900609500									
34	0721	280875	165	7	14	178170	4045	21	1	161002600	06000106100									
34	0722	050975	167	7	14	174168	5030	21	1	070401100	08300108400									
34	0731	050875	145	5	14	168170	5050	21	1	111302400	01600001600									
34	0732	080975	168	5	14	175174	5070	11	2	040400800	01500001500									
34	0741	050875	087	7	29	175180	5050	22	1	030100400	013002015									
34	0742	080975	168	7	29	175173	5070	11	2	060901500	02000302300									
34	0751	050875	079	7	32	175180	5050	22	1	000000000	00000000000									
34	0752	080975	160	7	32	175178	7075	11	2	000100100	01800402200									
34	0761	050875	122	7	31	175180	5050	21	1	000000000	06102008100									
34	0762	080975	159	7	31	174179	4060	12	2	000100100	02500202700									
33	0771	020875	050	7	40	160170	6565	21	1	000000000	0050020070									
33	0772	180875	034	7	40	200190	6060	23	2	000000000	00900201100									
33	0781	020875	054	7	36	160175	6060	22	1	000000000	00900000900									
33	0782	180875	043	7	36	200190	8060	23	2	000000000	03200703900									
33	0791	020875	055	7	36	160180	6070	22	1	000000000	03300403701									
33	0792	180875	065	7	36	195190	8065	22	2	000000000	03200403600									
33	0801	010875	140	6	14	180180	4040	12	1	010400500	03100103200									
33	0802	180875	153	6	14	190190	4060	32	2	040701100	00300100400									
33	0811	310775	165	5	09	180175	3535	11	1	030500801	01500101600									
33	0812	260875	152	5	09	190185	6560	22	1	201203200	00500000500									
33	0821	310775	146	1	16	165175	3535	11	1	130601900	09301811100									
33	0822	260875	159	1	16	190180	6060	22	1	130902200	00100000100									
33	0831	310775	121	2	22	165170	4030	11	1	060501101	08604413000									
33	0832	260875	169	2	22	190185	8060	22	1	282505300	00000000000									
33	0841	310775	045	7	34	150175	6065	11	1	000000000	00400000400									
33	0842	250875	148	7	34	185185	5070	21	2	000000000	02601303901									
33	0851	250875	144	1	14	185188	5070	21	2	000000000	01801703503									
34	0852	180975	050	1	14	999999	0000	00	1	080901700	00100000100									
33	0861	250875	139	7	34	185185	5570	22	2	000000000	06505712213									
34	0862	180975	050	7	34	999999	0000	00	1	040300700	00600000600									
34	0871	240875	159	7	25	179171	5060	31	2	130301600	01100001100									
34	0872	100975	160	7	25	175172	6050	21	2	040200600	00100000100									
34	0881	240875	166	5	14	179170	5055	31	2	130902200	01100101200									
34	0882	110975	166	5	14	175173	5550	21	3	140802200	00200000200									
34	0891	240875	109	1	14	175170	5555	21	2	010400501	00000000000									
34	0892	090975	167	1	14	175171	5050	23	1	201803801	00000000000									
34	0901	240875	120	7	32	175170	5055	21	2	162003600	00200000200									
34	0902	100975	156	7	32	175173	5045	21	2	000400400	00000000000									
34	0911	270875	064	7	49	179185	5580	12	2	000000000	00000000000									
34	0912	180975	050	7	49	999999	0000	00	1	000000000	00000000000									
34	0921	270875	125	1	32	181185	8070	12	2	010000100	00500000500									
34	0922	180975	050	1	32	999999	0000	00	1	000000000	00000000000									
33	0931	080875	015	7	40	200195	8080	21	1	000000000	00000000000									
33	0932	150875	030	7	40	210190	7570	21	1	000000000	00000000000									
33	0941	090875	025	7	43	200205	8080	21	1	000000000	00000000000									
33	0942	150875	032	7	43	200185	6060	21	1	000000000	00000000000									
33	0951	070875	046	7	34	195195	7060	13	1	000000000	00700200900									
33	0952	150875	079	7	34	205195	7065	22	1	000000000	00100000100									
33	0961	070875	150	1	07	192195	6045	13	1	312205300	00100000100									
33	0962	150875	140	1	07	200185	4560	22	1	232204500	00000000000									

Table 6. (cont'd)

A	B	C	D	G'	F	E	H'	I'	J'	KL	M	P	Q	R	S	P'	Q'	R'	S'
37	1083	120675	123	2	13	103	35	1	1055	000000000	05407913314								
37	1093	120675	101	1	14	103	35	1	1055	000000000	08404012400								
37	1113	120675	089	4	21	103	35	1	1055	000000000	06303409700								
37	1123	120675	087	2	23	087	43	1	1055	000000000	05703609300								
37	1014	240675	135	2	04	150	50	1	1105	000000000	08202010200								
37	1014	260675	142	2	04	158	50	1	1105	000000000	12706118800								
37	1024	240675	130	2	08	150	50	1	1105	000100100	04302707000								
37	1024	260675	142	2	08	158	50	1	1105	000100100	13009622600								
37	1034	240675	135	1	04	150	50	1	1105	040000400	00200000200								
37	1034	260675	142	1	04	158	50	1	1105	020300500	01600301900								
37	1044	240675	127	3	12	150	50	1	1105	040200600	02000302300								
37	1044	260675	142	3	12	158	50	1	1105	070200900	02100502600								
37	1054	240675	127	2	11	150	50	1	1105	010300400	04201806000								
37	1054	260675	142	2	11	158	50	1	1105	010100200	07502910400								
37	1064	240675	127	1	12	150	50	1	1055	000500500	00300000300								
37	1084	250675	130	2	13	150	60	1	2055	010000100	05101406500								
37	1114	250675	108	4	21	150	60	1	2055	000000000	05001206200								
37	1016	010875	138	2	04	149	60	1	1105	120401600	04004308300								
37	1016	020875	136	2	04	155	50	1	1105	150602100	02401704100								
37	1026	010875	138	2	08	149	60	1	1105	220803000	04403808200								
37	1026	020875	136	2	08	155	50	1	1105	271003700	03101804900								
37	1036	010875	138	2	04	149	60	1	1105	130501800	00800201000								
37	1036	020875	136	1	04	155	50	1	1105	050801300	00300100400								
37	1046	010875	138	2	12	149	60	1	1105	050801300	01500902400								
37	1046	020875	136	3	12	155	50	1	1105	040400800	00400200600								
37	1056	010875	138	2	11	149	60	1	1105	120101300	03004607600								
37	1056	020875	136	2	11	155	50	1	1105	100501500	01901002900								
37	1066	010875	138	1	12	149	60	1	1105	070401100	00700000700								
37	1066	020875	136	1	12	155	50	1	1105	110301400	00200100300								
37	1086	010875	140	2	13	140	45	2	1055	130802100	02701704400								
37	1096	010875	140	1	14	140	45	2	1105	000700700	05303608900								
37	1096	020875	138	1	14	155	60	1	1105	020000200	09206816000								
37	1116	010875	86	4	21	175	60	1	1105	000000000	10106416500								
37	1116	020875	86	4	21	164	60	1	1105	000000000	09904614500								
37	1017	260875	169	2	04	169	60	1	1105	030200500	00300901200								
37	1017	280875	169	2	04	169	60	1	2105	031001300	00600501100								
37	1027	260875	169	2	08	169	60	1	1105	030400700	00702102800								
37	1027	280875	169	2	08	169	60	1	2105	020500700	02406008400								
37	1037	260875	169	1	04	169	60	1	1105	020300500	01200501700								
37	1037	280875	169	1	04	169	60	1	2105	021001200	00800801600								
37	1047	260875	169	3	12	169	60	1	1105	021001200	01804105900								
37	1047	280875	169	3	12	169	60	1	2105	030600900	02808911700								
37	1057	260875	169	2	11	169	60	1	1105	020300500	01102003100								
37	1057	280875	169	2	11	169	60	1	2105	030500800	01604305900								
37	1067	260875	168	1	12	169	60	1	1105	000700700	00000000000								
37	1067	280875	168	1	12	169	60	1	2105	040701100	00000000000								
37	1087	260875	168	2	13	166	60	1	1105	010300400	02102704800								
37	1087	280875	168	2	13	166	60	1	2105	050901400	01001302300								
37	1097	260875	165	1	14	166	60	1	1105	000100100	02804507300								
37	1097	280875	165	1	14	166	60	1	2105	000300300	03505408900								
37	1117	260875	161	4	21	162	60	2	1105	010100200	04903007900								
37	1117	280875	161	4	21	162	60	2	2105	010200300	05802308100								
37	1018	230975	150	2	04	148	45	3	1055	030300600	00500000500								
37	1028	230975	150	2	08	148	45	3	1044	020100300	00903104000								
37	1038	230975	150	1	04	148	45	3	1055	000300300	00902203100								
37	1048	230975	150	3	12	148	45	3	1055	030200500	00800401200								
37	1058	230975	150	2	11	148	45	3	1055	020600800	01100401500								
37	1068	230975	150	1	12	148	45	3	1055	000400400	00400200600								
37	1088	230975	148	2	13	152	40	3	1055	010000100	07104111200								
37	1098	230975	148	1	14	152	40	3	1055	010200300	03103206300								
37	1118	230975	147	4	21	152	40	3	1055	000200200	03701305000								
37	1019	281075	090	2	04	090	60	1	1105	000000000	02001803800								
37	1019	291075	090	2	04	095	60	1	1105	000000000	05100305400								
37	1029	281075	090	2	08	090	60	1	1105	000000000	04305109402								

Table 6 (cont'd)

A	B	C	D	G'	F	E	H'	I'	J'	KL	M	P	Q	R	S	P'	Q'	R'	S'
37	1029	291075	090	2	08	095	60	1	1105	0000000000	04805710501								
37	1039	281075	085	1	04	095	60	1	1084	000100100	02200702900								
37	1049	281075	085	3	12	095	60	1	1105	0000000000	01006007001								
37	1049	291075	082	3	12	085	60	1	1105	0000000000	00601301900								
37	1039	291075	090	1	04	095	60	1	1084	0000000000	01300301600								
37	1059	281075	085	2	11	095	60	1	1105	0000000000	01811613402								
37	1059	291075	082	2	11	085	60	1	1105	0000000000	05803509300								
37	1069	281075	085	1	12	095	60	1	1105	010000100	00800401200								
37	1069	291075	082	1	12	085	60	1	1105	020100300	01100301400								
37	1089	281075	085	2	13	095	60	1	1105	0000000000	06006312301								
37	1089	291075	082	2	13	085	60	1	1105	0000000000	05306912200								
37	1099	281075	085	1	14	095	60	1	1105	0000000000	03902005900								
37	1099	291075	082	1	14	085	60	1	1105	0000000000	05907012900								
37	1119	281075	085	4	21	095	60	1	1105	0000000000	04607211801								
37	1119	291075	082	4	21	085	60	1	1105	0000000000	05103308401								

Table 7 (cont'd)

A	B	C	D	E	F	G	T	U	V	WXY	Z
9000962	150875	07	1	140	077	2	45	400	0		
9000962	150875	07	1	140	081	1		300			
9000962	150875	07	1	140	065	1		311			
9000962	150875	07	1	140	075	1		400			
9000962	150875	07	1	140	063	2	36	400	0		
9000962	150875	07	1	140	063	2	36	400	0		
9000962	150875	07	1	140	083	1		300			
9000962	150875	07	1	140	083	1		400			
9000962	150875	07	1	140	080	1		400			
9000962	150875	07	1	140	055	1		400			
9000962	150875	07	1	140	057	2	32	310	0		
9000962	150875	07	1	140	060	1		500			
9000962	150875	07	1	140	059	2	33	500	0		
9000962	150875	07	1	140	055	1		400			
9000962	150875	07	1	140	069	1		400			
9000962	150875	07	1	140	058	2	32	500	0		

