Vessel Charter Plan 1959

KING CRAB CHARTER VESSEL CRUISE PLAN 1959

The cruise during the spring and summer of 1959 is for the purpose of supporting several phases of the king crab investigation: abundance, growth, food, relationship to hydrography, ecology, migrations, condition, and effect of gear. The data needed and methods used are set forth by projects.

Schedule

April 15 to April 26	Trip to Unalaska
April 27 to May 25	Station Pattern
May 27 to July 31	Salmon
August 1 to August 15	King Crab Tagging
August 16 to August 31	Return to Seattle

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

Personnel: chartered vessel

April 15 to May 26	Sakuda and Hebard
August 1 to August 31	Miyahara and Hebard

Responsibilities:

1. A ship's log is to be maintained by the captain showing time, place, duration and results of all operations. The detail should be as follows: traveling times, courses and positions, time and position gear is set, depth, wind direction and velocity, sea conditions, weather, direction of tow, time lifting starts, estimated total weight in net, estimated weight of different items in catch, including everything in the net, count of crabs by numbers and species and number tagged.

2. The cruise chief (senior biologist aboard) has top authority and is responsible for carrying out the cruise plan and is responsible for the nature and timing of the operations 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 the safety of the ship and personnel. He is empowered to determine whether or not 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 so that the owner may be paid for the work completed. In the event days occur during which the vessel does not meet the terms of the charter, the

beginning and the 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, the senior scientist aboard shall report by telephone or wire to Tak Miyahara.

Tak Miyahara: CHerry 2-2731

The report shall include position, progress, estimated position for following day, and authorized overtime worked for each man.

6. At the end of the term of field duty, each cruise chief shall prepare a brief written summary of his work. This should include the period covered, the work attempted, accomplishments and suggestions for improvements.

Operational Plan:

The proposed station pattern was chosen to include the entire distribution of king crabs in the eastern Bering Sea and the personnel aboard should keep in mind that the intent is to sample the entire population and may require additional stations, outward in twenty mile intervals until no or very few crabs are caught (less than 10) in the standard trawl effort (one hour).

The general routine to be followed during the station pattern is described below, and each project discussion should be read and understood. This operational plan is included only as a quick reference and reminder.

1. Upon arrival at a station, the net with distance meter and bottom attached, is set.

SAMPLE

2. After sufficient time (10 minutes) has passed to insure that the net is properly set, measure the distance between the cables at the towing block and at points six feet from the blocks. Measure also the angle between and the distance to the balls. All measurements should be recorded.

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

3. Upon recovering the tow, the captain will estimate the weight of the catch and the biologist will read the distance meters and label and preserve the bottom sample.

4. The catch is then sorted and the abundance of each major animal group estimated.

5. All halibut will be measured (use salmon rack) and when killed the otoliths will be taken and records kept as to length, sex, and stomach contents. Periodically, a sample of halibut should be collected, labeled and preserved for the Halibut Commission.

6. Hydrographic observations to be taken at each station will include bathythermograph and water bottle samples which will include temperatures at the following depths: 0, 15, 30, 50, 80 meters and bottom.

An additional BT cast should be made midway between stations.

Should bottom temperatures of less than 1.5°C be encountered, additional samples should be taken. (Details itemized in hydrographic section).

7. All crabs will be measured, shell condition noted, and all males tagged.

8. As outlined in the attached plan, crabs shall be taken at intervals for meat content studies.

9. All moulting crabs are to be held in the live tank to observe growth.

The second phase of the plan will emphasize tagging and stomach content studies. On the stations designated, the procedure with respect to door and distance measurements, crab carapace measurements, shell condition determinations and tagging will remain the same. The major difference is that most if not all the bottom fauna will be collected in sacks and all male crabs will be tagged until a minimum of 300 male crabs greater than 140 mm. in length are tagged. This will undoubtedly require more than one tow in some areas and all steps previously mentioned, e.g. door measurements, etc., will be repeated to provide replicate data.

The stomach content requirements are detailed in the plan for that study.

Instructions for Population Estimate by Trawling:

1. Take measures on all trawl efforts.

2. Record: station number, date, depth, time when gear is first on bottom, time when hauling begins, length of trawl cable out, cable spread at start and end of haul, buoy spread and distance to buoy at start, middle and end of haul, number of king crabs caught and size and sex of each crab.

3. Cable spread should be measured and recorded as the distance between the trawl cables at the block and the distance at a point 6 feet down the cables from the stanchion block.

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 will be 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 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 foot.

5. All measurements observed will be recorded.

Hydrographic Sampling:

A. 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 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 REVERSING.

B. Station pattern sampling is to be taken as in the past, that being a hydrographic cast and a BT lowering.

1. The hydrographic cast will be taken with water bottles and reversing thermometers at the following depths: 0, 15, 30, 50, 80, bottom.

C. A BT cast will be made at mid-distance between stations.

Notes and Precautions:

A. Bathythermograph

1. Do not use 450' BT at depths greater than 75 fm (137 m) or 150 fm (274 m) 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 lead pencil, don't use unless necessary.

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

4. When BT is again aboard, check slide for trace, if none retake.

B. Water Bottle Casts

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

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 for 10 minutes before tripping.

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

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.

Stomach Contents v.s. Bottom Fauna

The Purpose is:

To determine whether stomach contents differ between mature and immature crabs and in crabs of various shell conditions and to determine if king crabs are selective in their feeding habits.

Procedure:

When an abundance of mature female crabs that include crabs which exhibit both old (those having eyed eggs) and new (those having hard shells, but purple eggs) and also crabs having just moulted (still with soft shells) are encountered collect a minimum of 50 old shelled and 50 new shelled crabs and as many (up to 50) moulting females as possible, for stomach samples. The crabs should be cut in the same manner as last year, retaining as much of the gut as possible. Place each stomach in an individual bag and close by means of a cattle tag. It will not be necessary to measure each individual crab. Freeze the stomach samples as rapidly as possible.

In recording data on all these females, note the numbers of the cattle tags and the shell condition of each crab. Repeat tow to obtain the required sample.

In conjunction with these samples, preserve the entire bottom fauna catch from each tow, excluding the fish (as much as possible) and king crabs. In addition take at least two dredge samples. Burlap bags are provided for the bottom fauna and freezer cartons (1 pint) for the dredge samples. Flush the mud out of the dredge samples and retain the entire faunal catch. Freeze all the bottom fauna and dredge samples. The bottom fauna sacks are to be tied, closed and fastened. Record these numbers with the other information on the stomach samples.

On either round one or two make two more stomach sampling stations. It is preferred that one of these stations be in the area around E-6, E-7, F-6, F-7, etc., and the second be in the area around H-11, H-12, G-11, G-12, etc. On both of these sampling stations collect crabs, preferably males, of all one shell condition other than soft or very old. The sample for each station is to consist of a minimum of 50 crabs less than 90 mm. in length and 50 crabs greater than 120 mm. in length. Obtain and preserve the stomachs in the manner previously described. If females are included in these samples the "less than 90 mm." category is to be modified to immature crabs (those having no eggs) 85 mm and less.

On these stomach sampling stations, collect the entire bottom fauna catch excluding fish and king crabs, and make at least two dredge hauls. Preserve these specimens in the manner previously described.

All samples are to be returned to Seattle still frozen.

King Crab Distribution v.s. Bottom Fauna

Purpose:

To determine the relation of particular bottom fauna to king crab distribution the following plan is proposed.

Procedure:

On the tagging stations retain the entire bottom fauna catch per tow, excluding the fish and king crabs. Bag this catch and mark with cattle tags. Preserve the samples by freezing. All samples are to be returned to Seattle still frozen. Record the bag numbers for each station. In addition to the bottom fauna samples taken on these tagging stations, on two or more stations where no king crab are caught, collect the entire bottom catch, again excluding the fish, and preserve in the previously described manner.

On all other stations in the pattern make an estimate of the numbers in the major groups present in the catch. These groups are to include: (1) crabs, spider, kelp, tanner, cancer, hairy, rock, and hermit; (2) starfish; (3) brittle stars; (4) basketstars; (5) cucumbers; (6) shrimp; (7) snails; (8) clams; (9) anenomes;(10) barnacles; (11) sponge; (12) worms; (13) tunicates; (14) coral, etc.

For purposes of clarity, it would be best if the same biologist made all the estimates. At those stations where bottom fauna samples are collected, use the 1½" mesh liner in the trawl.

Dredge samples are also to be taken on the major tagging stations and on the stations at which no crabs are caught and bottom fauna retained. Put the dredge samples in freezer cartons and preserve as for those taken in conjunction with the stomach samples. Label containers with date and station.

King Crab Distribution v.s. Bottom Types

Purpose:

To determine whether or not bottom types influence the distribution of king crabs.

Procedure:

On each station take a sample of the bottom by means of a pipe attached to the trawl net. Flush the sample out into a paper freezer carton and label with station number and date, and freeze the sample.

Cruise Plan - 1959 Tagging for Migration

Objectives:

The 1959 cruise plan for the determination of the migration of the Bering Sea king crab stock from tagging experiments is essentially the same as the 1958 plan except that only male crabs will be tagged.

The objectives are to determine the:

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

Methods:

With respect to the study of migrations of Bering Sea king crab stocks by means of tagging, the data collected from the 1954 to 1958 tagging experiments have not provided us with sufficient recoveries for the analysis toward the objectives stated above. Therefore, the following is a proposal to intensify the releases at a few major release stations in order to increase the number of recaptures:

1. Release more tagged individuals at specified areas.
2. Release all the sizes, making sure adequate numbers of large crabs are included.

Procedure:

To increase the number of recaptures, the following method is proposed:

1. Releases will be made on all the stations.
2. Releases will be made in excess to the regular station on the following central stations:

Z - 5	E - 6, 9, 12
B - 6	H - 9, 12

about

3. The number of releases at each extra station shall be greater ~~than~~ 300 crabs of 140 mm and larger.
4. All sizes of crabs to be tagged, making sure an adequate number of large sizes are included. 300 – 140 mm.
5. The data taken will be the same as in 1958 tagging.

Materials:

The equipment to be used in the tagging operation will be the same as in the 1958 experiment. These are:

1. Spaghetti type tags, end of C Series and D series.
2. Tagging needles.
3. Log Books.
4. Data copying equipment.

Cruise Plans - 1959 Meat Content Experiments

Due to the insufficient amount of meat content data collected in 1958, the 1959 plan is a continuation of the same procedures.

Objectives:

A. To determine the variation in meat content of:

1. Crabs of 150 to 170 mm. carapace length.

a. of different shell types; soft, new, old and very old.
b. of new crabs due to time.

Methods:

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

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

C. 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 40 crabs of

new shell only
these crabs to be captured together if possible.

D. Selection of samples

a. Crabs of 150 to 170 mm. carapace length only
b. Of new, old, and very old shell types as outlined above
c. To take soft shelled samples if available.

E. 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:

A. Record preliminary data.

1. Shell type, crab number, date

B. Live weight measurement.

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

C. Cooking crabs.

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

D. Cooling crabs.

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

E. Picking and weighing meat.

1. Remove merus section of the right third leg, pick meat by cutting the shell along the length of the merus, rinse the meat, weigh on the dietary scale and record the merus meat weight in grams.
2. Pick rest of leg and shoulder meat with shears.
3. Place the picked meat in the strainer until all meat is picked.
4. Wash off excess non-meat particles by shaking the strainer in the pot of sea water.
5. Weigh all meat on Chatillon Autopsy scale and record weight in pounds and to the tenth of an ounce. Meat to be transferred from strainer to foil pie plate and weighed in the pie plate.

Equipment:

A. Data collection.
1. Meat content data book
2. Calipers

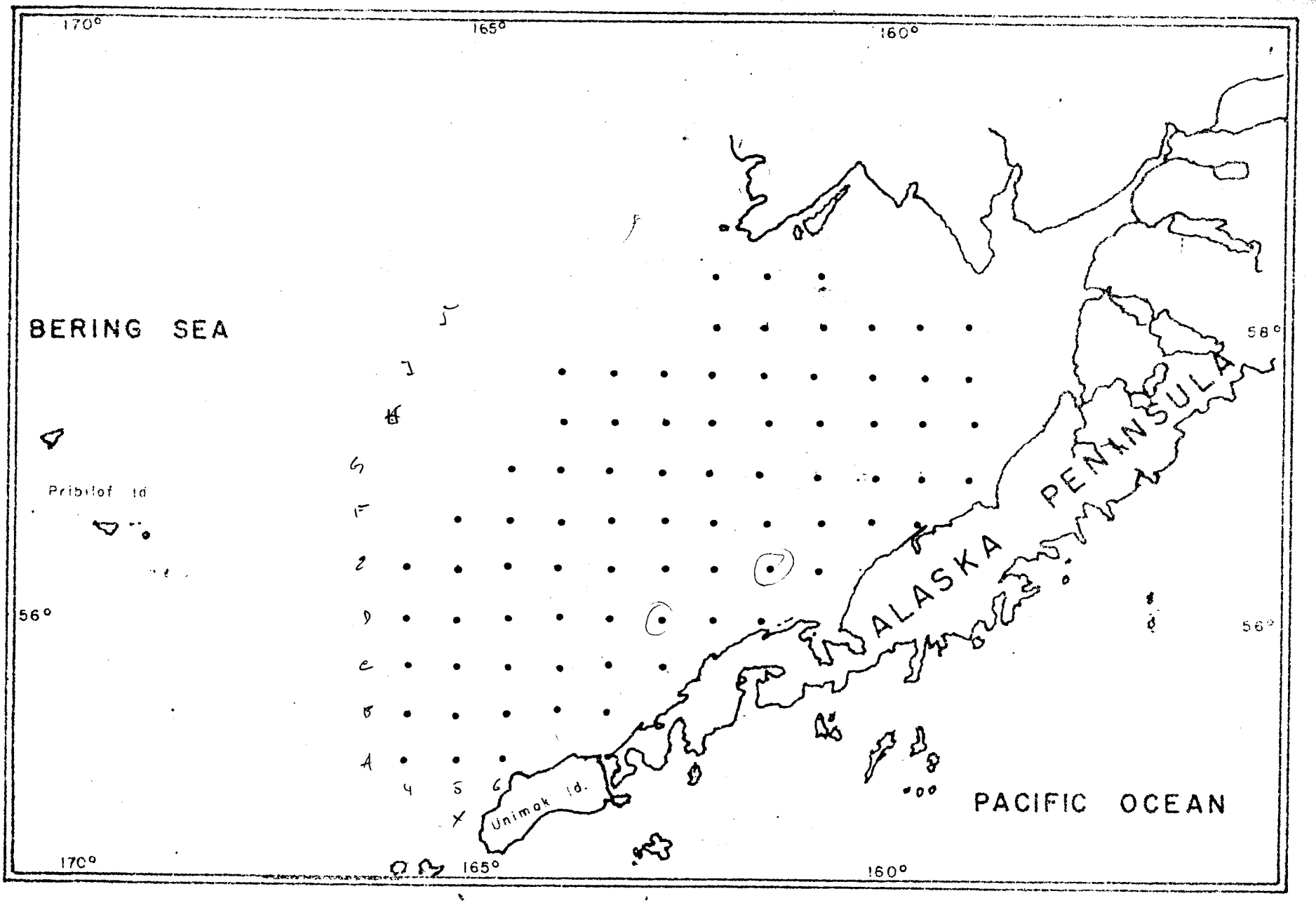
B. Crab preparation.
1. String to tie leg sections together.
2. A pot to cook leg sections.
3. Coleman three burner stove.
4. Shears for picking meat.
5. Strainer for washing picked meat.
6. Aluminum foil pie plate for weighing meat.

C. Weighing crab meat.
1. Chatillon dietary scale for merus meat weight in grams.
2. Chatillon Autopsy scale, for live and total meat weights in tenths of an ounce.

D. Crab Holding:
1. Live tank - for vessel
2. Crab pots for Unalaska

1958 CHARTER BOAT 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


170°
165°
160°
BERING SEA
58°
Pribilof Id
56°
ALASKA PENINSULA
56°
Unimak Id.
PACIFIC OCEAN
170°
165°
160°