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1960 Cruise Plan

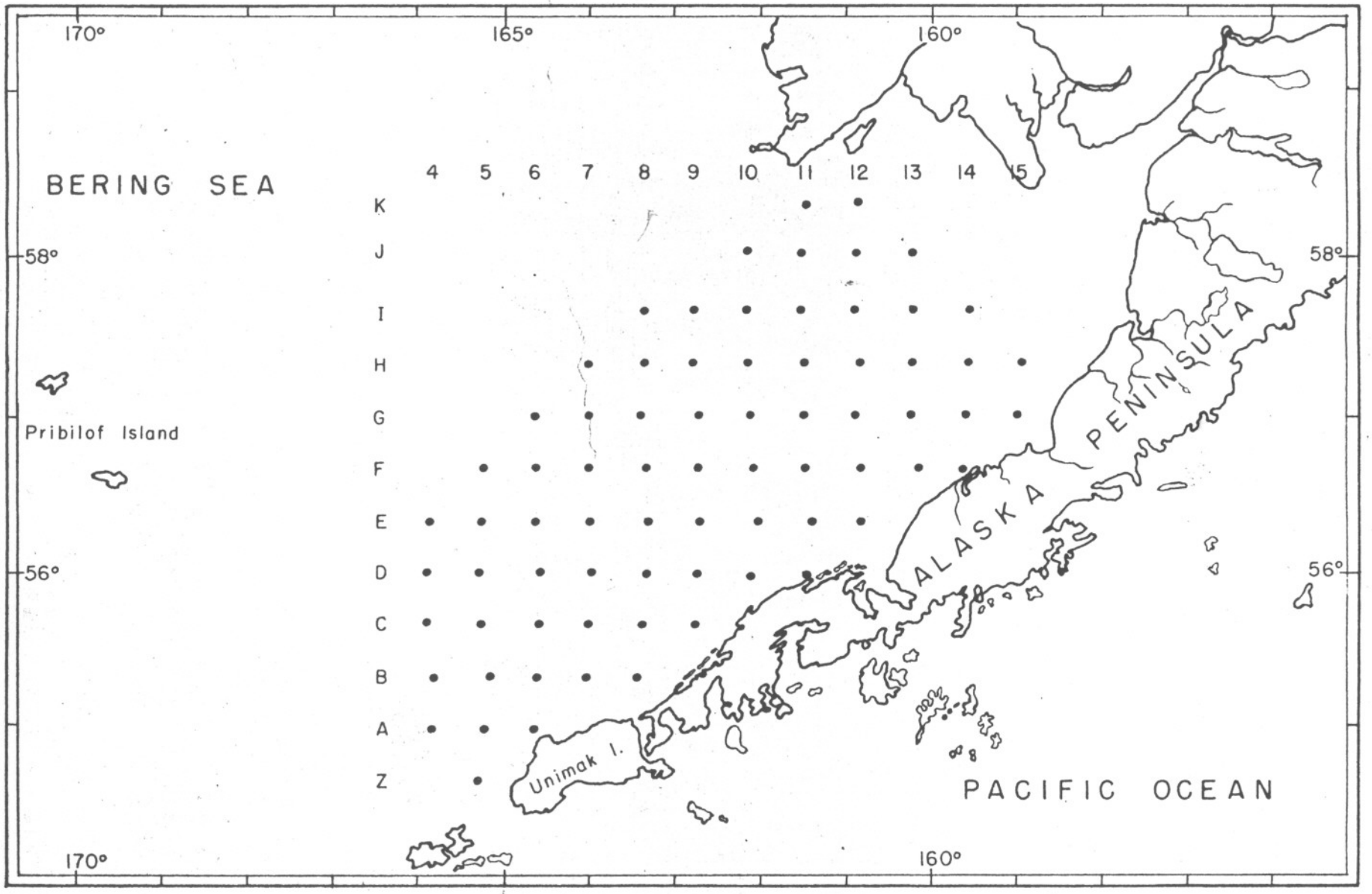
1960 KING CRAB INVESTIGATION

CHARTER VESSEL CRUISE PLAN

by

Staff, King Crab Investigations

U.S. Bureau of Commercial Fisheries
Seattle Biological Laboratory



Designated fishing stations for the 1960 King Crab Investigation cruise.

KING CRAB CHARTER VESSEL CRUISE PLAN 1960

The charter vessel cruise of the king crab investigation during the summer of 1960 is supported by projects related to abundance, growth, food, hydrography, ecology, migration, condition and effect of gear. The data needed and methods used are set forth by projects.

Itinerary:

May 4 to May 15	Trip to Unalaska and Adak, Alaska
May 18 to July 29	High seas salmon sampling
August 1 to August 30	King crab station pattern survey
Sept. 1 to Sept. 15	Return to Seattle

The above dates are tentative and subject to changes as conditions may dictate.

Scientific Personnel:

Herbert Shippen, Fishery Research Biologist

Douglas Weber, Fishery Research Biologist

Responsibilities:

1. A ship's log is to be maintained by the captain, showing time, place, duration and results of all operations. When traveling he will keep details on times, courses, positions and any other pertinent information. When fishing he will complete the king crab fishing information form in carbon, as well as any other information pertinent to the particular haul.

2. The cruise chief (senior biologist aboard) has top authority and is responsible for carrying out the cruise plan, the timing of the operation and making certain that the government receives the services contracted.

3. The captain of the vessel is responsible for the operation of the vessel and safety of the ship and personnel. He will determine whether conditions will permit operations and his judgment in such matters is final.

4. The senior scientist aboard is responsible for reporting promptly the completion of each fifteen day charter interval by wire, so that the owner may be paid for work completed. In the event the days occur during which the vessel does not meet the terms of the charter, the beginning and ending dates and hours of each period during which payment should not be made must be submitted, and the cause for non-payment stated.

5. At daily intervals or as reception and transmission may permit, the senior scientist aboard shall report by telephone or wire to Tak Miyahara: CHerry 2-2731. The report shall include position, progress and estimated position for the next day.

6. At the end of the cruise, the senior scientist shall prepare a brief written summary of his work. This should include the period covered, work attempted, accomplishments and suggestions for improvements.

Operational Plan:

The proposed station pattern was chosen to include the majority of crabs in the eastern Bering Sea. The personnel aboard should keep in mind that the intent is to sample the entire stock and thus may require additional stations, outward in twenty-mile intervals until none or very few

(less than 10) crabs are caught in the standard trawl effort (one hour).

The general routine to be followed during the station pattern survey is described below. Each project discussion should be read and understood.

1. Upon arrival at a station, the trawl with distance meter and bottom sampler attached is set. Door spread floats are then set attached to the trawl doors by 60 fathom stainless steel wires. The captain should start filling out the fishing information form.

2. After sufficient time (10 minutes), to insure that the trawl is set properly, measure the distance between tow cables at the towing blocks on the stanchions and at a point six feet from the towing blocks. Measure also the angle to the floats with the sextant and the distance to each float with the rangefinder. Record all measurements.

Repeat the ball measurements at the middle and near the end of the tow.

3. Upon recovering the trawl hydrographic observations will be made while the vessel has stopped. BT and Nansen bottle casts will be made at each station in accordance with accompanying plan.

4. The captain will estimate the weight of the catch, the scientist will read the distance meters and label and preserve the bottom sediment sample.

5. The king crabs will be sorted from the catch and stacked on their backs on the hatch cover.

6. All halibut will be measured (use salmon rack). When killed, otoliths will be taken and records of length, sex, and stomach contents kept. At least one entire sample of halibut should be collected, bagged and frozen each day. Tags may be used to identify the bags or isolated fish.

It is anticipated that a representative of the Halibut Commission will accompany our scientists during this phase of the vessel operation, in which case, he will be completely responsible for the collection of halibut or other duties concerning the species.

7. The captain will estimate the types of fish and their amounts in the catch and record the data.

8. Scientists will collect bottom sediment samples for the investigation and Dr. Illg of the University of Washington, also taking note of what is present in each haul.

9. On stations where stomach samples are taken the entire catch (exclusive of fish) is to be bagged, boxed, labeled and frozen. See details in project outline.

10. All mollusks will be collected on all stations (see details in project plans).

11. As outlined in the attached plan, crabs will be collected in the live tank for meat content studies.

12. All molting or soft shell crabs are to be held in the live tank to observe hardening and growth.

13. Crab blood samples will be taken and frozen. Records of sex, shell type, size, date and position to be kept.

14. Tagging will be undertaken at all stations, on all live male crabs. Data will be kept on date, position, station number, tag number, carapace length and width, sex and shell type. Tagging data sheets are provided. Information on tagging is given in detail in the project outline.

Instructions for population estimate by trawling:

1. Take measurements on all trawl efforts.

2. The captain will record in the fishing information form the station number, date, depth, time when gear is first set on bottom, time when hauling begins, length of trawl cable out, number of king crabs caught and number of tagged, untagged and number of female crabs.

3. Scientist will measure the cable spread between the cable blocks and at a point 6 feet down the cable from the stanchion block. This data will be taken three times during each tow.

4. The door spread will be measured by towing a float from each door on a line about 60 fathoms long. The lines from the doors need not be exactly 60 fathoms, but must be exactly the same length. Assuming that the lines from the doors to the floats are parallel, the spread between the floats will equal the spread between the doors. This spread is to be calculated from the angle which they form with an observer on the stern of the vessel and the distance from the observer to a float. The angle is to be measured with a sextant and the distance with a range finder. Angular measures should be taken to the nearest second and linear measures to the nearest yard.

5. All measurements observed will be recorded.

Procedure for setting floats for trawl door measurement:

The following procedure has been found best for setting the floats for trawl door spread measurements:

1. Distance meter (roller) and bottom sampler are secured to the purse line at the cod end of the trawl.

2. The trawl is set into the water.

3. The trawl is attached to the trawl doors and prepared to be lowered to the bottom.

4. The stainless steel float wire is clipped to a line (9 thread) that is secured through a hole at the upper forward end of the trawl door.

5. As the trawl door is slowly let out, the wire is also paid out of its winding drum.

6. The trawl door is lowered until the end of the 60 fathom wire is in sight on the winding drum.

7. Stop lowering the trawl doors at this depth, unclip the wire from the winding drum and clip on the floats. Hold on to the stainless steel wire securely, or it will be snapped overboard.

8. With both floats clipped on to their respective wires, resume lowering the trawl doors.

9. When the wires become taut, heave both floats away from both sides of the stern simultaneously.

10. The trawl doors may then be lowered to the bottom.

Procedure for recovery of floats for trawl door measurements:

The procedure for recovering the floats used to measure the trawl door spread is as follows:

1. As the trawl doors come up and are secured in place, the lines connecting the stainless steel wires to the trawl doors are retrieved.

2. Holding on to the wire securely, unclip it from the line and clip it on to the winding drum.

3. With both wires clipped to the winding drum, reel in the floats.

4. The trawl is not to be taken in until the floats are retrieved.

5. When the floats come in, unclip them from the wires and return to their place of storage until the next tow.

Preparation of equipment required for trawl door spread:

1. Bore a hole at the upper-forward corner of the trawl doors to secure nine strand lines.

2. The nine strand lines to be about six fathoms long with a loop spliced on one end and a brass clip spliced onto the opposite end. Two lines are required.

3. The stainless steel float wire should be about 60 fathoms long for stations under 45 fathoms depth. For stations deeper than 45 fathoms an additional 30 fathom wire will be added to the 60 fathom line.

4. All stainless steel float wires will be prepared prior to the cruise with brass rings at both ends. Clips will be attached to all other parts such as floats, line from the door and securing clip on winding drum.

5. Secure a pair of brass clips on the winding drum to attach the stainless steel wires.

6. Brass clips will be attached to all floats.

The King Crab Investigation Experimental Otter Trawl for Sampling King Crabs (Paralithodes camtschatica, Tilesius) in the Eastern Bering Sea.

Net: The otter trawl, Eastern type, 400-mesh size, is constructed of medium laid cotton netting in the approved conventional manner, completely treated with copper naphthanate or copper oleate net preservative. All mesh sizes are stretched measure between knot centers.

Specifications

Net is constructed as follows:

Top Wings: 80 meshes long, 68 meshes wide tapered to 15 meshes wide on forward end, to be of 48-thread 4-½ inch netting.

Bottom Wings: 133 meshes long, 68 meshes wide tapered to 31 meshes wide on forward end, of 48-thread 4-½ inch netting.

Square: 45 meshes long, 272 meshes wide tapered to 207 meshes wide on after end, of 48-thread 4-½ inch netting.

Top Belly: 100 meshes long, 207 meshes wide tapered to 64 meshes wide on after end, to be of 48-thread 4-½ inch netting.

Bottom Belly: 100 meshes long, 207 meshes wide tapered to 64 meshes wide on after end, of 48-thread 4-½ inch netting. In sewing top and bottom belly to Intermediate, extra meshes on top and bottom belly are picked up at even intervals around the Intermediate.

Intermediate: 90 meshes deep, 114 meshes around of 72-thread 3½ inch netting. In sewing intermediate to Bag, extra meshes on intermediate are picked up at even intervals around the Bag.

Bag: 60 meshes deep, 100 meshes around of 96-thread 3½ inch netting, complete with 33 galvanized rings 2½ inches inside diameter by 5/16 inch, fastened to 18-thread manila line in the conventional manner.

Head Rope: 71 feet long plus eyes, of 3/8 inch galvanized 6x19 wire rope wrapped with 6-thread manila line.

Foot Rope: 94 feet long plus eyes, of ½ inch galvanized 6x19 wire rope wrapped with 27-thread manila line.

Breast Lines: 7 feet long including eyes, of 3/8 inch galvanized 6x19 wire rope wrapped with 6-thread manila line.

Rib Lines: 8 each Bag, of 27-thread manila line installed in the conventional manner, one along each seam and one along the top and bottom center, and one from the corners of each bosom on top and bottom running diagonally to join the side rib lines. All rib lines are soaked in water at least 24 hours and then run before hanging.

Wing Extensions: 40 - 42 feet long, 46 meshes wide tapered slightly to fit the width of the after trawl door chains.

Wing Extension Rope: 40-42 feet long plus eyes, of 3/8 inch galvanized 6x19 wire rope wrapped with 6-thread manila line.

Cod End Liner: Last six feet, inside of cod-end lined with 1½ inch mesh netting.

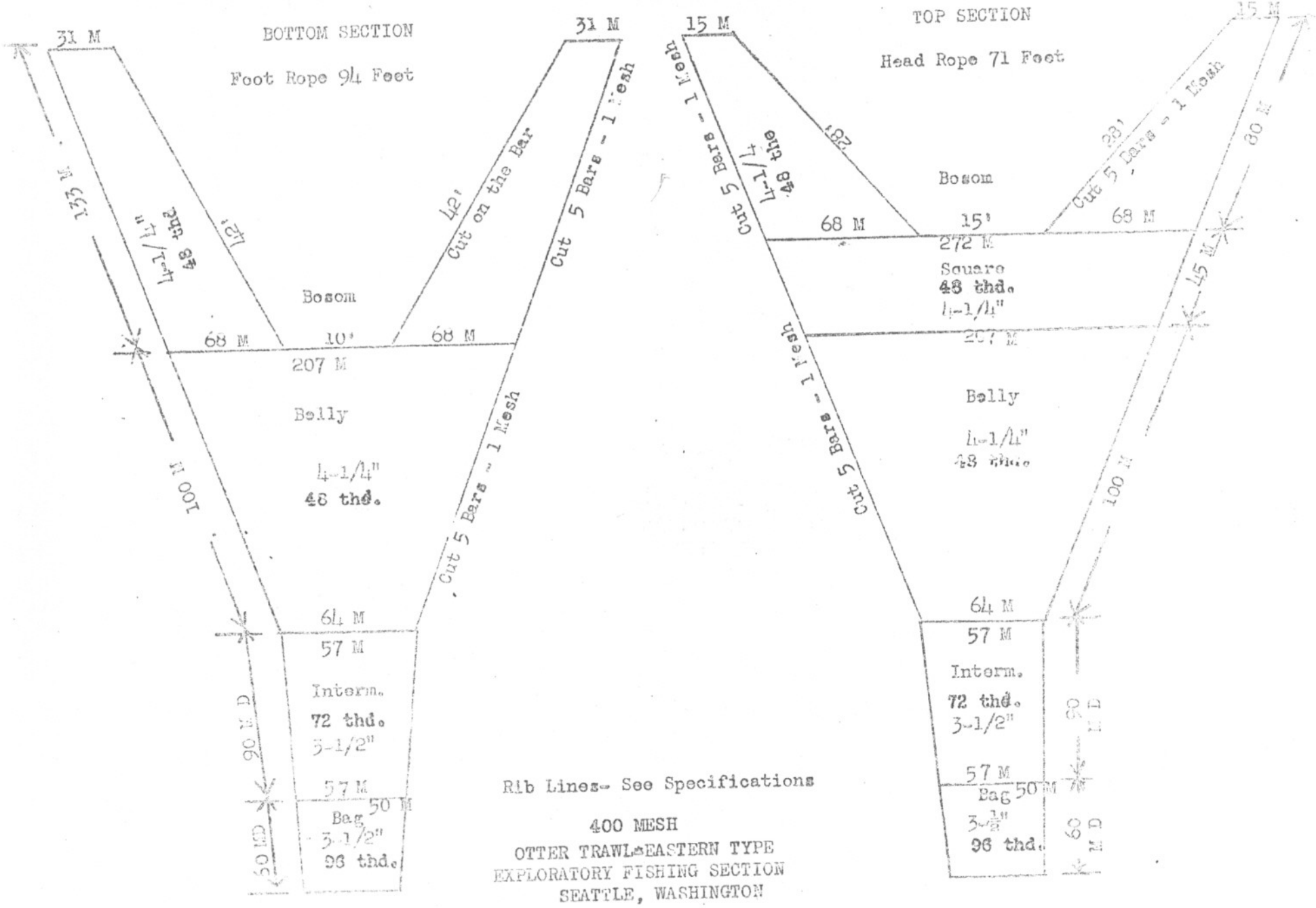
Chafing Gear: Of manila material, attached to the bottom of the cod-end to prevent wear to the bag.

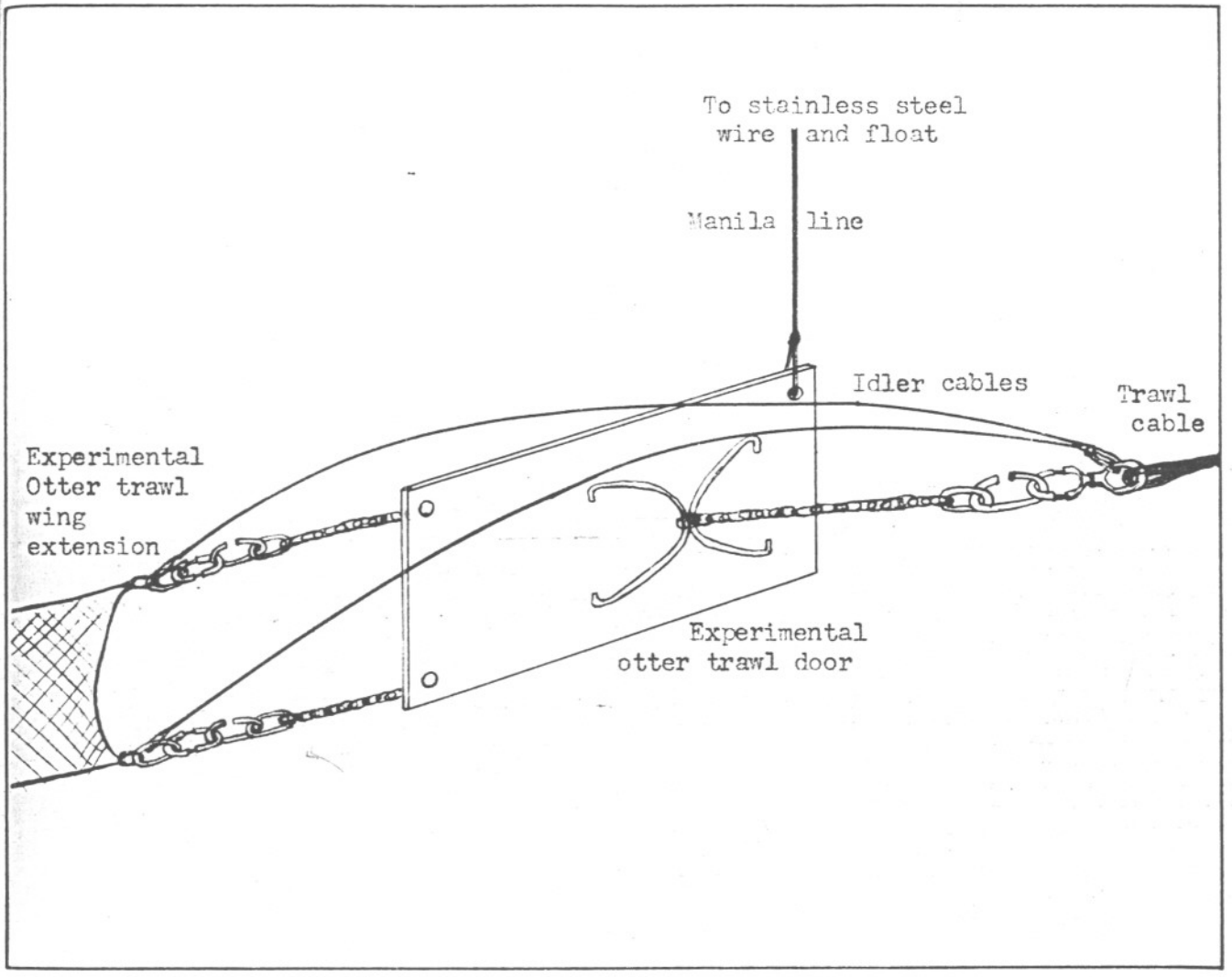
Trawl Floats: 8 inches diameter, NoKalon plastic trawl floats, secured along head rope, 8-9 floats or as captain feels sufficient for proper fishing.

C-Hook w/ Link: Secured to After trawl door chains with 5/8 inch shackles.

Flat Link w/ Link: Secured to Wing extension ropes with 5/8 inch shackles.

Idler Cables: To be secured to Links on wing extension ropes and swivel link on trawl cable with 5/8 inch shackles.


BOTTOM SECTION
Foot Rope 94 Feet
31 M
31 M
133 M
100 M
90 M D
60 M D
4-1/4" 48 thd.
42'
Cut on the Bar
Cut 5 Bars - 1 Mesh
Bosom
68 M
10'
68 M
207 M
Belly
4-1/4"
48 thd.
Cut 5 Bars - 1 Mesh
64 M
57 M
Interm.
72 thd.
3-1/2"
57 M
Bag 50 M
3-1/2"
96 thd.
TOP SECTION
Head Rope 71 Feet
15 M
15 M
Cut 5 Bars - 1 Mesh
4-1/4" 48 thd.
28'
Bosom
68 M
15'
68 M
272 M
Square
48 thd.
4-1/4"
207 M
Cut 5 Bars - 1 Mesh
23'
Cut 5 Bars - 1 Mesh
30 M
45 M
100 M
Belly
4-1/4"
48 thd.
64 M
57 M
Interm.
72 thd.
3-1/2"
57 M
Bag 50 M
3-1/2"
96 thd.
60 M D
Rib Lines- See Specifications
400 MESH
OTTER TRAWL-EASTERN TYPE
EXPLORATORY FISHING SECTION
SEATTLE, WASHINGTON



Schematic diagram for the door assembly of the King Crab Investigation's experimental otter trawl.

Hydrographic sampling:

A. Hydrographic data will be collected at all stations.

B. A hydrographic station will consist of the following samples:

1. A bathythermograph lowering (use 450' BT for depths to 137 meters and the 900' BT for depths between 137 and 275 meters). DO NOT LOWER BT MORE THAN THE LOWER LIMIT GIVEN ABOVE.

2. Water bottle samples at depths depending upon depth (see table included). Surface sample to be taken with bucket and thermometer; the deepest (near bottom) bottle is to be between one and two meters above the bottom. DO NOT PLACE BOTTLE SO CLOSE TO BOTTOM THAT IT STRIKES BOTTOM UPON REVERSAL.

3. A cast will consist of the BT at the bottom of the hydro line, and Nansen bottles at depths of 0, 15, 30, 50, and 80 meters.

C. A BT cast will be made at mid-distance between stations when oceanographer aboard deems it necessary.

Notes and Precautions:

A. Bathythermograph:

1. Do not use 450' BT at depths greater than 75 fathoms (137 meters) or 150 fathoms (274 meters) for the 900' BT.

2. Before using a slide for the BT, write name of boat to see how easy it marks. If slide won't mark with soft pencil, don't use unless necessary.

3. Be sure to push the slide into its holder as far as possible when placing into BT.

4. When BT is again aboard, check slide for trace. If slide shows no tracing retake the cast.

B. Water Bottle Casts:

1. After attachment of bottles to line, check to be sure the mercury at top of main thermometer has drained.

2. Check to be sure the stop cocks of the bottle have been closed before lowering.

3. Attach messenger to bottle so bottles below will be tripped.

4. After bottles reach depth, allow to soak 10 minutes before tripping.

5. After bottles are back aboard, draw salinity samples before reading temperature so that thermometers can reach equilibrium.

6. Upon completing the drawing of salinity and reading the thermometers, turn the bottles upright so mercury can be rejoined. THERMOMETERS WILL BE RUINED OR WILL BECOME INACCURATE BY LEAVING THEM IN A REVERSED POSITION ANY LONGER THAN NECESSARY.

1960 Cruise Plan

Biological Environmental Conditions

Examination of the invertebrate bottom fauna collected during the 1958-1959 field seasons indicate that a relationship may exist between king crab abundance centers and areas of abundance or absence of certain of the groups of bottom fauna: i.e., mollusks, echinoderms, and decapod crustaceans. There is reason, from the examination of stomach contents, to believe that echuroids also play a considerable role in the food habits, in addition to the groups previously mentioned. In order to ascertain whether the distribution patterns of the fauna are valid, more intensive sampling of the particular groups in question is necessary. Because of time and space limitations, sampling during the field season should be limited to one group per season. Of primary concern are the mollusks; thus the 1960 field sampling will concentrate on the molluscan fauna.

Objectives: To determine by qualitative and quantitative sampling whether valid correlations exist between king crab abundance and molluscan abundance.

Methods:

1. Examine the catch from each tow carefully and collect all (large or small) the shelled mollusks in the catch. Put the collected samples in either bags or boxes, depending upon the quantity, and freeze immediately. Keep each station separately and label completely. Some care is necessary to keep from smashing the shells when they are placed in the boxes.

2. A dredge sample is to be taken at the following stations: Z-5 A-5, E-5, 7, F-7, E-12 and G-10 or G-11, and wherever stomach samples are taken. Wash and collect the sample in labeled paper cartons provided for this purpose, and freeze.

3. Stomach samples are to be collected on a station of an abundance of mixed old and new shell crabs. In this instance 50 crabs of each shell type or 100 total crabs are desired. The scientists shall determine if samples are available. Size to be about 130 millimeters and greater.

4. A sample of 70 new shell crabs around station E-6 is desired. The sample will consist of 35 greater than 130 mm and 35 less than 110 mm.

5. Stomachs will be obtained by sectioning the crabs in three parts. The center section containing the vital organs of the crab will be bagged, bags clipped with a cattle tag, tag numbers and shell type recorded. Bags will be immediately soaked in formalin solution previously mixed in two 25-gallon cans.

Injury to female and non-commercial size male crabs

Objective: Determine the percentage of the crabs in period which die as a result of injury.

Method: Starting at the end of a haul on any one station, the following data should be recorded, and the following proceedure performed.

1. Record the dead non-commercial male and female crabs by

   a. Sex, size and shell condition.

   b. Most likely cause of death, i.e., under one of two categories:

      1. Injury to appendages

      2. Injury to body

2. For all of the injured non-commercial male and female crabs record the data shown above. Signify the type of injury by tying a piece of vinyl plastic tubing on:

   a. one of the right side appendages for appendage injury.

   b. one of the left side appendages for bodily injury.

Place these crabs in the live tank aboard, along with an equal number of uninjured crabs of each sex. Record the sex, size and shell condition of the controls. (instances where there are more injured crabs than can be placed in the live tank without serious overcrowding, take a random sample of those injured; preferably all of one sex. Instances where there are too few, say less than ten injured in one haul, utilize injured crabs from the next drag. Overcrowding is to be determined by the investigator).

3. After a period of 24 hours remove the crabs; of the number dead (if they exist) record:

   a. Sex, size and shell condition.

   b. Control or injured crab. If injured crab dead, record the injury as determined by the vinyl plastic tubing placed on the appropriate appendage.

4. Repeat as often as possible, for adequate results will depend on a large quantity of data.

Distribution of the Stock

Objectives: To resolve the general distribution of the eastern Bering Sea king crab stock in respect to abundance, shell type, sex and size during the period covered by the 1960 cruise the following cruise plan will be undertaken.

Methods: Size frequencies by sex and shell types will be collected for each fishing station. This will be used to substantiate data collected to date.

Procedure:

1. At all fishing stations, measure all king crabs caught for carapace length and width, shell type and sex.

2. All information to be recorded on data sheets.

Tagging for Migration

Objectives: The 1960 cruise plan for the study of the migration of the eastern Bering Sea king crab stock from tagging will feature releasing of tagged male king crabs at all fishing stations. The objectives are to determine the

(1) Degree of mixing of the crabs fished upon in the eastern Bering Sea.
(2) Amount of interchange with the stock of king crabs on the south side of the Alaska Peninsula.
(3) Movements and migration habits of the eastern Bering Sea king crabs.

Methods: The direct method of tagging is proposed to obtain information needed to reach the objectives. Although the operation has been underway for several years, this plan is intended to add to the number of tag returns already available. Therefore, at every station all male king crabs large enough will be tagged, records kept and released in the immediate area of capture.

Procedure:

1. Tagging and releasing will be undertaken on all fishing stations.

2. Tagging procedure will be as follows:

   A tagging line will be set up in the following order:

   a. Crew member attaching spaghetti tags to tagging needle in tag number sequence.
   b. Crew member or biologist tagging the king crabs.
   c. Biologist measuring carapace length and width and calling tag number, sex and shell type.
   d. Biologist or crew member recording the carapace measurements, sex, tag number and shell type.
   e. Crew member tying the loose ends of the tags and releasing the crabs.

Materials: The equipment to be used in the tagging operation will be the following:

1. Spaghetti-type tags, Series D-3000 to D-7999.
2. Tagging needles.
3. Tagging information sheets (forms).
4. Data copying equipment.

1960 Meat Content Experiments

Due to the insufficient amount of meat content data collected to date, the 1960 plan is a continuation of the same procedures.

Objectives:

1. To determine the variation in meat content of:

   a. Crabs of 130 to 200 mm. carapace length (of different shell types: soft, new, old and very old)

Methods:

1. Sample the meat content throughout the charter period by cooking, removing and weighing the crab meat.

2. The charter duration to be divided into periods when the vessel returns to port after each round.

3. Samples to be collected two to three days before returning to port. The collection of samples to be as follows:

   a. 1st round. a total of 20 crabs of 10 old shell; 10 very old shell

   b. 2nd round. a total of 20 crabs of new shell only

4. Selection of samples:

   a. Crabs of 130 to 200 mm carapace lengths.
   b. Of new, old, and very old shell types as outlined above.
   c. To take soft shelled samples if available.

5. Samples to be measured for:

   a. Carapace length for size.
   b. Weight: live, cooked, cooked merus meat and cooked total meat.
   c. Shell type in the same manner as determined in the tagging operation.

Technique and Data Collection:

1. Record preliminary data:

   a. Shell type, crab number, date

2. Live weight measurement:

   a. Pull crab out on its side to drain excess water
   b. Immediately weigh crab on its back to reduce excessive water loss and standardize weighing
   c. Record live weight in data book

3. Cooking crabs:

   a. Boil crabs for 30 minutes, starting with water already at boiling temperature

4. Cooling crabs:

   a. Cool crab in running water for 10 minutes and weigh for cooked weight

5. Picking and weighing meat:

   a. Place the picked meat in the strainer until all meat is picked
   b. Wash off excess non-meat particles by shaking the strainer in the pot of sea water
   c. Weight all meat on Chatillon Autopsy scale and record weight in pounds and to the tenth of an ounce.

Equipment:

1. Data collection:

   a. Meat content data book
   b. Calipers

2. Crab preparation:

   a. String to tie leg sections together
   b. A pot to cook crabs
   c. Coleman three-burner stove
   d. Shears for picking meat
   e. Strainer for washing picked meat

3. Weighing crab meat:

   a. Chatillon Autopsy scale, for live and total meat weights in tenths of an ounce

4. Crab holding:

   a. Live tank - for vessel

Information for the International Halibut Commission

Halibut are caught in the otter trawl during the surveys of the king crab investigation in the eastern Bering Sea. Since they are available their collection, which is very desirable to the International Halibut Commission and does not hamper the primary operation, will be undertaken by the members aboard the 1960 cruise.

Objectives:

The following are the purposes in the collection of the data:

1. Estimate of the halibut catch per unit effort.
2. Estimate of the proportion of sub-commercial sized fish in the halibut catch (those less than 66 centimeters in length).
3. Estimate of the age composition in the halibut catch.

Method:

The method for collection is as follows:

1. Data will be collected on halibut on all fishing stations.
2. All halibut caught will be either measured and released or bagged and frozen for later examination. Data will be kept on these in the Halibut data collection form.
3. Those killed will be sexed, measured and otoliths taken. Envelopes will be provided for otoliths.

Procedure:

1. Measurements will be made in millimeters with the salmon measuring rack and recorded in Halibut data collection form.
2. Bags of halibut will be tagged and tag numbers recorded with dates, and stations.
3. The captain will fill the Halibut data collection form which includes numbers of halibut frozen, halibut measurements, numbers measured and released, and number of halibut killed, as well as date, station and position.

4. At least one sample of the entire halibut catch should be frozen each day.

Bottom Invertebrate samples for Dr. Illg (U. of W.)

In conjunction with our bottom fauna studies and to aid in the identification of bottom invertebrates, Dr. Illg, Professor of Invertebrate Studies at the University of Washington, has requested collection of the following samples.

Procedure:

These samples to be bagged and boxed separate from those collected for the investigation. Bags to be tagged and records kept on tag numbers, dates and positions.

1. Tunicates (stalked onions): on stations of abundance, collect as many as possible (1500-2000, or bags full). On other stations collect some Tunicates of all types: onions, bread or brains and other solitary forms wherever available.

2. Echiuroids previously found on station F-11 and H-11. Reports state their presence with occurrence of herring. Collect as many as possible.

3. Cucumber (Psolus): previously found on station J-11. Collect as many as possible.

4. Starfish: collect at least 10 of each species available from stations Z-5, B-5, C-5, D-5, E-11, F-8,11, G-7,8, and H-7,8,9.

5. Shrimps and crabs: to obtain all the species present in the eastern Bering Sea, collect specimens at each station. Since identification is very difficult, collect as many as possible.

6. Sea pens: on any stations you find them, collect as many as possible.

7. Soft corals and bryozoans: wherever found, collect as many as possible.

1960 CHARTER VESSEL FISHING STATION POSITIONS

Station	Latitude	Longitude
A-4	55°00' N	165°44' W
A-5	55 00	165 10
A-6	55 00	164 36
B-4	55 20	165 46
B-5	55 20	165 12
B-6	55 20	164 36
B-7	55 20	164 00
B-8	55 20	163 25
C-4	55 40	165 49
C-5	55 40	165 12
C-6	55 40	164 36
C-7	55 40	164 00
C-8	55 40	163 23
C-9	55 40	162 49
D-4	56 00	165 49
D-5	56 00	165 13
D-6	56 00	164 36
D-7	56 00	164 00
D-8	56 00	163 24
D-9	56 00	162 48
D-10	56 00	162 12
D-11	56 00	161 38
E-4	56 20	165 51
E-5	56 20	165 13
E-6	56 20	164 36
E-7	56 20	164 00
E-8	56 20	163 24
E-9	56 20	162 47
E-10	56 20	162 11
E-11	56 20	161 37
E-12	56 20	161 00
E-13	56 20	160 23
F-5	56 40	165 14
F-6	56 40	164 37
F-7	56 40	164 00
F-8	56 40	163 24
F-9	56 40	162 47
F-10	56 40	162 11
F-11	56 40	161 35
F-12	56 40	160 59
F-13	56 40	160 22
F-14	56 40	159 46
G-5	57°00' N	165°14' W
G-6	57 00	164 37
G-7	57 00	164 00
G-8	57 00	163 24
G-9	57 00	162 46
G-10	57 00	162 10
G-11	57 00	161 34
G-12	57 00	160 58
G-13	57 00	160 20
G-14	57 00	159 44
G-15	57 00	159 07
H-7	57 20	164 00
H-8	57 20	163 23
H-9	57 20	162 46
H-10	57 20	162 09
H-11	57 20	161 32
H-12	57 20	160 56
H-13	57 20	160 19
H-14	57 20	159 42
H-15	57 20	159 05
I-8	57 40	163 23
I-9	57 40	162 45
I-10	57 40	162 08
I-11	57 40	161 31
I-12	57 40	160 54
I-13	57 40	160 17
I-14	57 40	159 40
I-15	57 40	159 02
J-10	58 00	162 07
J-11	58 00	161 29
J-12	58 00	160 52
J-13	58 00	160 14
J-14	58 00	159 48
J-15	58 00	158 59
K-10	58 20	162 06
K-11	58 20	161 28
K-12	58 20	160 50
Z-5	54 40	165 10

HALIBUT DATA COLLECTION FORM

Date_____ Station No._____ Tow No._____ Depth_____

Position_____

Catch: Total_____ Preserved_____ Released_____

Halibut Lengths (mm.)

1	16	31
2	17	32
3	18	33
4	19	34
5	20	35
6	21	36
7	22	37
8	23	38
9	24	39
10	25	40
11	26	41
12	27	42
13	28	43
14	29	44
15	30	45

Remarks: _____

CHARTER VESSEL SAFETY PRECAUTIONS

This is to emphasize again the need for observing and carrying out safety precautions while conducting research in the field. We are all aware of the hazards that are present on seagoing vessels and therefore should strive to be alert and safety conscious at all times.

You have been informed periodically on the detailed safety policy of the Service. However, because of the increase in duties and its consequent increase in machinery, etc., aboard these vessels, you should be extra careful in the performance of your duties. A detailed rule of safety is not possible as each vessel differs in its construction and operation. In any event, the captain should be consulted for safety rules and precautions pertinent to the vessel. The following general precautions, however, should be observed and carried out.

1. Discuss and go over again with the captain the "Safety" section in the charter bid. It is the duty of the captain to instruct all personnel on emergency procedures and maintain emergency equipment in good working order. Each person shall be assigned a Coast Guard inspected and approved life jacket which is to be kept in an accessible place. Upon commencement of the charter period a life boat drill shall be carried out during which the boats are lowered in the water and manned. At this time all life boat equipment will be checked and personnel instructed in proper operation and use of the equipment. Additional drills shall be held after any changes in personnel or modifications to the boats or handling equipment, and at any other time deemed advisable. The life rafts should be inflated and inspected for leaks. Distress flares are to be tested by actually firing one of each type or lot number.

2. Performance of hazardous work, not related to his duties, should be left to the more experienced crew members. See also paragraph 3 of "Vessel Equipment and Personnel" in charter bid.

3. No firearms will be permitted on board the vessel during the charter period without permission of the Laboratory Director.

4. The engine room is a potential danger to anyone not familiar with such spaces. The owner is responsible for the satisfactory operation of all machinery and scientific personnel shall keep out of the engine room and well clear of vessel equipment maintained by the crew.

5. Never exceed the manufacturer's specifications on winches, motors, gear or other equipment.

6. Do not attempt to perform work alone on deck without knowledge of others. Be sure that the wheel-watch is informed, or that another person is nearby or is aware of your situation. At night be sure that a deck light is turned on before going on deck.

7. Insure that a periodic check is made by vessel personnel to see that all items are fastened or lashed securely.

8. Any hazard, or potential hazard, should be pointed out to the captain so that safety precautions may be carried out immediately. If the hazard is unavoidably one of recurrent nature, be sure that everyone aboard is informed and thereby aware of the situation.

9. Any pertinent information which will lead to accident prevention should be exchanged between vessels.

10. Report additional precautions that should be incorporated in this list.

The following are some of the accidents which have occurred, and a few of the many danger spots or conditions which may exist aboard our charter vessels.

1. A scientist injured the tip of his index finger on an exposed "U" clamp during the hauling of a BT. Injury was such that the captain decided to go into port for proper medical care to prevent infection. Result - loss of two operational days.

2. A scientist received lacerations and a large bump on his head when the heavy hook of an unattended single block and tackle struck him on the head with sufficient force to knock him to the deck. Result - his efficiency was cut down for several days.

3. A scientist nearly had his finger badly injured or torn off during gillnet setting operations when he attempted to pull loose a lead line which became wedged between a pipe and the pilot house. There was sufficient strain on the outgoing nets to have caused severe injury, but luckily he was able to jerk his enmeshed finger out in time.

4. There were numerous occasions when someone has slipped on deck or in the companionway. This usually happens when a person, having spent some time on board, becomes lax or careless.

5. The loose-hanging shirt of an engineer aboard a charter vessel was caught in the belt of an auxiliary engine. He was knocked about severely but it resulted, luckily, only in painful lacerations all over his body. This shows that even an engineer, in his own element, will occasionally be involved in an accident in the engine room.

6. Firearms are occasionally carried aboard these vessels either by crew members or by scientific personnel. Most everyone is very careful when handling firearms. However, an unfortunate incident occurred when a scientist failed to check and clear his rifle while on deck. This person, upon retiring to his cabin, pulled the trigger of his rifle without any thought. The bullet, from the round which was still in the chamber, went through the headboard of a bunk, passed over a row of batteries, and lodged itself in one of the heavy beams. It was very fortunate indeed that the bullet did not richochet, nor hit the engineer who happened to be nearby, nor hit the batteries. The skipper, upon being informed of this accident, severely reprimanded the person. An accident of this nature should never have happened, but it did!

7. A scientist was accidentally locked in the ship's freezer when the door (with a snap-lock) slammed shut with the pitch of the vessel. He was able to get out an hour later only when a crew member, by chance, happened to go down to the freezer for some frozen food. The type of freezer and the type of door lock aboard our charter vessels this year prevents recurrence of this type of accident. However, all personnel should make certain that others are informed at all times of his (their) presence in the freezer.

8. In the past a potentially dangerous condition existed near the winches during hydrographic observations. When the free-falling method was used for lowering the wire, there was a tendency for the wire to slack and occasionally form a loop on the deck, then suddenly snap taut when the vessel surged. Accidents caused by this situation may be very serious. The winch operator should be alerted therefore, to prevent any slacking of wire.

In general, the skippers and crew members of all the charter vessels are safety conscious and will point out the many dangers which we may not be aware of, or tend to overlook, such as not standing in the bight of a line, etc. However, it is also our responsibility to be prepared for and be aware of most of the hazards which we may encounter aboard the charter vessels. To reiterate, accident prevention is an inherent responsibility of each individual, so be alert, and seek out and correct any unsafe condition.

Special SAFETY precautions for vessels using Trawl Gear

1. All scientific personnel shall acquaint themselves with the operations of the trawl during preparation for a cruise. The captain should be consulted at any time if there occurs any doubt of vessel or personnel safety regarding the trawl.

2. The crew shall handle all trawl and trawl door and winch operations.

3. All blocks or whatever is used, through which trawl cables are led shall have a safety device. In the event the block stem should break, the device should be able to hold the pressure of the trawl cables.

   Example: When the swivel of a trawl cable block on the rail of a vessel broke, a safety chain through the block saved the lives of three men working in the bight of the trawl cable.

4. All personnel will be especially careful with the trawl cables and alert during instances in the bight of the trawl cables. If possible, stay out of the bight.