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UNITED STATES DEPT. OF COMMERCE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL MARINE FISHERIES SERVICE

NORTHWEST AND ALASKA FISHERIES CENTER

SEATTLE, WASHINGTON

Manual for Biologists

Aboard Foreign Groundfish Vessels

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PREFACE

This manual has been prepared to assist you in your duties as an observer aboard foreign groundfish vessels operating in the eastern Bering Sea and Northeast Pacific. This manual plus training sessions and your perusal of reports filed by previous observers should adequately prepare you for your observer experience. It must be borne in mind, however, that conditions can and do change and that no set of instructions covering as broad an area as we have attempted to cover here can ever be complete. It is therefore the responsibility of the observer to objectively evaluate each unfamiliar situation on the vessel before deciding on a course of action. Study the manual carefully, refer to it often when in the field, and consider ways in which it may be improved as a guide for future observers.

INTRODUCTION

FOREIGN FISHERIES OBSERVER PROGRAM

In March 1977, the United States entered upon a new era in fisheries management with the implementation of the Magnuson Fisheries Conservation and Management Act of 1976. This Act extends U.S. jurisdiction over fishery resources out to 200 miles and establishes a program for their management. The management policy for the various fisheries embodies the concepts of: (1) the need to arrest the decline in abundance of overfished stocks and assure an adequate potential for the development of new U.S. fisheries; (2) the need to protect the halibut resource so that it may be rebuilt to former levels; and (3) permitting foreign fishing consistent with the above and in a manner that will allow rebuilding of overexploited stocks and prevent overfishing of currently healthy stocks. All foreign fishing vessels must obtain a permit from the Secretary of Commerce before engaging in any fishery within the U.S. 200-mile zone, and each nation will be subject to catch limitations as set by the United States.

In order to monitor the foreign fisheries within the U.S. jurisdictional zone, the Act stipulates that foreign fishing vessels must accept observers. These observers are assigned to individual vessels for periods at the discretion of the United States. The primary objectives of the observers are to: obtain daily catch rates; gather data on species, size, and age compositions; determine incidence of Pacific halibut, salmon, and crab in the landings; and report on possible violations of U.S. fishing regulations. The estimates of catch rates by species obtained by the observers, matched with data on the number of vessel days on the ground, enables the U.S. to estimate total daily landings of the various fisheries and pace the progress of the foreign fisheries towards the quotas.

The United States has placed scientific observers on foreign fishing vessels since 1973. Since 1977 we have placed observers on Japanese, Soviet, Polish, and Korean vessels fishing for numerous fish and shellfish species. Because of the need to cover a variety of fisheries spread over broad areas of the ocean and to cover a great number of vessels adequately, we schedule observers to sample for approximately two months per trip. For the same reason, we generally arrange with the foreign nation to transfer the observer to a second vessel after one month of sampling. If the Japanese crab mothership and landbased fleet operates, observers assigned to those vessels spend about five months at sea or for the duration of the fishery.

Because the United States is fully dependent upon the data obtained by observers in order to assess the impact of foreign fisheries upon the stocks, we must stress the necessity for accuracy in data collections, accurate determinations of species, and complete fulfillment of the sampling plan. Data forms must be carefully completed and checked. Sample forms in this manual serve as guidelines. (All observer data and reports are subject to certain restrictions of the Privacy Act, so any private use of them must be cleared by the National Marine Fisheries Service--please refer to "Observer Return and Completion of Duty".)

This manual, along with the training sessions, should adequately prepare you for an observer trip. Because of the variations in fish handling by the various ships, observers may be confronted with sampling problems not fully covered in the training sessions. We ask that you adapt to whatever sampling procedure is necessary to insure unbiased samples and devise sampling methods that insure representative samples of the landings for your ship. If you devise your own sampling procedure, make sure that you are able to collect all of the necessary data we ask you to obtain.

OBSERVER DUTIES AND PRIORITIES

Primarily, the observer's duties and priorities relate to determining the incidence of various species and biological sampling as listed below. Priorities may change according to cruise, so observers will be notified of the specific duties and priorities.

1. Determine the species composition of the catch according to specified instructions.
2. Record daily catch rates of the vessel. Special instructions will be issued regarding obtaining your estimates of catch for comparison with estimates made by the vessel.
3. Record the numbers, weights, and sizes of certain incidentally-caught species in the catch as per instructions. These species may include halibut, crab, salmon, and other species.
4. Send a summary of this information (items 1, 2, & 3) by radio message to Seattle weekly.
5. Obtain biological data and samples on target and other species as directed. This may include length frequencies, otoliths or scales for ageing, stomach content samples, or other information as requested.
6. Observe the compliance or lack of compliance to U.S. fishing regulations and document instances of violations of regulations when observed.
7. Record species, numbers, and viability of incidentally-caught marine mammals and occurrence of marine mammals in the fishing areas.

SPECIAL CAUTION ON DEPORTMENT

As a guest of the vessel:

1. Fisheries observers have traditionally been treated courteously, and in turn you should show the same respect to the vessel and everyone on board.
2. Observers should make a conscious effort to remain clean and neat, particularly at mealtimes, while aboard vessels. Dirty, unkempt hair appears to be particularly offensive to some.
3. Accommodations and food may be different from what you are used to at home. Adaptable observers with an easygoing attitude in these regards are apt to receive more consideration than those who constantly criticize and make demands.
4. Remember, your hosts often consider you a representative of the United States, so your behavior should reflect this.

As a fisheries observer:

1. When conflicts or sampling problems occur which affect your attempts to get unbiased samples of the catch (presorting of fish for example), promptly call them to the attention of the fishing manager.
2. Do not offer, even if asked, any advice on what a vessel can and cannot do under terms of the permit under which they are operating. All such questions should be sent via message to the NMFS Regional Director in Juneau for ships in Alaskan waters and the Regional Director in Seattle for vessels fishing off the California, Oregon, and Washington coasts.
3. Log suspected violations of treaty agreements in your private notebook for inclusion in your final report. It is not your responsibility to confront the ship's personnel with violation complaints. You are not an enforcement officer. Your job is simply to observe.

4. As an American observer you will abide by all rules and regulations relating to the conduct of the host vessel. You shall not utilize, for any purpose other than obtaining required data, any species which the governing permit prohibits the vessel from fishing for or retaining, including especially salmon, halibut, crabs, and marine mammals. (This includes eating them in the ship's mess, if served.) "Prohibited species" is interpreted as including also shrimp, scallops, sponges, corals, and other species which the vessel is not specifically permitted to retain. Do not accept or transport any item violating laws relating to endangered or protected species. (The permit in the appendix does allow you to bring back sea lion canine teeth for age analysis by the National Marine Mammal Laboratory.)
5. If your host vessel is boarded by the Coast Guard, do not attempt to interfere with their activities, or those of NMFS enforcement agents, in any way. You can let them know that you are aboard, then stand by. If they wish assistance from you as a guide or interpreter they will ask you.
6. Do not accept gifts with the purpose of bringing them back to the United States.
7. Consider safety first in everything you do.

If you travel to Japan:

1. In meetings with government and fishing industry officials, observers should appear neat, clean, wearing a coat and tie (for men; for women - appropriate dress).
2. Do not expect Embassy personnel in Tokyo to take care of your personal affairs such as obtaining supplies, shopping, or mailing personal items.

THE TRAINING PERIOD

The observer will spend approximately two weeks in Seattle for orientation and training. Transportation from your home to Seattle for training and from Seattle to your home after completion of your final report is at the observer's expense. Similarly, costs of food and lodging while in Seattle are also assumed by the observer.

Training will consist mainly of learning how to identify common species of fish and crabs found in the Bering Sea and Northeast Pacific, and explanation of the sampling procedure. The following list outlines some of the activities covered during the training period. The list is not necessarily complete and the items are not necessarily given in the order that they should be done.

1. Complete paperwork associated with the contracting agency.
2. Complete physical examination as may be required.

(Items 1 & 2 may have been completed before the training period begins.)

3. View introductory slide show--explanation of the fishery concerned, illustrated by slides.
4. Study manual, including sampling procedures and filling out of data forms.
5. Study species identification using the color slides, identification guides, and specimens available.
6. Learn methods of taking length frequencies, removing otoliths, and determining the sex of fish.
7. Review reports filed by previous observers.
8. Obtain passport and visa if necessary.
9. Make plastic on-deck sampling forms.
10. Prepare set of otolith vials. (See "Preparation of Otolith Vials").
11. Fill out and turn in "Emergency Data" forms. (See "Communication with Relatives and Friends").

12. Assemble equipment (including a complete set of all data forms) and pack gear. (See "Observer Clothing and Equipment" and "Packing the Equipment").
13. Pick up cash advance and plane tickets.
14. Each prospective observer will complete a data exercise that is designed to help the observer understand how to fill out data forms and radio messages correctly. These data exercises will be evaluated in small group sessions by a member of the staff and, at that time, observers will also be quizzed on their understanding of sampling procedures. If a complete grasp of the duties is not demonstrated, the observer may either be given additional training or released. We reserve the right to dismiss any individual deemed not qualified, exhibiting poor judgement, or lacking the appropriate human relation skills necessary for the job.

OBSERVER CLOTHING AND EQUIPMENT

NMFS will provide the scientific observers with adequate rainproof clothing and boots. All equipment necessary for the collection of biological data will be similarly provided. The sampling gear will be brought aboard the vessel by the observer, and at the end of the trip all serviceable equipment and supplies will be returned by the observer.

The observer will provide his own personal clothing, warm work clothes for wearing under raingear, toilet articles, and other items of a personal nature.

Unless otherwise informed, the vessel upon which the observer is to be stationed will be expected to provide adequate quarters, bedding, and meals. Reimbursement will not be made on the vessel for food and lodging. Support of the observers is one of the requirements of the fishing permit. In

addition, it is expected that the vessel captain will allow the observer an adequate and safe space in which to carry out his duties.

The following are lists covering the clothing and equipment necessary to perform 60 days sampling aboard a foreign fishing vessel:

A. Personal items supplied by observer--The following is a recommended list of personal clothing. The amount and type of heavy clothing is dependent on personal preference, fishing area, and time of year.

Work clothes--minimum number and type

Shirts, wool - 2 (1 light, 1 heavy)
Shirts, cotton - 1
Shirts, cotton sweat - 1
Trousers, wool work - 1
Trousers, cotton - 2
Hat or cap with earflaps
Slippers or beach sandals
Handkerchiefs, large - 3
Underwear, thermal - 2 pairs
Shorts - 5 pairs
T-shirts - 5
Socks, wool work - 2 pairs
Socks, cotton - 5 pairs
Jacket, medium wool or synthetic - 1

Other items or articles

Towel, medium cotton - 2
Toilet articles
Suitcase or duffle bag, light, medium size, old or inexpensive - 1
Dress suit or slacks and sport jacket if traveling via Japan
Traveler's checks purchased with the cash advanced
Language dictionary and/or phrase book

Optional

Felt/wool boot insoles
Needle and thread for repairs
Extra eyeglasses
Sunglasses
Camera and film
Watch
Pills to prevent seasickness
Vitamins, protein tablets
Prints of family, home town, hobbies
Earplugs
Flashlight

B. Groundfish sampling gear provided by NMFS

To be packed loose in baskets:

Baskets (2 or 3)
Set of castors
Rope
Lined pads (2)
Clipboards (2)
Log book (1)
2-liter wide mouth bottle with formalin (1) - (optional)
Vial block (1) (if collecting otoliths or cod scales)
Liter bottle of alcohol (1) (if collecting otoliths or cod scales)
Squirt bottle for alcohol (1) (if collecting otoliths or cod scales)
Scouring powder (1 can)
LPS-1 rust preventor (16 oz. bottle with applicator cap)
50 kg scale (1) - (observer should check accuracy with standard weight before leaving)
5 kg scale (1)
2 kg scale (1)
Filament tape (1 roll)
Sponge (3)
Plastic bags for salmon snouts (5) (15 for coastal hake fishery)
Plastic bags (15)
Rubber gloves (3 pair)
Glove liners (3 pair)
Hardhat (1)
Life vest
First aid kit (1) - (check contents for completeness)
Measuring strips (3)
Manilla folder (1)
Carbon paper (10 sheets)
Graph paper (5 sheets)

To be packed in cardboard box in basket:

Pencils #2 (12)
Pens (5)
Pencil erasers (2)
Plastic ruler (1)
Looseleaf rings for extra forms (3)
Scotch tape (1 roll)
Thumbtacks (1 container; about 25 tacks)
Forceps (2)
Rubber bands (1 container; about 40 rubber bands)
Scalpel handles (2)
Hooked scalpel blades (10)
Tape measure (2)
Thumb counters (1) - (mothership observers take 2; longline observers take 3)
Twine (1)
Knife (1)
Whet stone (1)

To be obtained during training:

Rain pants (1)
Rain jacket (1)
Boots (1 pair)
Large ring looseleaf notebook for data forms
Index pages for notebook (10)
Data forms (check for completeness)
Scale envelopes (50-200)
Otolith vials (200-500)
Permanent felt-tip marker pen (1)
Plastic sheets
   Basket sample form (2)
   Prohibited species form (2)
   Otolith form (2)

The following gear will be checked out to the observer:

Stopwatch (except longliners and small trawlers)
Calculator (1)
Extra calculator batteries (2)
Calipers (1) - for those who are to measure crab
Book - Hart (1)
Book - Hitz (1)
Book - Miller and Lea (1) - (Hake ships only)
Book - Wilimovsky (1) (optional)
Species photo guide
Species identification manual (check for completeness)
Marine mammal guide

C. Number of data forms to take for a two-month cruise

	Stern Trawlers	Longliners	Motherships	Joint Venture
Form 1	0	0	20	15
Form 1L	0	10	0	0
Form 2	25	0	0	10
Form 3	140	0	140	150
Form 3L	0	140	0	0
Form 4	50	50	50	50
Form 6	12	0	12	12
Form 7	60	50	60	60
Form 8	4	4	4	4
Form 9	50	50	50	50
Form 10	10	0	5	8
Form 11	15	15	15	15
Radio rpt. worksheets RM	10	0	0	6
Radio rpt. worksheets RM-1	7	10	5	5
Radio rpt. worksheets RM-3	10	10	5	5
Enforcement report #1	2	2	2	2
Cruise report #2	2	2	2	2
Net-scarred salmon form	3	0	3	3
Net discard form	3	0	3	3

D. Extra instructions and handouts

1. English letter of introduction
2. Translated letter of introduction
3. Personal history sheet
4. Notice to vessel captains (Japan only)
5. Gear, weather and sea codes (translated)
6. Meal and bath schedules (translated)
7. Form 1, 1L, or 2
8. Form 12a (vessel data)
9. Form 12b (net dimensions)
10. Language helper and translated phrases

PREPARATION OF OTOLITH VIALS

Otolith vials should be numbered sequentially (usually 1-500) with tape and a waterproof, rub-proof pen or marker. It may be possible to use empty vials from a previous observer cruise that are already numbered. Bundle together each succeeding group of ten vials with a rubber band. Take along a few unlabeled vials in case some of the numbered ones are cracked.

PACKING THE EQUIPMENT

All sampling gear and Forms 1-11 will be packed in a box or sampling baskets for transport to and from the vessel. The box or baskets may be exposed to salt spray so sensitive items should be packed in plastic bags. Pack the life vest so that it will be accessible prior to ship boarding. Remove the casters from the box to avoid their loss before checking in your baggage at an airport. While traveling, the observer should have the following papers with him (and easily accessible):

Manual/Completed Data Forms: On the flight to the embarkation port, carry the observer training manual in your carry-on luggage. (Some extra sampling supplies are kept at Dutch Harbor in the event that the airline loses your baggage; we do not keep manuals at Dutch Harbor, however, because it is too difficult to keep up with changes.)

On the return journey from the ship, carry the completed data forms with you. If these forms are lost, your whole trip is essentially wasted.

Letter of Introduction: This letter, written by the Director, Northwest and Alaska Fisheries Center, will introduce the biologist to the captain of the fishing vessel and will also explain the duties of the biologist.

Personal History: A brief statement giving observer's name, position, address, date and place of birth, marital status, number of children, education, and professional experience.

Passport: If the observer boards the vessel via Japan, a passport with visa is mandatory.

Translations: A packet of forms and letters in the language of the host country will be provided.

COMMUNICATION WITH RELATIVES AND FRIENDS

Observers will not receive mail while on board foreign groundfish vessels. Observers traveling via Japan may have their mail sent to the Regional Fisheries Attache for pick-up on their return. The address is:

(Your name), U.S. Fishery Observer
c/o Regional Fisheries Attache
American Embassy - Tokyo, Japan
APO
San Francisco, California 96503

On occasion, observers whose host vessel is boarded by the Coast Guard have been able to have them mail letters for them if the letters were all ready and stamped.

Before the observer departs, he will fill out an Emergency Data Form, giving numbers and addresses of whom to contact in emergencies or drastic changes in observer's scheduled return. Any of those on the list should be notified to contact anyone else who should know of the change in plans or emergency. Do not send or expect to receive any personal messages except in the event of emergencies. If a family emergency should arise at home, relatives should contact Mr. Russell Nelson, Northwest and Alaska Fisheries Center, (206)442-4990 (see also phone numbers in "Transport to the Ship").

SCHEDULING OF OBSERVER BOARDINGS, TRANSFERS, AND DISEMBARKATIONS

Vessel and observer schedules are arranged through the Foreign Fisheries Observer Program, Division of Resource Ecology and Fisheries Management, Northwest and Alaska Fisheries Center, Seattle, and the participating countries. As several back-and-forth radio messages may be necessary to establish which vessel the observer will go on, and the date, time, and place of observer boardings, the observer-in-training should be prepared for last minute changes in Seattle departure times and ship assignments. Sometimes observers stay in Seattle longer than was originally planned, so be prepared for this eventuality, and be patient. Similarly, dates of return may also be affected, so notify NMFS before leaving if you have any pressing dates soon after your expected return (such as the beginning of the school quarter). See the section on observer radio messages when arranging transfers and disembarkations--enough time must be allowed NMFS to make all necessary arrangements.

Observers are usually put on the payroll two weeks prior to the date they must fly to their ports of embarkation for 60 days at sea. Upon return to Seattle they are required to work at the Fisheries Center until their data forms have been properly completed and their cruise reports have been accepted. Observers are normally paid for five full working days after their return to Seattle. Refer to the "Observer Return and Completion of Duty" toward the back of the book.

TRAVEL TO THE SHIP

SHIPMENT OF GEAR

Because of the variety of places to which the observers must travel and the various modes of transportation employed, a variety of ways of handling the observer gear boxes are employed. These are detailed below.

Some observers have had their otolith alcohol confiscated by the airlines because of some confusion on the regulations concerning the transport of alcohol. If the airline personnel do not permit you to take the alcohol, do not argue further--dump the alcohol, rinse the container if necessary, and when you get to your destination, purchase rubbing alcohol to replace the ethyl alcohol that was dumped. Note on the top of the Form 9's that rubbing alcohol was used as the preservative.

The observer carries the gear and equipment baskets with him to the various ports whether traveling via auto, bus, train, or airplane. If traveling by plane, the baskets are normally transported as part of your personal luggage. Excess baggage costs can usually be avoided by careful planning and keeping the number of personal and equipment items at a minimum. The usual procedure is to pay cash for the amount of excess baggage at the time of check-in, so it is very important to limit the amount of personal items and to allocate enough cash to pay for the excess baggage upon your return.

CUSTOMS

Observers should register any foreign-made goods (cameras, watches, etc.) with Customs before they leave the U.S. so duty will not be charged upon re-entry. A foreign ship, even though fishing within the 200-mile limit, is technically considered (for Customs purposes, at least) a bit of "foreign soil," so observers must go through Customs as soon as possible after disembarking. It is the observer's personal responsibility to contact Customs Officers at the port of entry, and wait there until they arrive. This may require that airline flights be missed and that extra nights be spent in the port of entry. Failure to comply will result in the observer personally being fined, imprisoned, or both.

Observers disembarking foreign ships at Dutch Harbor, Kodiak, Seward, Sitka, or any ports off Washington, Oregon, and California coasts must contact Customs officers in those ports. Observers disembarking at Adak must contact the Customs officers immediately upon arrival at Anchorage International Airport. At some ports (Dutch Harbor and Seward, for example), Customs officers may work on a seasonal or part-time basis. If for some reason you are unable to contact the Customs personnel in these ports, report to Customs at the Anchorage airport.

Observers traveling via Japan must go through Customs at the international airports. While aboard the plane enroute to Japan a "Declaration of Unaccompanied Baggage" form should be obtained from the flight attendant, filled out, and given to the Japanese Customs Officer immediately upon arrival in Japan. This will greatly simplify getting the equipment box through the freight Customs Office.

Customs Agents:

Eureka, California - various agents, 707-442-4822
Coos Bay, Oregon - Theodore Bracken, 503-267-6312
Astoria, Oregon - Newton C. Smith, 503-325-5541

Anchorage, Alaska - various agents, 907-243-4312 Int'l Air
Kodiak, Alaska - various agents, 907-486-3112
Sitka, Alaska - August B. Anderson, 907-747-3374
Seward, Alaska - various agents, 907-224-5671
Dutch Harbor, Alaska - various agents, 907-581-1270
Seattle, Washington - 206-442-5491
San Francisco, California - 415-556-4340

EXPENSES INCURRED WHILE TRAVELING

The contracting agency should inform the observer before departure on the procedure for accounting for money spent while traveling from Seattle to the vessel and back again. While in some cases it may not be necessary, it is a good idea to save all receipts for transportation, hotels, meals, and other legitimate expenses. Be cautious in spending your travel advance--costs are high in Alaska and Japan and observers are frequently delayed in both getting on their ships and in getting flights out of the port after their return. UniSea Inn (Dutch Harbor) does not accept bank cards but sometimes accepts them as identification for a personal check. If you have to pay cash for any excess baggage charges on your return flights, remember to allow enough money (and get a receipt). Retain any unused airline tickets and turn them in to your contract agency upon your return.

TRANSPORT TO THE SHIP

There are several methods employed in transporting observers to and from foreign vessels. Observers destined for Japanese motherships sometimes board or disembark them in Japan. Joint-venture observers frequently ride out to the fishing grounds on U.S. catcher boats. Observers on other vessel types normally are taken by small chartered boats to a pilot pick-up point where they transfer to a foreign vessel.

Normally, airplane flights are arranged so that an observer arrives at the embarkation port at least one day in advance. This is often necessary since the weather is notoriously bad in certain parts of Alaska, and

flights are often postponed. Delays caused by weather may be unavoidable, but it is important that the observer not be the cause of delays by missing the flights, or having his equipment miss the plane.

Upon arrival at the embarkation port, contact the agency which is to provide transport to the vessel, and let them know of your arrival. Let them know of your whereabouts so that they can contact you if there is a last-minute change of plans.

The following list of addresses and phone numbers is supplied for your reference:

Observer Program in Seattle: (Home phone numbers--in case of emergency)

Foreign Fishery Observer Program Office
National Marine Fisheries Service
Northwest and Alaska Fisheries Center
2725 Montlake Blvd. East
Seattle, WA 98112
(206)442-4990 (office number)

Russ Nelson (home phone) (206)789-1496
Janet Wall (home phone) (206)283-1690
Heather Weikart (home phone) (206) 365-7775

Naval Reserve Training Facility
860 Terry Ave. N.
Seattle, WA 98109
(206)442-7271

Sandpoint Debriefing
NOAA facility
Hangar 32 (Rm 126)
(206) 527-6656

Contract Agencies:

Fisheries Research Institute
University of Washington
Seattle, WA 98195
Diane Rubiano (206)543-9575

Oregon State University
Department of Fish & Game
Corvallis, OR 97331
Virginia Veach (503)754-4531

For Seward:

Northern Stevedoring & Handling Corp.
P. O. Box 497
Seward, AK 99664
(907)224-5477 (Mr. Jack Goodwill or Mr. Gale Shingleton)

Mr. Sadao "Albert" Kawabe
(liaison agent for Japanese companies)
P. O. Box 67
Seward, AK 99664
(907)224-5235

Breeze Inn 224-5238
Murphy's Motel 224-5650
New Seward Hotel 224-5211
Van Gilder Motel 224-3079

For Sitka:

Southeast Stevedoring Co.
Sitka, AK 99835
(907)747-3377 (Mr. Jay Helland)

Sheffield Sitka 747-6616

Alaska Dept. Fish & Game
Box 499
Sitka, AK 99835
(907)747-3278 (Alan Davis
or Stuart Roberts)

For Kodiak:

Alaska Tug & Salvage Co.
P. O. Box 711
Kodiak, AK 99615
(907)486-5503 (office)
486-4295 (boat phone)
486-4373 (residence of
Mr. Damm, manager of AT&S)

Sheffield House: 486-5712
Shelikof Lodge: 486-4141
Wien Air Alaska: 486-4102/6151
Ace-Mecca Taxi: 486-3211/3255
(or use "standby taxi" at the
airport)

National Marine Fisheries Service
Kodiak Laboratory
P. O. Box 1638
Kodiak, AK 99615
(907)487-4961/4962/4987
(Rob Wolotira--Bob Otto)
Office hours only: 8 a.m. to 4:30 p.m.

For Adak:

Lt. Sweetser
U.S. Naval Station
Adak, Alaska
(907)592-4250

Port Services Officer
U.S. Naval Station
Adak, Alaska
(907)592-2151

For Dutch Harbor:

Carolyn Griffin
Box 308
Dutch Harbor, AK 99692
(907)581-1529 (home phone)
(907)581-1239 (Ken Griffin)

John Davidson
Dutch Harbor Transit
Dutch Harbor, AK 99695
(907) 581-1384

For Tokyo, Japan:

Mr. Iverson
Regional Fisheries Attache
American Embassy
Tokyo, Japan
583-714 ext. 7618

Transfers between a small transport vessel and a large fishing vessel are potentially hazardous, especially in rough seas. Do what you can to minimize the danger, such as accepting a rope belay from the ship. Always wear the life vest when boarding, disembarking, or transferring between two vessels. In most cases, two free hands are needed and balance is important, so do not encumber yourself with baggage while making the transfer. Given a choice between using a Jacob's rope ladder or a gangway (accommodation walkway), to board a ship, use the Jacob's ladder since the use of a rigid ladderway in rough seas can be extremely hazardous. Baggage will be transferred via ropelines or cargo nets.

Soon after boarding you may be taken to see the captain. You can take this opportunity to give the captain the letter of introduction and curriculum vitae, explain your sampling procedure and sampling needs, and find out the meal schedule, etc. (See also the section "The First Day on Board").

Once you are aboard your sampling ship, avoid making visits to other vessels which are not necessary to the performance of your job. Sometimes other ships or U.S. catcher boats may tie up to your vessel. Consider going aboard in these circumstances only if your transfer there and back can be made under extremely safe conditions and if your work performance is not affected. Do not make social visits to other vessels if they are not tied up to your vessel.

If your ship comes into port during mid-cruise to refuel or get supplies, it is obviously your responsibility to be back aboard when the ship is ready to leave. Departure times are often uncertain, so do not risk being left behind by disembarking for any length of time. Do not stay away from your vessel overnight without prior permission from Observer Program staff. Any costs you incur while you are off the ship may be at your own expense.

Embarking/Disembarking through Dutch Harbor

Observers flying into the airport should call Carolyn Griffin who will take them to the hotel (Unisea Inn or Carl's Commercial). Reservations are usually made in advance. Mrs. Griffin will keep you informed of changes in vessel schedules, so make sure that you periodically check the hotel desk for messages and keep her informed of your whereabouts, especially on your day of embarkation.

When returning to Dutch Harbor, contact Mrs. Griffin on the radio if the transfer boat is not at the pick-up point on schedule (see "Radio Telephone Procedure" in the Appendix). Ships approaching Dutch Harbor can no longer go into buoy #2 without a harbor pilot, so in rough weather a ship will have to wait at the pilot point for the seas to subside, or pay for a harbor pilot to bring the ship in closer. Be sure to go through Customs before leaving Dutch Harbor.

Embarking/Disembarking through Kodiak

Arrival from Seattle:

1. Confirm accommodation reservations.

2. Check with Alaska Tug and Salvage as soon as feasible to be sure of your schedule. Let them know how to contact you in the event of last-minute changes. Arrange meeting time and location.

3. Arrange for transportation to the meeting place. Taxi service is available - see reference phone numbers. The M/V KODIAK KING, normally used by the Alaska Tug and Salvage for observer transfer, is berthed in Kodiak Boat Harbor and can easily be seen from the Sheffield House.

Disembarking at Kodiak:

1. If the KODIAK KING is not at the pilot pick-up point at the pre-arranged time, they can be contacted on Channel 16 (VHF) or Channel 2 (CB), using the call letters: WYN 6116.

2. After checking with Customs, call Wien Air Alaska to check on your flight reservations.

3. If you arrive in town too late to catch a plane, check with the Sheffield House to see if room reservations have been made for you already.

NMFS Seattle makes arrangements through the Kodiak Facility for airline and transfer boat reservations, so if there are problems, the Kodiak Facility may have the information. If you arrive in Kodiak after office hours or on weekends, check for messages from NMFS at Alaska Tug and Salvage or Sheffield House.

Embarking/Disembarking through Seward

Arrival from Seattle:

1. Available transportation from Anchorage to Seward varies with the season. During the summer there are flights between the two cities. During winter months a bus makes a daily run except on weekends or when the road is blocked by snow.

2. Observers are on their own in making hotel reservations - phone from the airport or bus station if you have not made them in advance.

3. Contact the Northern Stevedoring and Handling Corporation as soon as possible to be sure of your schedule. Let them know how to contact you in the event of last-minute changes. Arrange meeting time and location.

Disembarking at Seward

1. If a transfer boat is not waiting at the pilot pick-up point, observers can contact the Seward police station on marine VHF Channel 16 and ask them to pass the message to Jack Goodwill at Northern Stevedoring.

2. Check in with Customs if an agent is presently in Seward; if not, go through Customs clearance in Anchorage.

3. Check with Northern Stevedoring for messages from NMFS regarding plane tickets or other information.

Embarking/Disembarking through Adak

Observers flying into the airport should check through security at the airport. Notify your port contact that you have arrived and keep them informed of your whereabouts in case there is a change in pick-up schedule. Much of Adak Island is closed to civilians, so check on restricted areas before going for a walk. On return to Adak from a cruise, if the transfer

boat is not at the pick-up location, contact the Navy Base on Channel 16. The Customs officer in Adak only handles military personnel, so be sure to go through Customs in Anchorage.

ARRIVAL ABOARD THE SHIP

LIVING CONDITIONS ABOARD VESSEL

As a guest of the fishing vessels, the observer will be courteously treated. However, he cannot expect any aid in carrying out his assigned duties. Living conditions will be good on the stern trawlers, motherships, and longliners.

Quarters

The observer will probably have a private room although possibly he might have to double up with another observer or crew member. Quarters are more apt to be cramped on small stern trawlers and longliners. Bedding will be furnished.

Food

Meals on Japanese vessels will generally consist of rice, fish, soybean soup, and pickled vegetables. Semi-western meals will also be served from time to time. Breakfast will usually consist of rice, soybean soup, and pickled vegetables. Raw or boiled eggs are also served occasionally. Lunch may consist of curried rice, pork steak, or a mixed meat and vegetable dish. Supper consists usually of traditional fish cuisine such as broiled and raw fish. Korean meals consist of soups, fish, and rice. Soups are very spicy and hot to the American taste.

On Soviet vessels, meals will usually consist of soups, dark bread, meat, potatoes, cabbage rolls, and sometimes fish. Generally the food is closer to the western style of preparation than observed on Japanese vessels. On Polish vessels the food has been more closely allied to the typical U.S. fare than noted on either Japanese or Soviet vessels. Observers have been served bacon, eggs, and cereal for breakfast, and soup, meat, potatoes, cheese, and lunch meats at lunch and dinner.

Baths

Saltwater baths normally will be scheduled daily aboard large Japanese vessels. They may be less frequent on small Japanese vessels and on other vessels of the various nations.

Laundry

Facilities are usually available for washing clothes. On occasion the vessel's crew arranges to have clothes washed.

Medical Advice

On both large stern trawlers and motherships the observers can probably expect an able medic or doctor who is thoroughly familiar with treating minor illnesses and injuries connected with life at sea. In some cases, however, medical procedures are different from those in the United States, so caution and good judgment should be exercised. In an emergency, the U.S. Coast Guard can be contacted for assistance.

Medical supplies on longliners and small stern trawlers are often very limited, so it is advisable to take along some first aid supplies.

SAFETY ABOARD THE VESSELS

Fishing vessels have many potentially dangerous areas. Extreme care should be taken to avoid injury. In addition to the personal suffering that would result, the observer program could be drastically hampered. The following points must be adhered to while on the vessel:

(1) The first day aboard, note where the lifeboats, life preservers, and other safety devices are kept. Memorize the exit route from your cabin, the factory, the mess hall, and other locations where you spend a fair amount of time. Keep your survival suit where you can get at it in a hurry.

(2) During your first talk with the captain, ask him to explain to you what to do in the event of a major emergency such as a fire aboard the ship,

a serious collision with another vessel, or other conditions which might require abandoning the ship. Find out whether there is anyone who would be responsible for your safety in the event of such an emergency.

(3) Observers will wear hard hats at all times when sampling or on deck.

(4) Observers will wear life vests at all times on the trawl deck, whether sampling or observing a trawl being dumped into a bin.

(5) The observer should wear thick-soled rubber boots to wade through the fish catch since rockfish spines have been known to penetrate thin-soled rubber boots and cause painful wounds on the feet.

(6) Apparel with loose strings or tabs should be avoided as they might become caught in the equipment or belts.

(7) Observers will not run aboard the vessels. Slipping, tripping, and bumping are all very common accidents traceable to hurry. Specifically, the observer should watch out for slick spots where the deck is wet or frozen, the half-foot combing rising from the bottom of metal latch doors and passageways, and the low overheads of vessel ladderways.

(8) The observer will stay clear from under the area where the hatch covering the bin on an independent stern trawler swings down to open. Furthermore, when the observer is working inside the bin, he should be cognizant of the low overhead and especially of the overhanging parts of the hydraulic system of the hatch covers.

(9) The observer will not stay outside on the aft deck during rough seas. An observer has been swept forward over the winches by waves sweeping up the stern ramp. When the observer is outside, he should remain in full view of a second party at all times.

(10) Cables that break under strain frequently kill sailors. Whenever a cable is subjected to tension, stand in a place where a backlash will not

hit you. If your sampling station is on deck, do not work while a trawl is being set or retrieved--interrupt your work to go to a safe place during the process. When nets are being hoisted off the deck, stand well clear. Heavy nets have fallen near observers when the suspending cables parted.

(11) When working near the exit door, where incidental halibut are released, the observer should be extremely cautious not to slip and fall overboard through the exit door. Moreover, the observer should be aware of the danger of surging seawater that may pour through the exit doors and portholes during rough seas. Therefore, the sampling site should be situated away from exit doors and portholes during rough seas. The opening and closing of exit doors should be left to factory workers.

(12) Observers are cautioned not to pry loose any fish caught in the chinks of slat or rubber conveyors since this may result in getting a finger or hand mangled in the machinery.

(13) Electrical lines are everywhere in the processing room. Therefore, when reaching and picking up anything, the observer should look beforehand to see that the area is clear of any suspicious "hot wires."

(14) Observers must avoid close proximity to equipment used in filleting or reducing the fish to surimi or meal.

(15) The observer will wire the U.S. Coast Guard should an injury or illness occur to him which requires immediate hospitalization.

(16) Treat all minor cuts, especially those on hands, with antiseptic to avoid infection from fish slime. Wash hands thoroughly after sampling.

(17) Ask ship personnel which water sources are safe to drink. Some ships have lines containing water for washing, not drinking.

Safety in Transfers

(1) Observers will wear life jackets or vests at all times on skiffs or other small-sized vessels and while transferring.

(2) Observers will not encumber themselves with baggage when transferring vessels. Both hands must be free during transfers. All baggage will be secured with lines. Observer baskets have been lost overboard because they were thrown between ships without lines attached.

(3) If a cargo net or basket is used to transfer observer or baggage, make sure that a line is attached to the conveyance and used to prevent it from crashing on the other side. The observer should maintain a crouched position as opposed to sitting to avoid back injury.

(4) Radio messages concerning dates of transfer at sea all assume "weather permitting." The observer should insist upon reasonable safety during transfers. This includes waiting for good weather when necessary, or radioing for the Coast Guard to get permission for the two ships to approach within 12 miles of shore so that the transfer can take place in a more sheltered location. Note the names of any transport vessels for your final report.

THE FIRST DAY ON BOARD

For the first one or two days, the observer should spend his time adapting himself to his new surroundings, meeting people, and making preparations for work. If the host vessel has not had an observer before, the captain and crew will most likely be interested in knowing what your work duties are. At this time, the observer can also explain, using the translated forms, what information is needed from the deck log. Cooperation from the captain, officers, and crew is also essential in many instances in order to obtain the unbiased samples the observer needs for his work, so

many misconceptions of what the observer needs can be cleared up at this time. Arrange in advance with the captain and the radio officer the procedure in sending the weekly radio messages. Ask to have the ship's carpenter make a measuring board (see measuring board plans in the Appendix), or ask for the tools and materials to make one yourself. Ask to be informed if the Coast Guard comes aboard or if any marine mammals are found in the catches. The first day is a good time to note the location of the lifeboats, exit doors, and various safety devices. Ask the captain about emergency procedures.

If the host vessel fishes on the first day you are aboard, you can watch the fishing and processing operations and decide what is the best location for your sampling station. Observers on stern trawlers and mothership should note where and how cod ends are dumped; whether different hauls are mixed in the bins; if crab, halibut, salmon, and other species are presorted on deck, and generally how they are normally handled; the system of conveyor belts or chutes being used; and where the catch is sorted by species and size. Refer to the manual sections on sampling for directives on obtaining different kinds of samples, and determine where and how you can obtain each kind of sample. Basically, samples for species composition should be representative of the whole haul, and incidence of crab, halibut, and salmon should involve a method for getting information on the numbers of those species per ton (or known weight) of the total catch. The sampling requirements, plus considerations of personal safety, convenience (avoid having to haul baskets of fish long distances), and minimum interference in fish processing will all help determine the location of the sampling station.

Observers on longline vessels should note the configuration of the set (especially the number of hooks per hachi); the species that are knocked off the hooks and not brought aboard; the species that are landed, and the

species that are utilized. Ideally, the sampling station location should be convenient, safe, and out-of-the-way.

Once the location of the sampling station has been determined, the observer may wish to arrange for the construction or adaptation of a sampling table and see that there is adequate lighting.

If fish are available, the observer can also practice removing otoliths and sexing the target species. In determining sex, it is generally easiest to start with large, mature fish and work down in size to small, immature specimens. Practice measuring crabs and reading the calipers; work out efficient routines for sorting, weighing, counting, and measuring the various components of the catch. This preparation should make the first day of sampling run much smoother.

CARE OF SAMPLING GEAR

We hope that the sampling gear provided for you is in good working order. Most gear is expected to be used for several observer cruises, therefore, we depend on you to give proper care and maintenance to the equipment.

All gear checked out to you will be examined upon return to see that it is in good condition before it is checked in. We have facilities for cleaning, if this could not be done while aboard ship.

All returned gear must be clean and free of scales.

All metal parts must be clean, free of rust, and oiled.

Here are a few tips for shipboard maintenance that should make your job easier:

1. Keep all paper products and small, loose equipment (pencils, pens, thumb tacks, scissors, counters, etc.) in plastic bags throughout your trip.

2. Try to keep as dry as possible: calculator, stopwatch, thumb counters, and tape measure.

3. Books should be protected from water and slime at all times.

4. Most important: Every day after use, the 2 kg, 5 kg, and 50 kg scales must be cleaned and oiled. They have steel springs inside which will rust - oil must be squirted up inside the scales.

5. Tape measures, calipers, and thumb counters must also be cleaned and oiled each day when used. (Be careful to keep oil away from plastic forms, since pencil marks tend to wipe off a slick surface).

6. It is recommended that your knife be cleaned, sharpened, and oiled daily.

7. Keep your otolith alcohol in your room. Sometimes crew members consume alcohol which has been left at the work station.

Remember--others must use this gear after you, and proper care of equipment will help make all our work easier.

Please do not give away our gear or books. You will have to replace any government equipment that you give away. Replacement calculators cost about $20.00 and must be the type we specify. The photo species guides cannot be replaced; they originally cost over $50 each in materials alone.

USING THE SCALE FOR WEIGHING SAMPLES

Just prior to the start of basket sampling, prepare the weighing scale to read zero when the basket is attached. Do this by adjusting the set screw at the top of the scale. With the scale adjusted, all measurements will then reflect the weight of the basket content only.

Accurate weights are sometimes hard to obtain when the ship is rolling. When possible, secure the top of the scale directly to a fixed structure, such as a pipe. If the top of the scale has to be attached to the ceiling by a length of rope, use three ropes attached to widely separated points on the ceiling to minimize the swing of the scale. Shortening the length of

the ropes to the basket also helps. Scales located close to the center of the ship tend to swing less.

If a flatbed scale belonging to the ship is available for your use, by all means use it, but check it for accuracy first.

SAMPLING PROCEDURES

OBSERVER OBJECTIVES

The main objectives (see Observer Duties and Priorities) are to determine catch rates, the catch composition, the incidence of certain specified species in the catch, and biological data on target and other species. Secondary objectives include marine mammal observations, fish stomach sampling, recording gear design, and fish sorting methods, etc.

Since ship design and procedures vary from ship to ship, it is the responsibility of the observer to devise sampling techniques which will obtain the needed data. In the following sections, several basic methods of sampling will be outlined. In most cases the observer will be able to use one of those methods or an adaptation of one of them.

When conducting biological sampling, the two most important things to remember are to take representative, unbiased samples, and to do so with a maximum amount of accuracy. We stress the taking of representative samples of all data collections. Accuracy is important in all aspects of the work including actual sampling, recording the data on plastic sheets, transposing the data on the plastic sheets to the final paper copy, and correctly calculating averages and totals on the final copy. The need for representative, unbiased sampling and accuracy cannot be overstressed.

OBSERVER WORK SCHEDULE AND WORKLOAD

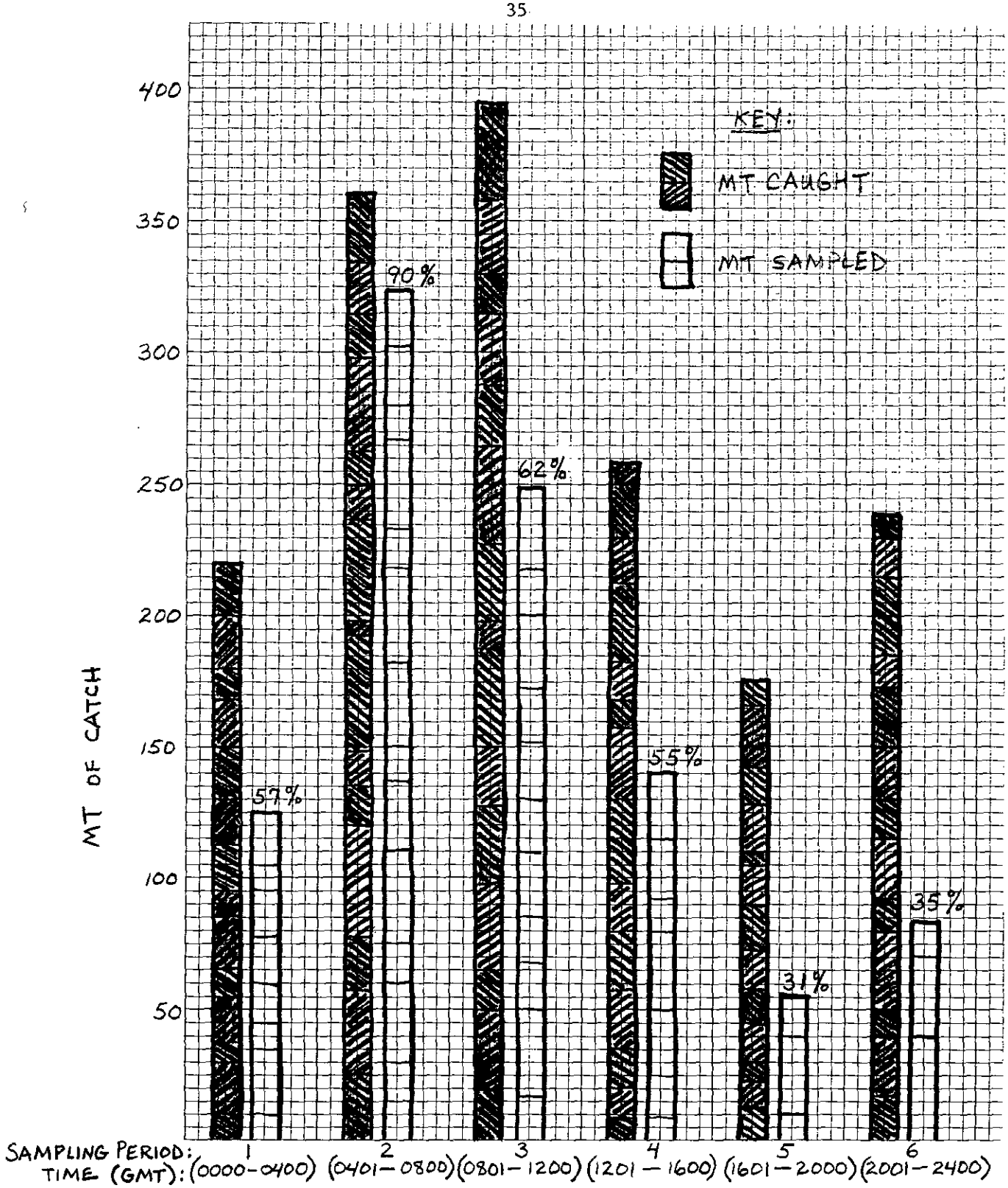
Not only must an observer strive to obtain representative samples of a certain haul or during a given sampling period, but the observer should also select the sampling periods so that the catch sampled is representative of the daily catch. Since most of the foreign vessels fish around the clock, the observer should arrange his schedule to sample at different times of the day. Care should be exercised so that all or most of the observation and

sampling is not done during the same time period. The observer's efforts should correlate with the time period that the catch is brought on board. If 20% of the daily catch is brought aboard from 8 a.m. to 12 noon, 20% of the total sampling should be done during this period. Similarly, if only a small tonnage is brought aboard between 1 a.m. and 5 a.m., the observer may decide to sample that time period only once every two to three days.

The bar graph on the following page is offered as a suggested way of keeping track that the tonnage you sample by time period is proportional to the total tonnage that is brought aboard during those time periods. The day has been divided into six equal periods of four hours each, and the haul tonnage has been assigned according to the time the haul was retrieved. The shaded bars indicated the tonnage landed during that period and the open bars stand for the tonnage of the sampled hauls. The percentage of the catch sampled for each time period is given in the parentheses at the top of the bars. The graph can be updated periodically by adding to the bars and recalculating the percentages. In this example, the observer needs to adjust the sampling pattern so that more tonnage is sampled from periods 5 and 6 and somewhat less from period 2. The graph (for a one-month cruise on a large trawler) is only a suggestion--you may find a running tally for each time period more convenient.

Once a given time period has been selected, the appearance of the catch should not be a factor in deciding whether or not to sample it. For example, the observer may decide to sample the next haul--he should not change his mind after it comes on board. This way the observer will not intentionally select for small hauls or large hauls, hauls with large numbers of rockfish, or with many salmon, crab, or halibut.

The frequency of sampling may vary according to the type of host vessel and its schedule. Specific directions on taking different kinds of samples



GRAPH USED TO INSURE THAT HAULS FROM VARIOUS TIME PERIODS WERE SAMPLED PROPORTIONALLY ACCORDING TO TONNAGE CAUGHT.

are given in the appropriate section, but in general the workload is as follows:

Mothership (2 observers)

Basket sampling--20 to 30 baskets or more (35 to 45 kg each), 3 times daily

Monitoring for incidence--3 times a day for approximately 1/2 hour periods.

Length-frequency--approx. 150 lengths of the sampling species every day; ~~up to 150 lengths of herring when available~~.

Otoliths/scales--as assigned.

Crab, halibut, salmon--note species composition, length, weight, and sex, of those found in basket samples or while monitoring for incidence; take viability data on halibut; take scales of salmon; 4 times during a two-month cruise take width frequencies of approximately 3 baskets of randomly selected Tanner crab (if there are enough to make this feasible).

Independent Stern Trawler

Sampling for species composition--2-3 times daily if the ship is making 4 to 6 hauls per day; if the ship averages more hauls per day, sample more hauls; if the ship averages fewer hauls per day, you may sample fewer hauls but increase your sampling weight if possible. Whole haul sample whenever possible.

Incidence sampling--3 times daily.

Length frequency--approx. 150 lengths of the sampling species each day; up to 150 lengths of herring when available.

Otoliths/scales--as assigned, plus herring scales/otoliths when available.

Crab, halibut, salmon--note species composition, length, weight, and sex of those found in basket samples or while monitoring for incidence; take viability data on halibut (need not sex); take scales of salmon. Do not measure crab if you were not issued calipers.

Estimate haul weight from as many hauls as possible, but aim for at least 3 per day--the estimates don't necessarily have to be of the same hauls that are sampled.

Stern Trawlers Fishing for Hake

Sampling for species composition and incidence--aim for at least 3 hauls (whole-haul sampling).

Length frequency--approx. 150 lengths of the primary sampling species each day, and as many lengths as possible (up to 150) of the secondary species (if assigned) when available.

Otoliths/scales--as assigned, plus herring scales/otoliths when available.

Halibut, salmon--take species composition, length, weight, sex, and scales of salmon found in sampled hauls; take length, weight, and viability data on halibut (need not sex).

Estimate haul weight from as many hauls as possible, but aim for at least 3 per day--the estimates don't necessarily have to be of the same hauls that are sampled.

Longliners

Species composition--sample the catch from at least 20% of the hachi, spread out over three sampling periods. Usually this will require tally sampling three times daily.

Length frequency--approx. 150 lengths of the target species each day (either Pacific cod or sablefish, whichever is being targetted on at the time).

Otoliths/scales--as assigned.

Crab, halibut, salmon--note species composition, length, weight, and sex of those found in basket samples or while monitoring for incidence; take viability data on halibut (sex need not be taken); take scales of salmon. Do not measure crab if you were not issued calipers.

Estimate set weight for each set sampled.

All Vessels

The above workloads are meant to be guidelines for minimum sampling. On some hauls, however, an observer may not be able to get more than two basket samples, or the observer may sample only one haul because the ship moved to another area and did not fish any more that day. Observers with extra time should read the section "Extra activities for the bored or ambitious observer."

CATCH RATES

Ship Estimate of Catch Rates; Location of Catches

Your normal procedure is to obtain daily catch totals from the captain or fisheries manager for recording on Forms 1, 1L, or 2 (see the appropriate section in Data Forms for detailed directions on filling out the forms). Catches on independent stern trawlers will be by haul; all hauls should be recorded whether sampled or not. On motherships the catch will be recorded by vessel type (pair trawlers, Danish seiners, dependent stern trawlers) for the day. Longliner catches are recorded by set, and all sets are attributed to the day that the retrieval of that set was completed. On all vessels (except longliners), the noon position (GMT noon) should be recorded every day, whether the vessel fished or not. On a longliner the only time a noon position is recorded is on a non-fishing day.

Even though the information on noon position, catch location, fishing time, depth fished, trawling speed, number of hachi set, weight of total catch, water temperature, weather and sea code are normally all supplied by vessel personnel, the observer should check all data for accuracy. The date, catch location, and total catch weight are especially important items--without this information the observer's sampling data cannot be used. Try to find out how the catch estimate is being estimated. Some captains estimate the total catch by direct observation of the volume of

fish in the net or in the fish bins. Other captains may put a rough estimate or "hail weight" in the logbook in pencil, then later change it when the daily production figures from the factory are available. If production figures are used to estimate the total catch, try to find out how the calculations are being made. The total catch should be the weight of everything that is caught--whether it is utilized or not; and it should include the weight of fish waste as well as the finished product. If the weight recorded as total catch is the weight of the processed product only, try to determine the recovery ratio (the proportion of the product weight to the weight of the whole fish), but do not change the recorded weight on the forms. (See also "Vessel Catch Records" in FISHERY REGULATIONS section.)

Due to inaccuracies in catch size estimation on some ships, in certain cases the observer may adjust the ship's estimate. For a complete explanation of when and how to adjust the ship's estimate, refer to "Adjusting the Ship's Estimate" in the DATA FORMS section.

In most cases, when estimating the tonnage sampled that was not actually weighed by the observer (as in the metric tons observed for incidence of prohibited species), the data base will be the ship's estimate of catch weight. For example, if you sample some fraction of a haul, the sample weight will be a given proportion of the total haul weight estimated by the ship.

Observer Estimates of Catch Rates

Observer estimation of the total catch is important, so you should do your best to get good data. Observers should make their own estimates, and record them even if they are close to or the same as the ship's estimate. The observer estimate should not be confused with an "adjusted ship's estimate"

described in the DATA FORMS section, which is obtained through a different method.

On independent stern trawlers, estimate the weight of several hauls per day, if possible, and record the date, haul number or haul time, captain's estimate, and your estimate in your logbook. Some techniques for estimating haul weights are as follows:

(1) Measure the fish bin into which the fish will be emptied and obtain the volume in cubic meters. If the bin is sided with common width boards of known dimension, use the height of each board to estimate the height of fish in the bin. If the bin is of other composition, ask to mark the sides as to height of fish in the bin. From known bin dimensions of length and width, and observed depth of catch, the volume of fish per haul can be estimated. This volume is then multiplied by the weight of a cubic meter of the catch to obtain total catch for the haul. The weight of a cubic meter of fish is derived from the random basket samples for that haul. Obtain weight of a known volume of fish measured from basket samples for that haul or similar hauls and calculate the number of metric tons per cubic meter of fish. This known weight/volume (density) is then used to calculate the weight of the catch from a known volume of catch. It is not normally advisable to utilize a factor to account for seawater. Unless the addition of water to the bins actually causes the fish to float, the volume of the catch should not be affected.

(2) When the volume of fish in the holding bin cannot be determined, you might estimate the total catch in the haul from observations of the cod end. Observe the cod end prior to emptying into the fish bin, counting the number of wraps (bands or horizontal support straps) around the cod end. Estimate the total amount of catch per band by roughly measuring the length and width of a full wrap and estimating the volume of fish per band, and

for the total number of bands. Multiplying the total volume landed per haul by the average weight per cubic meter of fish gives the weight for that haul. Usually a net will have several banded sections completely full, and one or two banded sections partially full. The volume of the partially full sections are to be estimated and included with the full sections to calculate total volume of the haul.

(3) If measurements of the banded sections are impossible to obtain, the observers may then accept the captain's estimate of weight per band. From the captain's estimate of tonnage per band, the observer will estimate the weight of each haul landed (see also "Procedures to obtain catch sampled and total catch from basket samples, conveyor belt monitoring, and fish bin-volume calculations" in the Appendix).

Occasionally an observer will be on a ship when a haul comes in containing mud or boulders which makes up a large percentage of the weight/volume of the catch. As the ship's estimate probably will not include the weight of the mud/rocks, and NMFS is only interested in the catch of organisms, do not include the weight of the mud in your catch estimation, and avoid including this in your species composition samples.

On motherships, catch estimates may be impractical to obtain because catches from several vessels are dumped into common bins. You might, however, estimate the weight of cod ends from a single pair trawl or Danish seiner delivery providing you can observe all cod ends of a particular vessel's delivery, but for comparison, you would have to obtain the official estimate for the same quantity of fish. On some motherships, the cod ends are actually weighed as they are lifted onboard the mothership. If this is being done, note the fact on Form 1 and in your final report.

Observers on longliners should be able to estimate the total catch of each sampled longline set using the following proportion:

$$\text{Estimated catch weight} = \underset{\text{(for that set)}}{\text{weight sampled}} \times \frac{\text{Hachi (or hooks) retrieved}}{\underset{\text{(during all sampling periods)}}{\text{Hachi (or hooks) sampled}}}$$

If some hachi are set but not retrieved due to bad weather or gear conflicts, note this in your logbook and final report. Do not include catch estimations of these lost hachi in the total catch estimation.

There is no need to be surreptitious about making your own estimate of the catch size. It is difficult to measure the depth of fish in the bins or estimate a cod-end without having someone realize what you are doing. In some cases, captains have improved their method of estimating the catch size by watching the observer. (This practice may be encouraged but not demanded.) On the other hand, avoid providing the captains with your final estimates--this can lead to argumentation and an attempt to make the two estimates match.

SPECIES IDENTIFICATION

Accurate species identification is an essential part of determining the species composition of the catch. Attempt to identify to species at least all of the commercially important fish, especially all rockfish and flatfish. (Refer to the Species Identification Manual for helpful clues, as well as the identification guides and photoguide.) Less economically important species such as eelpouts, snailfish, and sculpins can be grouped. If you have a question concerning the identity of an important species, work through several different keys in the identification guides; note down all important characters, such as the number of fin spines, presence or absence of various head spines, presence or absence of a symphyseal knob, color, and size range. If the identity is in doubt, take a photograph and/or a preserved specimen for possible later identification back in Seattle. If the fish is too large to bring back in entirety, the head or other parts (such as otoliths) may be enough to identify it. Whole specimens should be slit along the right

side of the body for proper preservation, and all pertinent information, including location of capture, should be noted in your logbook as well as in pencil on a label with the specimen. Upon return, observers will bear the responsibility of determining the identity, but they may confer with NMFS personnel. The museum at the University of Washington has been designated as the official depository of all specimens brought back from observer cruises unless permission has been granted for other purposes.

SPECIES COMPOSITION OF THE CATCH

Determination of the species composition of the catch is one of the high priority duties of an observer. The essential features and data that must be obtained for determining species composition are as follows:

(1) Samples of the catch must be representative of a particular haul (independent stern trawlers), a day's catch (mothership), or a portion of a set (longliner).

(2) The sample must have a known weight. (This is sometimes obtained by actual measurement, and sometimes calculated.)

(3) The sample is sorted according to species or species groups, and the total weight of each group is determined. The combined weight of all species groups must equal the sample weight.

(4) The number of individuals in each species group is determined. Thus a weight must be entered for every group making up the sample and the number of individuals making up each weight must also be recorded.

There are a number of different ways the above information can be obtained. The method you choose may be dependent on the diversity of the catch or on the shipboard setup. Basket sampling is the most common means of sampling when the catch is reasonably diverse. When one species predominates in the catch and there are very few other species, it may be

possible to use a variation of the whole haul sampling scheme. In addition, some observers have devised other, but equally valid means of sampling species composition for use in certain situations. The above-mentioned methods will be discussed in detail; it is up to you to decide which method provides the most accurate information in your particular situation, or if none of them are practical, to devise or adapt a sampling scheme which will work.

Basket sampling for species composition

A. On independent stern trawlers:

The sampling aim is to obtain baskets of fish from a particular haul catch so that the sample will represent the species composition of the whole haul. Some things to watch for in taking the samples:

(1) The heterogeneity of the catch in the net--i.e., some species, such as rockfish and crabs, tend to be found at the head end of the net while other species, such as flatfish, tend to concentrate at the bottom of the cod end. Therefore, samples should be taken from different parts of the trawl.

(2) As the fish are dumped into a bin, or as they pass onto a conveyor belt, the physics of fish flow may cause further sorting to take place--sampling should compensate for this.

(3) Note the points where species sorting or size selection by crew members or by machines takes place--samples must be taken before such sorting takes place. Do not worry, however, if after presorting for prohibited species the basket samples do not contain a representative sampling of certain prohibited species. The number of king crab, Tanner crab, halibut, and salmon per metric ton of catch will be obtained from the incidence side of Form 3. (If the incidence rate of any of those

species is obtained from basket samples, however, make certain that the samples have not been presorted for those species.)

Since observers must avoid unconscious selection for certain sizes or certain species when obtaining samples, various methods have been used to obtain random, representative samples. On some ships it may be possible to get samples directly from the cod end by holding a basket into the flow of fish as they fall from the net into a hatch opening on the deck. Another good method is to hold the basket where unsorted fish are falling from the bin to conveyor belt, or from one conveyor belt to another. Yet another technique is to design a diverter board for the conveyor belt. This is a board hinged to the side of the conveyor belt trough capable of blocking the fish flow along the conveyor belt, thereby allowing the catch to spill off the conveyor belt into a basket. Sometimes slats of the bin can be raised, allowing fish to spill into a basket. As a last resort, a flat, wide-mouth shovel can be used to scoop samples into a basket from either the fish bin or conveyor belt, but this may select for small fish. This selection can be minimized by taking all of the fish in several different small areas. Refer to the section "Observer Work Schedule and Workload" for guidelines on the number of basket samples that should be taken, keeping in mind that the larger the total sample weight, the better.

Once the sample has been taken, there are two ways to handle the weighing of the species groups. The best method is to sort the sample by species (see section "Species Identification"), weigh each species group, count the number of individuals making up each group, and total the weights of each group to obtain a "total basket weight." The second method may be more practical when one species predominates in the sample. In this method, weigh the basket of unsorted fish, then sort the sample by species. Count the number of the predominant species, and count and weigh the remaining species

groups. The weight of the dominant species group can then be obtained by subtraction of the total weight of the various species groups from the total basket weight. (See also the section "Weighing Samples.")

B. Basket sampling on motherships

At any one time the unloading bin of the mothership contains a mixture of several hauls, and upwards to 200-400 metric tons. Due to the mixing of landed hauls, possibly from several types of catcher boats, the observer must select "sampling periods" rather than any one individual haul to conduct sampling. The sampling periods, as mentioned before, should be selected from different times of the day to effectively represent all the net-landing periods.

Most of the sampling cautions for observers on independent stern trawlers (see previous section, part A), apply equally to observers on motherships, and most of the methods for obtaining samples will work equally well. Sampling conditions on some motherships warrant a few additional considerations, however. Crews aboard some catcher boats have been known to do some sorting of the catch before delivering it to the mothership. If you know that to be true in some cases, make some attempt to avoid the presorted catches.

C. Obtaining species composition on longliners:

Unlike the situation on a mothership or an independent stern trawler, all of the fish from a longline set are not dumped at once into a bin. On longliners the catch comes up one fish at a time and the fish are usually processed as they come aboard. Many observers have noted "patchiness" of fish on a longline set. The change in species composition in different portions of the set makes it difficult to get samples that are representative of the entire set. The only solution to this problem is to try to get as large a sample size as possible; sample large portions of the longline set. The large size of both sablefish and Pacific cod makes sampling a large

portion of the set difficult since the sample baskets fill up quickly but contain few fish.

A sampling system has been devised to try to reconcile some of these problems. Determine which species dominates the catch at a given time--it may be sablefish, Pacific cod, or rattails. As this chosen species is brought aboard during your sampling period, tally the number of these fish using a thumb counter or a stroke-tally on a plastic sheet. (As you gain in proficiency, it may be possible to tally two species at once, such as sablefish and rattails.) Include in your count, fish that drop off the hooks and are missed by the gaffer. Place in your sample baskets everything else that comes up on the line--including those organisms that are normally not wanted and are usually knocked off the hooks so that they are not brought aboard (such as crabs, halibut, sea anemones, sea cucumbers, etc.). Do not bother to include rocks, old fishing gear, etc.--only organisms. Continue in this fashion until all of the sample baskets are filled. Note how many hooks it takes to fill the baskets--count empty hooks as well. The easiest way to get the number of hooks is to count the number of hachi and fractions of hachi and multiply times the average number of hooks per hachi. Sort the samples by species, weigh each species group, and count the individual organisms in each group as you would in any other form of basket sampling (see part A). As close as possible to your sampling period, gather several basketsful of the species that you tallied, making sure that you either get every fish or a representative sample. Weigh the baskets and count the fish to obtain an average weight of the tallied species. (You will also be able to use these fish for your length frequency sample, if desired.) Multiply the average weight of the tallied species times the number tallied to obtain the total weight of those fish brought aboard during your sampling period. (See "Recording species composition on longliners" in the Data Forms section.)

Some observers have found it convenient to make their tallies from the deck immediately above the longline pit since it is less dangerous during rough weather and they were able to obtain a good view of the fish coming up on the line without getting in the way. If this alternative is chosen, make sure that from your vantage point (whether above the pit or on the fishing deck) you can watch the crew place all of the non-tallied species in your baskets. Obviously, this method requires a good deal of cooperation and understanding on the part of the crew, so it may not be possible to use this sampling method on board your vessel.

If you are unable to use the above sampling method, or for the first few days until you become familiar with the fish and fishing operation, you may wish to resort to a simpler sampling method. Simply place all of the catch in your sample baskets until they are filled. Note how many hooks (hachi) it takes to fill the baskets. Take as many basket samples as possible to increase the sample weight. Weigh and count the species groups as you would on an independent stern trawler (see part A).

Whole-Haul Sampling for Species Composition

In some cases independent stern trawlers make hauls which are composed almost entirely of the target species. This happens most frequently on vessels fishing for hake, but it sometimes happens on pollock-fishing ships. In these cases, basket sampling would not provide a large enough sample size to get an accurate representation of the percentages of the other incidentally-caught species. Due to the relative purity of hake catches, all hauls should be sampled using whole-haul sampling or a variation of it--A, B, or C.

A. Standard whole-haul method

On most hake vessels and many times on pollock ships, it may be possible to get the crew to separate out all of the non-target species for the entire haul. Then the observer can basket sample just to get the average weight of the hake (or pollock). The total sample weight would then be the ship's estimated weight of the entire haul. Count and weigh the non-hake species (include any prohibited species). The weight of hake can then be obtained by subtraction of the total weight of the non-hake from the estimated haul weight. Obtain basket samples in the usual manner and count and weigh just the hake to obtain the average weight. Using the calculated average weight and the total weight of hake in the entire haul, the total numbers of hake in the haul can be calculated. This is the most common situation on hake fishing vessels, and the recording of the data from this type of sampling is illustrated in the first sample on the "Form 3 example of data from a hake fishing vessel" in the DATA FORMS section.

B. Partial whole-haul sampling

When your normal sampling procedure is to whole-haul sample, and you are faced with a haul containing large numbers of non-target species, such as several rockfish species or jack mackerel, you may be forced to sample only a portion of the haul. The sampling procedure is the same as when sampling the whole haul, but the observer must determine what the sample weight is. The sample weight may be determined by measuring the difference in the depth of fish in the bin at the beginning and end of the sampling period and multiplying that difference times the floor area of the bin and the density. Alternatively, it may be possible to determine what proportion of the haul was sampled and divide the ship's estimate by the appropriate factor to obtain the sample weight. To calculate the catch data for the radio

message, however, the data should be expanded to the ship's estimate of the haul weight, see "Instructions for weekly radio messages."

When prohibited species make up a significant portion of the catch (roughly 10% or greater) and are presorted from the whole haul, the observer should add to the species composition a representative percentage of the numbers and weights of each prohibited species. If, for example, the observer samples one-third of the haul for species composition and whole-haul samples for incidence of prohibited species, one-third of the crab, halibut, and salmon (to the nearest whole individual) should be added to the species composition. Do not affect the average weight of halibut, for example, by dividing the weight of a large halibut into thirds just so that it can be added to the species composition sample.

C. Whole-haul sampling with two major species

When two species (for example--hake and widow rockfish) dominate the catch, it may be possible to use a variation of the whole-haul sampling method and determine the proportionate numbers and weights of the two species in the catch by basket sampling. Take representative basket samples of the haul and count and weigh the hake and widow rockfish. Obtain from the whole catch all of the other species--identify, count, and weigh these. Subtract the combined weight of these other species from the ship's estimate of the haul weight to get the combined weight of the hake and widow rockfish. Using the proportionate weights of the two species in the basket samples, the estimated weights of hake and widow rockfish in the whole catch can be estimated. Using the average weights of these species obtained from the basket samples, the number of fish each weight represents can be calculated. (See the second sample on the "Form 3 example of data from a hake fishing vessel" in the DATA FORMS section.)

*Make sure that you note what type of sampling system you used for each haul.

D. Other methods of obtaining species composition

Due to problems in using the previously described methods, some observers have devised other means of obtaining data on species composition: (Note--In these cases, the sample weight will not necessarily be the captain's estimate of the haul size.)

1. "Since the conveyor belt moved slowly and erratically, I had to devise a new method for estimation of my sample weight. I found that monitoring the entire haul resulted in confusion and misunderstanding between the factory workers and the manager. For 3 or 4, 15-minute periods per haul I would time each decapitator. From this I could obtain the average hake per minute (h.p.m.). After weighing several baskets of hake, I could obtain the average weight of one hake for that haul. I would remain in the factory anywhere from 1-1/2 hours to 3-1/2 hours to monitor for incidence and obtain species composition. My calculations for a hypothetical sample would be as follows:

   (a) 120 minutes sampling time
   (b) 68 h.p.m.
   (c) .817 kg average weight of 1 hake
   120 minutes x 68 hake/minute x .817 kg = 6666.72 kg = 6.67 mt of hake observed.

   I would then add the weights of the other species to this total to achieve my total sample weight."

   "I feel confident in this method since I obtained an average h.p.m. for each haul. The processing time ranged from 58-125 h.p.m. To test this method I monitored two entire hauls of known quantity (hauls 21 & 58). The time it took to observe entire hauls was fairly closely correlated with the time it took to observe partial hauls." (Leslie Watson, Polish Cruise #17, Wlocznik).

2. "The fish bunker opened directly into the processing area so it was necessary for me to take my basket samples of hake directly from the cod end as the fish were dumped into the bunker. I attempted to space my sampling so as to get fish from all parts of the net."

   "To estimate frequency of incidentals, I went into the factory and had the factory crew dump all non-hake fishes onto the garbage conveyor belt that led from the cleaning stations to the fish-meal plant. I monitored this belt for half an hour for each haul that I sampled, removing all incidentals as they passed. In order to estimate sample weight during this period, I simultaneously counted all hake heads that passed me. Multiplying the number of hake heads counted by the average weight of one hake (obtained from the basket sample) gave me the estimated weight of hake observed; which, added to the weight of incidentals, yielded observed sample weight. I feel that this sampling technique is fairly accurate providing the following assumptions are true:"

(a) "The average weight of hake obtained from the basket samples was an accurate reflection of the average weight of all hake in the catch."

(b) "The frequency of incidentals in the portion of the catch samples was representative of the frequency in the entire haul." (Charles West, Soviet Cruise #31, Vulkan)

The Inclusion of Presorted Prohibited Species in the Species Composition Samples

When presorting of prohibited species occurs and the weight of the prohibitied species is included in the total haul estimate, then sometimes the prohibited species are not accurately reflected in the species composition. If you are whole-haul sampling, this can be avoided by including all the prohibited species in the species composition as part of the sample (see "A. Standard whole-haul method" section). However, when you are partial whole-haul sampling and the prohibited species make up a significant portion of the total haul (roughly about 10% or more), then an appropriate fraction of the total prohibited species should be added to the species composition sample (see "B. Partial whole-haul sampling" section). When you are basket sampling you need not worry about adding an appropriate fraction of the prohibited species to your basket samples (see "Basket sampling for species composition A.(3)" section). The calculations would be difficult and the problem is reduced because the computer program which analyzes the data combines the information from both form 3(2) (species composition) and form 3(1) (prohibited species) to get a complete picture of the species composition.

DETERMINING INCIDENCE OF CRAB, HALIBUT, AND SALMON

Catch landed other than the target species is called incidental catch. Among the species caught incidentally and described as "prohibited species" are Pacific halibut (Hippoglossus stenolepis), salmon (Oncorhynchus spp.), steelhead (Salmo gairdneri), king crab (Paralithodes spp. and Lithodes spp.),

and Tanner or snow crab (Chionoecetes spp.). As the United States extensively fishes these species, a great deal of interest has been shown on their number per ton of catch on foreign vessels. Determining the incidence of crab, halibut, and salmon is thus a fairly high priority duty for observers. Since these species are normally relatively rare in the catch, a large sample weight must be observed in order to obtain effective data.

The essential features of incidence sampling are as follows:

(1) The observers must be able to count all of the individuals of an incidental species in a given portion of the catch.

(2) The catch sampled should be representative of the haul (IST), days's catch (mothership), or set (longliner).

(3) It must be possible to estimate the weight of the sample observed.

(4) As many as possible of the crabs, halibut, and salmon should be identified to species, weighed, sexed, and measured.

Various methods of obtaining incidence data

As with sampling for species composition, there are a number of different ways to determine the incidence of a particular species per ton of catch. On some ships, the catch is dumped from the cod end into the fish bins slowly enough so that the crab, halibut, and salmon can be picked out as the net is emptied. On motherships and many large stern trawlers, incidence data are obtained by monitoring a conveyor belt (see the section on conveyor belt monitoring). On ships, or hauls in which species composition is obtained by separating out all of the non-target species for the whole haul, the sample weight is the ship's estimate of the haul weight. On longliners, the incidence data is taken from the same sample as the species composition.

Observers have experienced a number of problems in attempting to determine incidence. Since crab, halibut, and salmon are designated as

"prohibited species" which must be thrown overboard as soon as possible, observers often have a difficult time convincing fishing crews to allow them to collect data on these species before throwing them overboard. Hopefully a new clause in the regulations will clear up these misunderstandings, and the observer will be able to count, weigh, measure, and sex these species without interference. On some ships, due to a high incidence of prohibited species or a particular sampling problem, it may not be possible to gather the data on prohibited species immediately. Observers on longliners have had a particular problem with this, especially when tallying from an upper deck. Some observers have arranged to have a tub of seawater available to keep halibut alive until the data could be obtained.

Presorting of prohibited species often occurs on the main deck as the catch is emptied into a below-deck bin, so the observer should be present to oversee the operation. If presorting occurs, the observer should request that all the presorted species be placed in baskets so that data can be gathered on them. Check the factory as well to gather crab, halibut, or salmon that may have slipped by the sorters on deck. Attempt to at least get a total count of these prohibited species, and if a count is not possible, make an estimate and note on both the forms and in the final report that sampling was inaccurate. If you are able to count some individual specimens but are unable to weigh them, try to at least get an estimate of their weight.

On certain vessels the problem arises of some species being too abundant to count. This situation happens most often on motherships, and then only for Tanner crab. Usually the only solution to this problem is to reduce the sample size for Tanner crab by monitoring a smaller portion of the conveyor belt, or sampling for a shorter time period. If the depth of the fish on the belt is so high that small crab are apt to be missed, then incidence may best be obtained by taking about 10 additional basket samples per sampling period,

weighing the baskets to obtain the sample weight, and separating just the crab from them.

Occasionally the problem of too many crabs occurs on those stern trawlers on which crabs are sorted on deck. Try to at least weigh all of the baskets of crabs, then count all of the crabs in a few of the baskets so that the total number of crabs can be estimated. Remember to add in any crabs that are sorted out in the factory.

Conveyor belt monitoring for incidence

If incidence data are to be obtained by monitoring a conveyor belt, count all the individuals of the specified species passing a point on the belt, and remove and weigh as many of the individuals as possible. The sample weight of the catch observed must then be determined. In some instances it may be possible to monitor an entire haul, in which cases the sample weight is the weight of the entire haul catch as estimated by the captain. In many cases, however, due to mixing with other hauls or interruptions to take basket samples or to eat meals, an entire haul cannot be monitored. Partial catches must then be substituted. This involves knowing the amount of catch sampled, or partial haul weight.

One method of determining the catch sampled is to note the height of fish in the bin at the start and end of the sampling period. Calculate the volume of fish observed and convert that volume to tons as explained in "Observer Estimates of Catch Rates."

Another method, used mainly on motherships, is to measure or estimate the volume of fish passing a given point on the conveyor belt during a specified length of time and converting the volume to metric tons. In order for this method to work, the flow of fish must be such that it fills up the volume of the belt, with minimal spaces between fish. The steps are:

(1) Determine volume of fish passing a given point or measured section of the conveyor belt per minute.

(2) Convert the volume to metric tons.

(3) Determine total tonnage sampled from number of minutes in the sampling period.

The average weight per cubic meter (density) of fish can be determined from basket samples as shown under "Observer estimates of catch rates" or by weighing all fish from a marked section of the conveyor belt (obtained when the belt is stopped). The volume of fish from this marked section is determined from measurements--length x width x depth.

To help in assessing the sample weights passing on the belt, determine the tons per minute for different fish levels on the belt. You can therefore estimate tonnage for different levels on the conveyor belt.

An example of calculating the tonnage of fish and crabs passing the observer is as follows: 0.4 m (belt width) x 0.058 m (depth of fish on belt) x 26.3 m/min. (belt speed) = 0.610 cu m/min. (volume of fish per minute) x 30 min. (period of observation) x 0.94 metric tons/cu m (density of fish and crabs determined from basket samples) = 17.2 metric tons.

During the period of sampling, all species of interest are to be counted and, as feasible, saved for later sex-length-weight measurements as described under "Length Frequencies."

BIOLOGICAL DATA COLLECTED FROM PROHIBITED SPECIES

In addition to the data required on the incidence of prohibited species (number and weights of halibut, salmon, Tanner crab, and king crab per metric ton of catch), certain data are required on these groups by species, and in most cases, by sex. While determining the incidence of these species groups, as many as possible should be saved in order to collect the species composition,

sex, weight, measurement, and viability data. In some cases, it may be possible to obtain these data from all of the individuals observed in the catch; in other instances when there are too many of a given species group to process in a reasonable length of time, a random representative subsample may be taken. If you must subsample, try to collect data from no fewer than 20 halibut, 20 salmon, 20 king crab, and 70 Tanner crab. Measurements and, if possible, canine teeth should be obtained from dead sea lions and seals.

Collecting data from salmon and steelhead

The following information should be collected from the salmon and steelhead obtained in the incidence samples:

(a) Incidence of salmon/steelhead (no. observed in mt of catch sampled)--the sampling methods for determining this have already been described in "Determining Incidence of Crab, Halibut, and Salmon."

(b) Check for missing adipose fin--this may indicate that the salmon or steelhead was tagged with a coded wire in the snout. Follow the directions in "Tagged Fish."

(c) Check for "net-marks" or scars (see report form); note any on Form 9.

(d) Species identification--note the species identification of all individuals--king, chum, sockeye, pink, coho, or steelhead.

(e) Sex--determine the sex of each dead salmon; live salmon should not be sexed, but listed as "unknown" sex. When the observer is not sure of the sex of a salmon or does not have enough time to sex it, the sex should also be listed as "unknown."

(f) Length--the fork length of each individual should be recorded in the same manner as for sampling species, see "Length Frequencies of Sampling Species."

(g) Weight--record the individual weights if scale samples are to be taken; if scale samples are not taken of all fish, obtain the total weight by sex for those fish whose scales were not sampled.

(h) Scale samples--remove scale samples from all salmon according to the directions in "Taking Stratified Otolith and Scale Samples."

The observer should seldom have to subsample salmon from the incidence sample. If time does not allow the observer to gather all of the above

information from each salmon, then take scale samples from a subsample but make sure that you collect scale samples from each species in the catch.

Collecting data from king and Tanner crab

The following steps should be performed on each incidence sample or subsample of king or Tanner crabs:

(a) Determine the incidence rate of king and Tanner crab as described in "Determining Incidence of Crab, Halibut, and Salmon."

(b) Separate the sample into species, sex groups, weigh each species/sex group, and count the individuals in each group.

(c) Observers provided with calipers should measure the lengths of king crabs and widths of Tanner crab as described below.

Crab measurements are to be recorded by species and sex: red, blue, golden, and *Lithodes couesi* king crab; *Chionoecetes bairdi*, *C. opilio*, *C. angulatus*, and *C. tanneri* Tanner crabs. Tanner crabs frequently hybridize but hybrids should be categorized as the species they most closely resemble.

Using calipers, measure the width of the Tanner crab carapaces at their widest points, excluding spines, recording the measurements to the nearest 5 mm size group (crabs 41 to 45 mm in size are recorded as 43 mm; crabs 46 to 50 mm are recorded as 48 mm). Observers should measure all of the Tanner crab found in each of the daily incidence samples. Normally less than 70 Tanner crab will be found in the sample. If more than 70 are found, take a representative subsample, selecting every second, third, etc., so that carapace width measurements are made from approximately 70 Tanner crab.

On motherships, observers should collect and measure three additional baskets full of Tanner crab twice a month. To ensure an unbiased sample, all of the crabs must be removed from a chosen volume of the catch. To do this, either collect every crab from a corner of the bin so none are missed, or collect crab from the conveyor belt only when it is less than one-fourth full; otherwise, the small ones will remain hidden.

The carapace length of king crab should be measured using calipers. Measure from the right eye socket to the midpoint of the posterior margin of the carapace and record the length to the nearest 5 mm size group as with Tanner crab.

Collecting data from halibut

The following information should be collected from halibut obtained from the incidence sample:

(a) Lengths--except in the case where halibut are mistakenly discarded before you have a chance to measure them, you should be able to get lengths of all individuals. Measuring tape is used for unusually large specimens.

(b) Weight--individual weights are not necessary, but you should obtain the total weight of the halibut in the incidence sample. Halibut that are too large to be weighed should be measured only, and the lengths can then be looked up in the halibut length-weight table in the Appendix to obtain the corresponding weights. (The total weights of halibut should include these estimated weights as well as actual weights.) When possible, however, halibut should be weighed instead of using the length-weight table.

(c) Viability--an estimate of the survival chance of halibut upon release to the sea composed of:

(1) an appraisal of the condition of the halibut

(2) the probability of the halibut being consumed by a sea lion or killer whale upon release. (See below for sampling procedure.)

[Note--it is no longer necessary to determine the sex of dead halibut--simply list the sex as "unknown."]

The estimates of the condition of halibut should be made only in those cases in which observer interference with the way the crew normally handles halibut is minimal. The observer's primary duty is to get accurate incidence data, lengths, and total weights, and these tasks may require that the halibut be handled in a different manner than when the observer is not sampling. If the ship crew normally presort halibut on deck and you continue the practice, the viability of the halibut should not be affected by the process of measuring their length and checking their condition. If the crew normally

presort halibut on deck but your sampling method requires that the catch be dumped into bins unsorted, then you should not use your incidence samples to judge viability. Similarly, if on a longline vessel you tally the catch from a deck above the gurdy, and halibut are kept for you for some time out of water, the condition of the halibut will be affected by your sampling procedure. If you are unable to get viability information as part of your ordinary sampling procedure, then try to sample specifically for viability of halibut at least twice a week. Using the table on the following page giving the definitions of "excellent," "poor," and "dead" halibut condition, note the number of halibut in each category. The viability estimate should be the estimate of the halibut condition upon release to the sea. For example, if you judged the halibut to be in excellent condition, but it was subsequently chopped up in order to get it out a small exit hole, change your estimate of the halibut to "dead." Do not guess the condition of halibut that you do not personally examine. If the sample of halibut checked for viability is a subsample of the incidence sample, make certain that the subsample is a representative one.

As it is difficult to make an estimate of the probability of a halibut being consumed by a sea lion, this estimate is based upon the numbers of sea lions present around the ship at the time that most of the halibut in the viability sample are released. If you do not see any sea lions (or other fish-eating marine mammals) around the ship, record "1" as the probability; if you see one to three sea lions, record "2"; and if you see more than three, enter "3." If the halibut in your viability sample are released out an outwash hole in the factory, base your estimate of sea lion predation on your last observation period for marine mammals, or on what you feel is a likely estimate.

DEFINITION OF HALIBUT CONDITION

Trawl Catches

(1) Excellent: No sign of stress

(a) Injuries, if any, are minor

(b) Muscle tone or physical activity is strong

(c) Gills are red (not pink) and fish is capable of closing gill cover (operculum) tightly

(2) Poor: Alive but showing signs of stress

(a) Moderate injuries may be present

(b) Muscle tone or physical activity is weak

(c) Gills are red (not pink) and fish is capable of closing gill cover (operculum)

(3) Dead: No sign of life or, if alive, likely to die from severe injuries or suffocation

(a) Vital organs may be damaged

(b) No sign of muscle tone or physical activity

(c) Severe bleeding may occur

(d) Gills may be pink and fish is not able to close gill cover

Longline Catches

(1) Excellent: No sign of stress

(a) Hook injuries are minor and located in the jaw or cheek

(b) No sign of severe bleeding; gills are red (not pink)

(c) No sign of sand fleas

(d) Muscle tone or physical activity is strong

(2) Poor: Alive but showing signs of stress

(a) Hook injuries may be severe, but vital organs are not injured

(b) Moderate bleeding may be observed, but gills are still red (not pink)

(c) No sign of sand fleas

(d) Muscle tone or physical activity may be weak

(3) Dead: No sign of life or, if alive, likely to die from severe injuries

(a) Vital organs may be damaged

(b) Sand fleas may be present (they usually first attack the eyes)

(c) Severe bleeding may occur, gills may be pink

(d) No sign of muscle tone

SELECTION OF SAMPLING SPECIES

Some observers will be specifically assigned particular species from which to take otolith/scale samples and length frequencies. Other observers may be asked to collect age structures from either primary or secondary species. In addition, some observers may be assigned special projects such as collecting ovary or stomach samples which may or may not require accompanying length frequencies or age structure collections. All observers (unless told otherwise) will take length frequencies of their sampling species. The following section will help you select your sampling species if you were not assigned one.

Table A has two columns: column 1 lists those species that are considered primary species and column 2 gives the secondary species for the Alaska and Washington-Oregon-California regions. If you are assigned to collect age structures from a primary species, select the species from column 1 on which your ship seems to be targetting and try to complete your collection during the month specified. If, for some reason your ship is targetting on a species other than these in column 1, then choose as your sampling species the target species. Length frequencies should be taken of that sampling species throughout your observer trip, even during the period you are not collecting otoliths/scales.

Observers assigned to collect age structures from secondary species should choose a species from column 2. These species should be common enough in the catches so that you can collect enough for good length frequency samples. The otolith collections may be made whenever the secondary species is available, but try, if possible, to take all of your collection on a single vessel.

Observers assigned to make age structure collections on longline vessels will collect either Pacific cod scales or sablefish otoliths, depending on which species the vessel is targetting on at the time. If your vessel is targetting on Greenland turbot, there will usually be enough bycatch of either sablefish or Pacific cod for you to collect enough otolith/scales and length frequencies.

Sometimes observers have difficulty collecting enough otolith/scales or length frequencies if their ship changes target species. If this happens, stop collecting age structures and length frequencies of your first species until you can get enough of them. During the interim, choose a different species from which to take length frequencies until your first sampling species starts reappearing in the catches. If the ship shifts its target from one species to another for what is expected to be a considerable length of time, shift your collection of lengths and age structures to the new species. Avoid having a collection of fewer than 50 age structures per species.

Observers that were not asked to make otolith/scale collections (except for herring and salmon) should take length frequencies of the target species.

All observers should collect scales from salmon as well as other data from salmon, halibut, Tanner crabs, and king crabs. (Refer to the directions in "Biological Data Collected from Prohibited Species.") Only observers that were provided calipers should measure crabs. All observers on ships in the Alaska region should collect data and scales/otoliths of herring whenever 50 to 150 are available (see "Length Frequencies of Sampling Species and Herring" and "Taking Stratified Otolith Samples and Scale Samples.")

Table A. Biological sampling species

Region	Column 1 Primary Species	Column 2 Secondary Species
Alaska	Walleye pollock Yellowfin sole Greenland turbot Atka mackerel	Alaska plaice Arrowtooth flounder Flathead sole Rock sole Rex sole Dover sole Pacific cod Sablefish Northern rockfish Pacific ocean perch Rougheye rockfish Shortraker rockfish Redstriped rockfish
Washington-Oregon-California coast	Hake	Sablefish Jack mackerel Pacific ocean perch Widow rockfish Yellowtail rockfish

LENGTH FREQUENCIES OF SAMPLING SPECIES AND HERRING

Length frequencies should be collected from each sampling species selected, as well as herring and the prohibited species collected while incidence sampling (measure crab if issued calipers). See "Biological Data Collected from Prohibited Species" for directions on collecting information from salmon, steelhead, halibut, king and Tanner crab.

Approximately 150 individuals of the particular sampling species should be measured each day. Due to the often sporadic appearance of herring in the catches, length frequencies should be taken each time it is possible to obtain a random size selection of 50 to 150 herring.

Length data of the sampling species and herring are normally obtained using a plastic measuring strip. This is a long, narrow piece of white plastic divided into one centimeter spacings. The strip is held to a 3-sided

measuring board (bottom, end, and back) by thumbtacks. For species of fish whose length range is less than 75 cm, the strip should be positioned on the measuring board so that the first spacing line is at 4.5 cm from the cross-board and the center of the 5 cm space is at exactly 5.0 cm. Mark each 10th strip unit to read 10, 20, 30...etc. For species of fish whose length range commonly exceeds 75 cm, the measuring strip may be offset (as in the illustration in the Appendix) so that the first spacing line is at 14.5 cm and the center of the first centimeter space is at 15 cm. Mark the units of the strip accordingly.

Maturity data should be recorded of the herring from which scale samples or otoliths are removed. See "Scale samples" in "Taking Stratified Otolith Samples and Scale Samples."

Position the fish on the strip measuring board with snout against the end, dorsal surface against the back, and the fish body flat and straight. With a pencil, place a stroke on the plastic strip at the fork length of the fish tail (total length to midpoint of tail on flatfish). Place the marks for males on one-half of the measuring strip and for females on the other. At the end of sampling, the number of pencil strokes per cm length spacing will give the group length frequency.

Fork lengths only should be taken of all fork-tailed species, even if the tails are ragged and the exact location of the fork has to be estimated. Measurement of round-tailed species (most flatfish) should be of the total length from the snout to the midpoint of the tail. (See "Length Measurements for various species" in the Appendix.)

Length frequencies are taken of fish collected in the random basket sample or by some other random, non-size selective method. Take the basket of fish, sex each fish (refer to "Sexing Fish"), and deposit it in a basket

by sex. Next, set up a plastic strip on a measuring board, recording on it the haul number, date, and species. Designate one side or half of the plastic strip for males, and one for females. Measure all of the fish in each basket (measurements to be nearest cm), and return them to the belt. Some of these fish may be used for otolith or scale samples (refer to "Taking Stratified Otolith Samples and Scale Samples").

In some cases it may be difficult to fulfill the suggested daily workload of up to 150 lengths of each sampling species. It is usually easy to obtain enough fish of the primary species in the basket samples to get a good length-frequency sample. If the secondary species is not plentiful, however, there may not be enough in the baskets for a good length-frequency sample and you may have to use other methods to get additional randomly-selected fish of that species. Try collecting all individuals of that species (large and small) from a portion of the conveyor belt or use some other method to obtain randomly-selected fish from a larger sample weight than your basket samples. This method is especially useful for getting enough herring for length frequency and scale or otolith samples.

Observers on independent stern trawlers should keep length frequencies for each haul separate, recording the data for different hauls on different plastic strips. Observers on motherships or longliners (as long as they are sampling the same set) should put data for all of the day's sampling periods on the same plastic strip, so that the data will be totalled upon transferral to the keypunch Form 7.

SEXING FISH

During training you will have been instructed on the proper way to determine the sex of various fish species. Due to lack of availability of specimens of certain species for dissection purposes, you may not have been able to practice on your particular target species, but you should

be able to determine the sex with practice by referring to photos of roundfish and flatfish gonads in the species photo guide. See also the table in the appendix "Sex Determination for Select Target and Incidental Species." In determining sex, it is generally easiest to start with large, mature fish and work down in size to small, immature specimens.

Jack mackerel have been found difficult to sex by some observers because of their large amounts of fatty tissue. Males often have thread-like gonads running through the fat (scrape the thread and look for a small amount of milt coming out of a cut end). Refer to the diagram and instructions in the Appendix: "How to Determine Sex and Remove Otoliths from Jack Mackerel." Thoroughly dissect a few fish and identify the various internal structures so that you know what you are looking for.

Some Japanese have shown observers a way of telling the sex of pollock without cutting them open. This method uses the relative size and shape of the pelvic fins to distinguish male from female. Since this method requires a fair amount of judgment and works consistently only for the larger specimens, we recommend that this method <u>not</u> be used. Pollock can be more accurately sexed by splitting the belly and inspecting the gonads, and with practice this can be accomplished very rapidly.

Halibut and live salmon should not be sexed, but all other pertinent data should be obtained before releasing the fish. Halibut have a greater likelihood of surviving upon release than salmon do, so do try to get them back to the sea as soon as possible (and away from the reach of sea lions if feasible). Some observers have been so eager to get salmon back, however, that they neglected to collect the necessary information. Most salmon have a very poor chance of surviving after being caught in a trawl net, especially if many scales have been lost, so identify the species and

obtain the individual lengths, weights, scale samples, and sex (if already dead) before returning the fish. The gonads in salmon are up against the dorsal wall of the body cavity close to the backbone. When identifying the sex of salmon, make sure to slit the belly far enough forward to see the rounded sacks which are the ovaries of immature females. Male gonads are frequently two straight tubes running right along the body wall.

TAKING STRATIFIED OTOLITH SAMPLES AND SCALE SAMPLES

Stratified Otolith Samples

Otoliths, or fish ear bones, are collected from a stratified sample of the catch for age determination later. These are read in the same manner as tree rings to determine age. Five pairs of otoliths per sex for each centimeter length group are sampled (5 males and 5 females of each centimeter group). (Note: You may be instructed to take two separate sets of otoliths--simply start over the second month.) Do not be concerned if after filling your vials you do not have a complete set of five pairs of otoliths per sex for each centimeter length group that you observed. The paired otoliths from each fish are placed in a numbered plastic vial, one set of two otoliths per vial. It is very important to have a clear understanding of the scheme used to identify the otoliths being collected. A mistake in the numbering sequence or procedure used to relate the otolith to associated biological data can make a collection useless. If it is necessary to take more otoliths of the same species on a second ship, continue with the same numering sequence but start the second collection over with a new otolith tally sheet.

Otoliths lie in the head region, posterior of the eyes and symmetrically located along the dorsal midline (refer to the diagram in the Appendix). Removal of the otoliths is accomplished by making a cut through the dorsal surface at a point midway between the eyes and the operculum. This will break the otolith cavities, exposing two white otoliths. Care should be

taken not to break or crack the otoliths, but if an otolith is broken, include all pieces in the vial. After extraction, clean the otoliths by rubbing them in water to remove slime and tissue. Store most roundfish otoliths in a 50% ethyl alcohol--50% fresh water solution, filling 1/2 of the plastic vial; flatfish and jack mackerel otoliths are stored dry in plastic vials; herring otoliths (if taken in place of scales) are stored dry in the scale envelopes (see "Otolith and scale collection for select species" in Appendix).

Some fish with bony skulls (jack mackerel, some rockfish) or small otoliths (jack mackerel, Atka mackerel) may pose problems at first. If you have the tools available you may want to try using a hacksaw or bone knife on species with bony skulls. Refer also to the diagram in the Appendix "How to Determine Sex and Remove Otoliths from Jack Mackerel." This should help you determine exactly where to cut to find small otoliths.

Start with vial number one for the primary species and fill consecutively numbered vials. Start with the highest number vial and work down for the secondary species. Attempt to take some otoliths each sampling day if the species seems readily available. If a sample species is seldom seen in quantity, however, you may want to take advantage of hauls containing many specimens and collect more otoliths/scales on those days.

Otoliths are normally taken while taking length-frequency measurements by sex from the target species. After taking the length measurement, weigh the fish with the 2.0 kg or 5.0 kg scale, depending on size. Record this weight, sex, and the fish length on the plastic otolith sheet, Form 9, after the vial number in which the otoliths will be placed. The otolith vials are to be filled in numerical order. Remove the otoliths, rinse in some water, and place them in the vial. Add the alcohol-water solution if it is called for, and cap the vial. At the end of the measuring period,

the plastic Form 9 should be completed with species name, haul or set number, otolith number, and all corresponding sex, length, and weight data. Especially note any otoliths taken from other than the length-frequency sample. These "hand-selected" samples will be coded "2" in column 60 of the otolith summary sheet--Form 9. "Hand-selected" samples have limited usefulness to us, so avoid taking them, ~~until you have difficulty obtaining fish of the proper length from your length-frequency samples.~~

On special collection projects use the same otolith number to identify and label the additional structures taken (such as scales, vertebrae, fin rays, etc.). The numbers on those structures will then correspond to the sex, length, and weight information for that fish on Form 9. There is no need to fill out an additional Form 9 unless instructed to do so.

Scale Samples

For salmon and Pacific cod do not remove otoliths, but instead collect a scale sample. The same data as for otoliths are recorded on Form 9, but scales for salmon are placed dry in small paper envelopes. For herring, scales should be taken if enough good ones are available on the fish; if not, remove the otoliths. Herring scales and otoliths should be placed dry in the scale envelopes. On each envelope should be recorded the species name, date, sample or haul number, scale number and body zone (see below). Each scale sample should be numbered sequentially by species, for each cruise. The data and sample numbers should then be in order also.

1. Examine fish and select zone A, B, or other. RECORD ZONE on envelope. "A" is the preferred zone, "B" and "D" are the next preferred zones. Refer to the figures in the Appendix (Location of Preferred Scale Sampling Zones"). In extreme cases, another area may be used.

2. Wipe the area to be sampled with a sponge, paper towel, or cloth. This is to minimize contamination of the sample with scales of other fish and to remove slime which can cause scales to rot.

3. Using any clean, thin-edged instrument (knife, scalpel, forceps), scrape within the zone in an anterior direction (toward the head). For salmon especially, try to pluck scales out with forceps so as to minimize the amount of accompanying mucus.

4. Wipe off, inside the coin envelope or vial, 15 to 20 scales that adhere to the instrument. Be certain the envelope is properly labeled or the vial is marked and all pertinent information is recorded on the plastic sheets.

5. Remove excess scales from instrument before sampling the next fish.

Scale samples should be taken from all salmon or steelhead in the incidence samples, or from as many as possible. As there is a high chance of obtaining regenerated scales from salmon, try to pluck samples from both sides of the fish to increase the chance of getting readable scales.

Scale samples for Pacific cod should be taken from a stratified centimeter/sex group as explained in "Stratified Otolith Samples." Unlike most scale samples, Pacific cod scales should be put into vials of alcohol instead of into scale envelopes. The primary reason for this is to prevent the scales from sticking together so badly that they are damaged by pulling them apart. Thus it is important to insert the scales into the alcohol solution in the vials rather than to add the alcohol to the scale samples at a later time. Scale location (A,B,D, etc.) can be marked in pencil on the vial tape next to the vial number.

Herring scales should be taken from as many fish as possible in the length-frequency sample. If you must subsample, take a random sample, not a stratified sample. Record the maturity stage for each female herring used for scale samples. Refer to the maturity index for herring in the Appendix and record the stage of maturity (numbers 1-8) on Form 9 in column 65. Fish observed during the winter months should be immature (stages 1-2) or mature (stages 4-5). Spent herring are not found at this time of year.

It is recognized that strict adherence to the methods will sometimes be impossible or impractical. Keep a record of the deviations from instructions so that the effect can be evaluated.

Labeling boxes of otoliths and groups of scale envelopes

Upon your return, separate your otoliths by cruise if you have not already done so. Each box should contain samples from only one vessel and only one species. The otolith vials, rubber-banded in groups of ten, should be arranged by number within each box. Using a felt-tip marker, write the following information on the ends of the boxes so that it can be easily read while the boxes are stacked.

Observer's name	Species name
Ship name	Vial and/or scale numbers
Cruise number and vessel code	Box_____of _____
Month(s) of cruise and year	Area (by number, i.e. 51, 52, 62, 72, etc.)

If you have 3 boxes of a given species for one cruise, mark them Box 1 of 3, Box 2 of 3, etc.

Salmon or herring scale packets should be separated into groups by cruise and species. A slip of paper bearing the same information as above should be rubber-banded or paper-clipped to each group of scale packets.

OBTAINING INFORMATION ON FACTORY RECOVERY RATES

A recovery rate represents the proportion of the organism that is used in the factory products. Vessel officers frequently make use of recovery rates to estimate the weight of the catch from the tonnage of the products. Coast Guard boarding officers also utilize recovery rates to check whether the cumulative catch log accurately represents the weight of the fish used to make the products in the holds.

A wide range of recovery rates is used to describe the utilization of different species in a variety of products. The type of processing, the size of the fish, the area and season of the year, and the vessel class may all have a bearing on the recovery rate of a particular species. As there is a need to find out what recovery rates are being used, observers are being asked to record the rates used on their vessels, and if possible, to determine recovery rates on their own.

Refer to the directions for Form 8-"Product Recovery Rates" in the DATA FORMS section for instructions on recording the recovery rates that the ship personnel use and for recording your own recovery data.

If time and opportunity allow, try to determine your own recovery rates for particular products. If possible, obtain a representative sample of the fish that are waiting to be processed. They should be sorted to species and be of the size and condition of those that are normally processed in one particular way. (For example, in order to obtain the recovery rate for roe from Pacific cod, select a basket of mature female cod of the sizes normally used.) Weigh the sample of whole fish, have them processed by the factory crew as usual, then weigh the end products. The weight of the products divided by the weight of the fish before processing is the recovery ratio. No reasonable method has yet been found to obtain observer recovery data on such products as surimi and fish meal, so NMFS depends on the figures provided by the ships' personnel for those products.

OBSERVATION OF MARINE MAMMALS

Observations for marine mammals are one of the secondary missions of the Foreign Observer Program. Observers should be aware of any mammals caught in the hauls that are sampled, and should try to have crew members

inform him if sea lions or other marine mammals are captured during non-sampling periods. In addition, it is requested that observers spend at least five minutes, three times a day, to look for mammals swimming in the water. If the observer chooses to stand longer mammal watches or make detailed observations, such as mammal transit observations, it will be appreciated. See the DATA FORMS section for details on recording the mammal observations.

If a dead seal or sea lion appears in the catch, measure either the standard length or curvilinear length of the body using a measuring tape and according to the diagram and instructions in the Appendix.

A highly voluntary effort which will yield valuable data is to collect the upper canine teeth from dead seals or sea lions for age and sex determinations. The method of extraction is explained in the Appendix. Since age is determined from counting the growth ridges on the root of each tooth, care should be taken not to break or cut off the root of the tooth--therefore, part of the jaw containing the tooth may be brought back, as long as all of the flesh is removed. A label with the date, haul number, location, body length of mammal (see Appendix) ship name, type of ship, cruise number, and observer name should accompany the tooth. Teeth or jaws are the only part of seals or sea lions to be brought into the United States. A marine mammal collection permit is in the Appendix. Walrus tusks can not be used for aging and should be left with the body.

DISCARDED NETTING STUDY

In recent years, biologists have documented a decline in the fur seal population on the Pribilof Islands in Alaska. The population decline may be partially explained by the harvest of female fur seals which occurred from 1956 to 1968. After the harvest of females ceased, however, the population did not recover and is currently declining, and other populations of this species in the Western Pacific appear to be declining also.

Various hypotheses have been proposed to explain the continued decline. Fur seals are opportunistic in feeding, so lack of a given food item is not thought to be a problem. In fact, general conditions for fur seals are considered to have improved rather than declined in recent years. Some investigators have felt that entanglement in discarded netting or other fishing debris may be responsible for significant mortality. It is difficult to estimate the extent of this problem because entanglement mortalities are usually lost at sea and not washed in to beaches. Some studies have been made on the rate of accumulation of net debris on beaches, but the rate of deposition is highly dependent on the relationship of the beach to currents. In an attempt to get a better idea of the amount of webbing floating in the ocean at any given time, observers are being asked to monitor net-mending operations when possible.

Observers should attempt to monitor several net-mending operations per week. Try to determine how often the nets are repaired and the number and size of pieces of webbing that are discarded each time. Avoid having your presence affect the discarding of webbing--the object of this study is to determine how much is being discarded, not to discourage it at this point. In addition, try to find out what happens to any codends that are damaged beyond repair and make note of any nets that are lost while trawling or in delivery to a mothership or joint-venture operation.

TAGGED FISH

If you should find a tagged fish while you are sampling, or if a crew member brings you a tagged fish, do your best to comply with the instructions to return the tag, along with all pertinent information to the agency of origin. Such information should normally include the date, location, and circumstances of capture, and the length, weight, sex, and stage of maturity of the fish. Otoliths and scales are often also very useful to the tagging agency.

The Pacific Biological Station at Nanaimo, B.C. injected a number of sablefish with a bone-marking chemical and tagged them with a small, yellow, plastic tube implanted just below the first dorsal fin. Obtain the otoliths and scales of these fish, and store them in an envelope to protect them from light which tends to fade the marking chemical. These samples, along with the accompanying data on date, position of capture, etc. will be forwarded to the Nanaimo laboratory after your return. Tags from yellowfin sole, halibut, and other fish will also be forwarded to the appropriate tagging agency. NMFS will pay a $2 reward to the captain of the ship from which a sablefish tag is returned (the observer cannot be paid). To expedite the sending of the reward, include the captain's name and address with the data.

Some agencies tag salmon by inserting a coded wire into the snout of fingerling salmon. These wire-tagged salmon are marked by clipping their adipose fins. If you find a salmon missing an adipose fin, check to see whether it is missing any other fins, collect a scale sample, record the usual data, and in addition, weigh the gonads. Remove the snout by cutting just behind the eye, salt the snout well, attach the completed data tag to the snout, and seal it in one of the provided plastic bags. After a few days, drain off any accumulated liquid and resalt the snout. Repeat the draining and resalting as needed. The tag should be filled out in pencil and the scale sample number written on the top.

INTERACTION WITH VESSEL PERSONNEL CONCERNING SAMPLING

In most cases, observers are treated very well by both officers and crew, and are provided work space, sampling table, and assistance when needed. (See "Treatment of Observers" in FISHERY REGULATIONS section.) At times, however, observers are faced with situations in which their sampling data could be biased (either unintentionally or on purpose) due to requests from ship officers or assistance from helpers. Common sense, good judgement, and diplomacy are needed when dealing with such situations, but the observer should be insistent in efforts to avoid data bias. The following are some situations which have occurred in the past and suggested ways of dealing with them:

1. Officers or crew may request that you not sample at a particular time--in this case, evaluate the request by finding out the reason they do not want you to sample, and if your data might be biased if you complied with their request. Some possible reasons:
   a) Helpers not available--observers should be able to figure out ways to do all of their sampling duties by themselves, without any assistance or supervision, so this is not a valid reason for not sampling.
   b) Concern for observer safety--During rough weather the officers may not want observers to watch the dumping of codends on deck. Evaluate the safety hazard (some officers give this excuse during a flat calm), and see if you can satisfy the concern for your safety without affecting the validity of your data. You must be able to at least observe the taking of your basket samples to insure that they constitute random representative

samples and insure that the incidence data you obtain is accurate. If you decide that it is too dangerous to be on deck, you may have to have the crew eliminate all on-deck sorting.

c) High incidence of crab, halibut, rockfish, or other species--This is not a valid reason for not sampling; you should decide whether or not to sample a particular catch before it comes on board. Do not allow yourself to be swayed by the desires of officers.

d) Officers may want your completed data by a certain time, so they may urge you not to sample at night--The observer is under no obligation to provide data to vessel personnel; data are provided as a courtesy only. The observer should not let the provision of data to vessel personnel interfere with obtaining representative samples throughout the day.

2. Observers may have sampling problems due to actions of crew members. Crew members often provide invaluable assistance in sorting out prohibited species and carrying basket samples, but the observer should always oversee their actions. Watch the catch being brought aboard to be certain that presorting does not bias the sampling data, and that incidence data are accurate. If there is a problem caused by vessel personnel and you are unable to deal with it directly, speak to the captain or factory manager. If this problem continues, inform the captain of the problem in writing and document the situation in your logbook. Do what you can to circumvent the problem and get good sampling data.

3. As a courtesy, observers are asked to provide vessel personnel with copies of completed data forms 3 or 3L, if desired. The provision of these data should be made at the convenience of the observer, and should not interfere with the daily sampling routine. The observer is under no obligation to explain to officers any discrepancies between observer sampling data and vessel catch figures. Note in your logbook, and later in your report:

   a) any refusal to send observer radio messages as originally written;

   b) attempts to make observer data and vessel data agree by forcing you to change your data or vice versa. Do not sign any statement which you do not know to be true or of which you have inadequate knowledge of all of the circumstances involved.

DUTIES OF LEAD OBSERVERS

In certain instances, one of a group of observers going to a particular fishery may be asked to be a lead observer for that group. This is frequently the case in coastal hake fisheries and joint venture cruises. Normally the designated observer is placed aboard the vessel with the fleet commander, if there is one.

Usually the main reason for having a lead observer is to coordinate embarkations and disembarkations and to keep NMFS informed of pending vessel movements (ships leaving the grounds or new ships arriving). NMFS may advise the lead observer on some matter and ask that the information be passed to the other observers. In certain cases, the lead observer may be asked to collect information from the other observers, summarize it, and send it to NMFS. Other observers in the group should keep the lead observer informed

if they find out their ship will be leaving the grounds or if they have to get off to attend to a medical problem or other matter.

EXTRA THINGS FOR THE AMBITIOUS OR BORED OBSERVER

Some observers have found extra time on their hands, whether because of receiving extra help in sampling, or because of the schedule of that particular ship. If you should find yourself in that position, and you wish to gather more information that would be of use to us, the following activities would be most beneficial:

1. Sample more hauls (sampling periods) for species composition.
2. Increase the amount of catch sampled during a sampling period - take more basket samples.
3. Make more of your own estimates of the total catch.
4. Monitor more hauls for the incidence of crab, halibut, and salmon.
5. Take pictures of yourself at work or of the factory processing.

Sometimes there are long periods when no fishing is done, so the observer has been unable to sample. At these times, some observers have inquired more about the operation of the ship or about processing and fishing methods, and have consequently brought back some interesting information in their reports. Some information may help explain differences in total tonnages or species composition of the catch by vessels of the same size class but different nationality, fishing strategy, or efficiency. If the ship is traveling to another fishing area, you can also make marine mammal transit observations from the bridge (see Observation of Marine Mammals).

OBTAINING INFORMATION ON FISHING GEAR

Observers are provided with translated gear diagrams and asked to have the captain or one of the ship's other officers fill it out. In the past, however,

observers have failed to verify or even question some of the information that was recorded, and as a result, due to misunderstanding or carelessness, much erroneous information was obtained.

Refer to "Commonly observed gear dimensions" in the Appendix - so that you can recognize dimensions that are questionable and thus verify them. While we do not expect observers to weigh the trawl doors or measure the total length of the trawl cable (warp length), there are some elements of the gear that can be easily checked. As you watch a haul come in, you can count the number of floats and bobbins and note their shape, approximate size, and material of which they are made. If there is more than one kind of float or bobbin, record each kind separately. Observe the trawl doors - note the shape, approximate dimensions, and the material of which they are made. Dubious headrope and footrope lengths can be checked using a tape measure on an occasion in which the net is not being used. As mesh size is quite important in many instances, check the measurements even if you feel the measurements you are given are reasonable. Refer to "How to measure mesh size" in the Appendix. The figure we want is the stretched measure, not the bar measure. If more than one trawl net is being used, and the dimensions vary, record the specifications of each. Note whether the trawl net has a net recorder and also note the presence of any other recording device such as an instrument to measure the amount of strain on the cables (as from a full net). Hook size and number of hooks per hachi can easily be verified by longliner observers.

When recording the verified information on your report diagrams, modify the diagrams where necessary to more accurately depict the actual gear used. For example, the pelagic trawl diagram has lines in the wing of the net instead of mesh--if the net you observe has large mesh instead, note it and record the mesh size.

DATA FORMS

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GENERAL INSTRUCTIONS

In gathering the necessary data, observers occasionally have to be inventive to overcome sampling problems, but once the data are ready to be transferred from the plastic on-deck sampling forms to the paper keypunch forms, all creativity should cease. Data from well over 500 cruises a year have to be processed, analyzed, and summarized, and there is no way to footnote the data from a particular cruise after they are fed into the computer. Thus, certain data columns always have to be filled in and they have to be filled in a certain way, with leading zeros in some places but not others, zeros filled in behind printed decimal points, and decimal points added by observers in other cases. Refer to the specific directions and examples for each form. If you do need to make a note to alert us to make a decision on some of the data, place the comment on a portion of the form which is not keypunched.

The forms should be neat - all the numbers should be precisely printed in conventional arabic numbers so that they are readily legible. Sloppy forms multiply the number of keypunch mistakes and sometimes require guesswork to interpret. Use a sharpened pencil, not a pen, to fill out all forms so that erasures can be neat if changes have to be made. Brackets and arrows can be used to indicate that the numbers in a column are to be repeated.

Translated forms have been provided for use as a guide in obtaining the data for forms 1 (motherships), 1L (longliners), and 2 (stern trawlers). If at all possible, the observer should fill out these forms from the ship's logbook, taking care to record the correct information and avoid making copying errors. Avoid the practice of leaving the forms on the bridge - observers have forgotten to pick up these forms when hurriedly packing for a transfer. All sampling data require the position data on these forms, so if

these are missing, other data cannot be used. If the ship's officers fill out the catch data forms it might be necessary for you to recopy them to put them in the proper format--if so, be sure to bring back the original forms so that any recopying errors can be corrected.

Observers should provide the ship captain (especially on Japanese ships) with copies of all completed form 3's (incidence and species composition, all ships), unless the captain specifically states that he does not want a copy. Copies given to Japanese captains are turned into the Japanese Fishery Agency upon return to Japan. Carbon paper is provided so that the forms can be made out in duplicate. These copies are to be made at the observer's convenience, but before leaving the ship. Vessel owners have no right to demand that any form be completed at a given time.

Cruise numbers and vessel codes

The cruise number and vessel code help to identify each page of the data from your particular sampling period on each vessel. The cruise number is assigned according to the day each observer begins sampling. If you transfer to another ship, you begin a new cruise, and will hence have a different cruise number. Cruise numbers will be assigned at NWAFC during your trip, and you will find out what it is upon your return. In the meantime, keep data from two cruises separate and mark your name and the ship's name on the first page of each set of forms.

There is a unique vessel code for each ship. The first letter indicates the nationality; the second, the vessel type; and the last two digits designate the particular ship in that category. You will be given the vessel codes of your ships upon your return.

Page numbering

On the top of each sheet of each form is a phrase "page ___ of ___." This helps to keep the forms in order and alerts us to a missing sheet. Each set of forms (1-11 and radio message forms), for each cruise, should have pages numbered consecutively. Enter the first number as you do the daily forms and fill in the second number after the cruise is complete. For example, if you used 58 Form 3's on cruise #121, then the first sheet will be page 1 of 58 and the last sheet will be page 58 of 58. Form 9's are further subdivided by species so that you may have a page 1 of 10 on king salmon scales, and page 1 of 32 on pollock otoliths.

Upon transfer to another vessel

If you transfer to another vessel, keep all data of the two cruises separate. Upon your return, data for different cruises will be filed in separate notebooks, so make sure that you start on a new sheet for each form, and start numbering each set of forms with page 1 again. If you should happen to be aboard a vessel from December to January of a new year, treat the data beginning with January 1 as a separate cruise, even if you did not transfer vessels at that time.

Greenwich Mean Time

The time and date to be used on all forms (except the first part of the itinerary on the report #2 form) is Greenwich Mean Time (GMT), which is the time and date at that moment in Greenwich, England. All ships keep track of GMT since there is a requirement that the official haul-by-haul (or set-by-set) logbook is kept in GMT. This eliminates much confusion concerning time zones as all ships keep the same time regardless of longitude. (If someone wants to know the hours of daylight, this can be easily computed from the position of the ship and the date.)

A GMT day or "data day" is defined as the time period from 0000 to 2359 GMT for a given GMT date. On independent stern trawlers, the date of a haul is the date the trawl net leaves the "fishing level" as it is begun to be retrieved. On motherships and joint-venture vessels, the date of the catch is the date it is landed on the processing ship. On longliners, the date of a set is the day the set has finished being retrieved. Make certain that the hauls, codends, or sets are attributed to the proper GMT day on the total catch forms (Forms 1, 1L, or 2).

The dates on the sampling data forms (species compostion, incidence, length frequency, etc.) must correspond to the dates on the total catch form. Species composition data from a haul with a "nets off bottom" time of 0000 GMT would be entered on a new sheet of Form 3, since it would be the start of a new day. Daylight hours will not correspond to the GMT day; therefore, it is important to obtain the information on the total catch form before transferring your data to the paper forms so you can be certain to get it on the right day. Sampling should also be adjusted so that species composition data from at least two sampling periods (preferably three) are entered for each GMT day. (This quantity of data is necessary to determine the variance of observers' samples.) Frequently on motherships, codends landed on two

different GMT days may be mixed in the bin, so you may have to make a more or less arbitrary decision as to which GMT day to assign your sample data.

In addition to GMT, most ships also keep "ship time", which may be local time, the time in Japan, Korea, Siberia, or some other time frame. Do not use ship time or dates on the data forms. Since most of the clocks on board may be set to ship time, and meal times, bath times, etc. may be given in ship time, it may be useful to learn how to convert ship time to GMT or vice versa. Compare the times shown by the GMT and ship-time clocks, and refer to the table "Relationship of Ship Time to GMT Time" to obtain the relationship for your particular ship. Once this relation has been ascertained, you should easily be able to convert the time systems using the table.

Example: In the summer, ships operating off the California, Oregon coast frequently use a ship time which corresponds to "+7" on the table. One o'clock AM (0100) ship time thus corresponds to 0800 GMT time; noon (1200) ship time is 1900 GMT; and 4 PM (1600) ship time is 2300 GMT. In this example, 5 PM (1700) June 12th ship time is 0000 June 13th GMT, the start of a new day. Ships in Alaska may use a +12 or some other time system.

If for any reason the ship's total catch log is being kept in a time other than GMT, note this in your report, and make sure that you convert the times to GMT for your data forms.

Relationship of Ship Time to GMT

SHIP TIME							
+12	+11	+10	+9	+8	+7	GMT	
1200	1300	1400	1500	1600	1700	0000	Beginning of new day
1300	1400	1500	1600	1700	1800	0100	
1400	1500	1600	1700	1800	1900	0200	
1500	1600	1700	1800	1900	2000	0300	
1600	1700	1800	1900	2000	2100	0400	
1700	1800	1900	2000	2100	2200	0500	
1800	1900	2000	2100	2200	2300	0600	
1900	2000	2100	2200	2300	0000	0700	
2000	2100	2200	2300	0000	0100	0800	
2100	2200	2300	0000	0100	0200	0900	
2200	2300	0000	0100	0200	0300	1000	
2300	0000	0100	0200	0300	0400	1100	
0000	0100	0200	0300	0400	0500	1200	
0100	0200	0300	0400	0500	0600	1300	
0200	0300	0400	0500	0600	0700	1400	
0300	0400	0500	0600	0700	0800	1500	
0400	0500	0600	0700	0800	0900	1600	
0500	0600	0700	0800	0900	1000	1700	
0600	0700	0800	0900	1000	1100	1800	
0700	0800	0900	1000	1100	1200	1900	
0800	0900	1000	1100	1200	1300	2000	
0900	1000	1100	1200	1300	1400	2100	
1000	1100	1200	1300	1400	1500	2200	
1100	1200	1300	1400	1500	1600	2300	

During daylight savings time, Seattle is +7; Anchorage, Kodiak, and Dutch Harbor are +8.

During the remainder of the year (standard time), Seattle is +8; Anchorage, Kodiak, and Dutch Harbor are +9.

FORM 1 - DAILY CATCH SUMMARY FOR MOTHERSHIPS

This form summarizes all fishing effort of the various catcher boats in the mothership fleet by day and gear type. If the mothership has eight pair trawlers, the combined data for all eight on a particular day is what is entered on the "pair trawler" line. The data for this form should be obtainable from the vessel personnel. Whether the observer or the ship officers fill out this form, check to see that the information is recorded properly and that no errors have been made in transposition. Points to note:

1. A number corresponding to catcher boat type should be entered in column 11 to indicate trawl gear (see gear code).

2. For hauls spanning midnight GMT time, the date of the haul, columns 12-17, is the date it was landed on the mothership.

3. The noon position, columns 18-26, should be the position of the mothership at noon GMT time, not the position of the catcher boats - thus there should be only one noon position per day. Use brackets and arrows to indicate the application of that one noon position to all vessel types for the day.

4. Check the latitude and longitude to make sure it is reasonable - i.e., 58°68' does not exist; doublecheck positions that indicate large movements if you haven't been aware of any.

5. The first digit of the longitude (1) is understood, so record only the following digits.

6. The times and dates for noon or midnight (and all other times logged on the forms) should be GMT time. According to the fishery management regulations, the officers should keep a catch logbook in GMT time.

7. The total daily catch should represent the weight of all of the fish and invertebrates landed on the mothership, plus any catches that were made and dumped that day instead of being delivered for processing (sometimes done by scout vessels).

8. If one vessel type did not fish on a given day, or if none of the catcher boats fished on that day, enter the noon position of the mothership as usual, leave the average depth and duration blank, and enter 0 in no. of tows. You can comment on the reason there was no fishing in columns 27-34 only.

9. The codes for weather and sea conditions are given on a following page.

10. If water temperature information is available, enter it in columns 57-62. Water temperature should not ever go below -1.8°C.

11. Leading zeros should be in columns 1, 2, 14, and 16 only.

12. *Skip a line after each day.*

FORM 1L - DAILY CATCH SUMMARY FOR LONGLINERS

This form summarizes longliner fishing effort by each line retrieved. The data for this form should be obtainable from the vessel personnel. Whether the observer or the ship officers fill out this form, check to see that the information is recorded properly and that no errors have been made in transposition. Points to note:

1. The set number in column 8 will usually be 1, since normally only one set is retrieved per day. Occasionally a longliner may complete retrieval of two different sets on a day; if so, they should be labeled 1 and 2.

2. The date of the set should be the date (GMT) that the retrieval of that set was completed.

3. The time system used (on this and all other forms) should be GMT. According to the fishery management regulations, the officers should keep a set-by-set catch logbook in GMT from which you can copy.

4. Check the latitude and longitude for the position of the ship at the time retrieval was completed. Make sure it is reasonable - i.e., 58°63' does not exist; doublecheck positions that indicate large movements if you have not been aware of any.

5. The first digit of longitude (1) is understood, so record only the following digits.

6. Average depth - we are aware that since lines are long, there may be quite a range of depths which are averaged.

7. The approximate fishing time (recorded in tenths of an hour) should represent the time interval from the time the first part of the line was laid until the time the last of the set is brought in. If bad weather or killer whales prevent the crew from bringing in any of the line for a period of time, subtract the time spent waiting from the total elapsed time.

Gear Codes

1. Pair Trawl

2. Danish Seiner

3. Otter Trawl (dependent and independent stern trawlers)

Weather Code

0 Clear (no cloud at any level)
1 Partly cloudy (scattered or broken)
2 Continuous layer(s) of cloud(s)
3 Sandstorm, duststorm, or blowing snow
4 Fog, thick dust or haze
5 Drizzle
6 Rain
7 Snow, or rain and snow mixed
8 Shower(s)
9 Thunderstorm(s)

Sea State Code

		Height of Waves*	
Code	Description	Feet	Meters
0	Calm-glassy	0	0
1	Calm-rippled	0-1/3	0-0.1
2	Smooth-wavelet	1/3-1 2/3	0.1-0.5
3	Slight	1 2/3-4	0.5-1.25
4	Moderate	4-8	1.25-2.5
5	Rough	8-13	2.5-4
6	Very Rough	13-20	4-6
7	High	20-30	6-9
8	Very High	30-45	9-14
9	Phenomenal	>45	>14

*The average wave height as obtained from the larger well-formed waves of the wave system being observed. The exact bounding height is to be assigned for the lower code figure, e.g. a height of 4 meters is coded as 5.

8. The number of hachi (columns 34-36) should represent the number of line units that are retrieved, not necessarily the number that are set. If possible, however, keep track of the number of hachi that are lost and include that in your final report.

9. The total set catch should represent the weight of all of the fish and invertebrates caught on that particular line that ended retrieval that day, whether or not it was landed. This should not include losses due to sea lion predation, however, since that would be difficult to determine. Heavy predation should be noted.

10. If no set retrieval is completed on a given day (due to bad weather, transfer of cargo, traveling, etc.), enter the noon position of the longliner in columns 18-26, leave average fishing depth and fishing time blank, and enter 1 in the set no.(column 8). You can comment on the reason there was no fishing in columns 39-47.

11. The average number of hooks per hachi should be recorded in columns 42-47. This number usually remains constant throughout the cruise. Sometimes a line consists of alternating hachi with different numbers of hooks - find out what the pattern is and take the average.

12. The codes for weather and sea condition are given on a preceding page.

13. If water temperature information is available, enter it in columns 57-62. Water temperature should not ever go below -1.8°C.

14. Leading zeros should be in columns 1, 2, 14, and 16 only.

15. Skip a line after each day.

16. Columns 67-69 are for observer's estimate of catch size (to be filled in after leaving the ship).

17. If you adjusted the ship's estimate (see next section), enter the corrected ship's estimate in columns 39-41 and the original ship's estimate in columns 73-75. If you did not adjust the ship's estimate, enter the ship's estimate in columns 39-41 (columns 73-75 will be blank). If you are filling out an old form 1L, which is missing the columns 73-75, the observer's estimate goes in unmarked columns 67-69, and the original ship's estimate should be written in the margin next to column 69.

FORM 2 - HAUL FORM FOR INDEPENDENT STERN TRAWLERS

This form summarizes stern trawler fishing effort and total catch by haul. The data for this form should be obtainable from the vessel personnel. Whether the observer or the ship officers fill out this form, check

to see that the information is recorded properly and that no errors have been made in transposition. Points to note:

1. Collect Form 2 data for the entire period you are aboard. Make certain that you have all of the hauls recorded for the days you begin and end sampling.

2. The gear code for a stern trawler is 3, entered in column 8.

3. A haul is assigned to a day according to the time the net is begun to be retrieved from the fishing level (nets off bottom time), which is not necessarily the same day the net was set or the day that you sample. Thus, hauls retrieved before 0000 hours are attributed to the previous day, and hauls retrieved on or after 0000 hours are assigned to the next day.

4. There should be only one noon position (taken at GMT noon) which applies to all hauls begun to be retrieved that day. There must always be a noon position since certain data are summarized by day as well as by haul.

5. Check the latitude and longitude for both the noon and trawl retrieval positions (haul position) to make sure they are reasonable - i.e., 58°63' does not exist; doublecheck positions that indicate large movements if you have not been aware of any.

6. The first digit of longitude (1) is understood, so record only the following digits.

7. A given haul number should be used only once - no duplicates. Haul numbers do not necessarily have to start with 1, but make sure that the numbers will not exceed 3 digits by the end of the cruise. The haul numbers must be in sequence. All hauls must be recorded unless there was a gear malfunction resulting in a zero catch.

8. The haul position is the location of the ship when a particular haul is begun to be retrieved, i.e. when the winches begin bringing in the cable. When net retrieval is begun, the time is recorded under "nets off bottom". ("Bottom" may refer to the fishing level rather than the actual ocean floor.) Under "nets on bottom" is recorded the time that the net first reaches the fishing level, where the winches stop paying out cable.

9. The time system used (on this and all other forms) should be GMT time and dates. According to the fishery management regulations, the officers should keep a haul-by-haul catch logbook from which you can copy. Time recorded should be in the 24-hour system.

   *Note--The ship may normally record positions and haul times for the landing of the haul but if possible, have them give you the times and positions asked for in #8 above. If this is not feasible, correct the times given you by subtracting the amount of time it usually takes to set or haul in the trawls.

10. All 2400-hour notations should be changed to 0000 hours. If this occurs in the "nets off bottom" time, the date should be changed accordingly.

11. Doublecheck haul times to see if they are reasonable times for your ship. Also, an overlap in haul times for two hauls is an obvious error.

12. Enter the average depth of the haul in columns 44-46. Make certain that the information you receive is the trawling depth, not the bottom depth. If the trawl depth exceeds 1,000 meters, enter 999 on Form 2 and the actual depth of each haul on the back.

13. The total catch should represent the weight of all of the fish and invertebrates caught in that particular haul, whether or not they were landed or utilized. The only time the weight of something in the haul may be excluded is when there is a large percentage of mud or rocks (or possibly even marine mammals) which are not represented in the observer's species composition.

14. Zero hauls should be recorded as 0.0; other hauls less than 1 mt should be recorded without the leading zero (i.e., 0.5 = .5 mt). Note - if there is a gear malfunction - ripped net, trawl doors hung up on net, etc., resulting in a zero haul, the captain probably won't record it - that is the only valid reason for not recording a haul.

    *If the ship's estimate is recorded as zero, yet you have sampling data for it, enter the 0.0 in columns 70-75 under "original ship's estimate." and enter either the total weight of your basket samples, your incidence sample weight, or your estimate of the catch size, whichever you feel is the most accurate estimation of the catch in columns 49-54 under "total catch." Report the entire circumstance in your logbook, and upon your return to Seattle, report to the person checking your data that the ship's estimate was adjusted.

15. Decimal points within the 49-54 block, 64-69 block, and 70-75 block will also be keypunched, so they should be made larger than usual.

16. If there were no hauls on a given day (due to bad weather, transfer of cargo, traveling etc.) enter the noon position in both the noon position and the haul position columns, and enter 0 in the haul number column. You can comment on the reason there was no fishing in columns 36-54. All days at sea must be accounted for in this manner.

17. The codes for weather and sea conditions are given on a preceding page.

18. If water temperature data are available, enter it in columns 57-62. Water temperature should not ever go below -1.8°C.

19. Leading zeros should be in columns 1, 2, 11, 13, 36-43 *only*.

20. Skip a line after each GMT day.

21. Columns 64-69 are for observer's estimate of catch size (to be filled in after leaving the ship).

22. If you adjusted the ship's estimate (see next section), enter the adjusted ship's estimate in columns 49-54 and the original ship's estimate in columns 70-75. If you did not adjust the ship's estimate, enter the ship's estimate in columns 49-54 (columns 70-75 will be blank). If you are filling out an old form 2, which is missing the columns 70-75, the observer's estimate goes in unmarked columns 64-69 and the original ship's estimate should be written in the margin next to column 69.

Form 1 Daily Catch Summary for Motherships

EXAMPLE OF MOTHERSHIP DAILY CATCH

Cruise No.	1	2	3	Vessel Code	4	5	6	7	Year	12	13
	4	5	9		N	M	0	5		8	3

NOTE: 1. If remarks are necessary, record on separate page; Use vessel name and date as reference.
2. Leading zeros in columns 1, 2, 14 and 16 ONLY.
3. Columns 8-10, 42-46, 49-54 (not shown) are blank.
4. Skip line after each day.

Vessel Type	GEAR	DATE Mo.	DATE Day	Noon Position (N) Latitude	E W	Noon Position (1) Longitude	Tow Data Average Depth (M)	Tow Data Average Duration (Mins.)	No. of Tows	Total Daily Catch (MT)	Av. Sp. Knts.	Weather Code	Sea Code	Water Temperature °C Surface	Water Temperature °C Bottom
	11	14 15	16 17	18 19 20 21	22	23 24 25 26	27 28 29 30	31 32 33 34	35 36	37 38 39 40 41	47 48	55	56	57 58 59	60 61 62
Pair	1	08	31	5816	W	7341	116	239	18	549.0	1.8	2	2	11.3	1.0
Danish	2	↓	↓	↓		↓	116	60	41	148.0	3.8	↓	↓	11.3	1.0
Stern Trawler	3	08	31	5816		7341	142	230	4	21.0	3.0	2	2	11.3	-1.0
										.	.			.	.
Pair	1	09	01	5833		7347	127	242	18	612.0	1.8	2	2	11.0	-1.3
Danish	2	↓	↓	↓		↓	120	95	13	56.0	3.5	↓	↓	↓	-1.3
Stern Trawler	3		01	5833		7347			0	.	.	2	2	11.0	.
										.	.			.	.
Pair	1		02	5856		7357	No Fishing -	Too Rough	0	.	.	6	7	10.8	.
Danish	2	↓	↓	↓	↓	↓	"	"	0	.	.	↓	↓	↓	.
Stern Trawler	3	09	02	5856	W	7357	"	"	0	.	.	6	7	10.8	.
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☆ GPO 799-921

FORM 1L DAILY CATCH SUMMARY FOR LONGLINERS EXAMPLE FORM

CRUISE NO.	1	2	3	VESSEL CODE	4	5	6	7	GEAR CODE	11	YEAR	12	13
	1	3	1		N	L	C	6		8		8	3

NOTE - 1. IF REMARKS ARE NECESSARY, RECORD ON SEPARATE PAGE; USE VESSEL NAME AND DATE AS REFERENCE.
2. LEADING ZEROS IN COLUMNS 1, 2, 14, AND 16 ONLY.
3. COLUMNS 9-10, 37-38, 63-66 (NOT SHOWN) ARE BLANK.
4. SKIP LINE AFTER EACH DAY.

* Adjusted ship's estimate (corrected for non-reporting of sculpins and nonallocated.)

SET NO.	DATE MO.	DATE DAY	END POSITION OF SET (N) LATITUDE	E W	(I) LONGITUDE	SET DATA AVERAGE DEPTH (M)	SET DATA FISHING TIME (HOURS)	NO. OF HACHI	TOTAL* SET CATCH (MT)	AVERAGE NO. HOOKS/HACHI (RIGHT ADJUST)	WEATHER CODE	SEA CODE	WATER TEMP.°C SURFACE	WATER TEMP.°C BOTTOM	OBSERVER ESTIMATE (MT)	ORIGINAL SHIP ESTIMATE (MT)
8	14 15	16 17	18 19 20 21	22	23 24 25 26	27 28 29 30	31 32 33	34 35 36	39 40 41	42-47	55	56	57 58 59	60 61 62	67 68 69	73 74 75
1	10	20	5815	W	7828	785	12.8	420	16.5	45	1	4	8.0	.	16.2	12.1
							.		.				.	.	.	.
1	10	21	5810		7839	815	12.0	420	8.6	45	2	4	8.0	.	8.7	7.4
2	10	21	5800		7850	725	14.3	320	10.1	45	8	5	7.0	.	9.8	5.3
							.		.				.	.	.	.
1	10	22	5800		7850		.		NO. FISHING —		8	7	TOO	ROUGH	.	.
							.		.				.	.	.	.
1	10	23	5755		7901	765	11.5	420	9.5	45	8	5	7.0	.	9.8	6.4
							.		.				.	.	.	.
1	10	24	5813		7832	790	13.3	350	8.3	45	8	3	8.0	.	8.3	6.7
							.		.				.	.	.	.
1	10	25	5850	W	7801	775	17.5	420	8.7	45	1	4	8.0	.	8.2	8.5
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☆GPO 693-439/38

FORM 2 HAUL FORM FOR INDEPENDENT STERN TRAWLER EXAMPLE FORM

CRUISE NO.	VESSEL CODE	GEAR	YEAR
1 2 3	4 5 6 7	8	9 10
5 3 0	N S 7 8	3	8 3

1. LEADING ZEROS IN COLUMNS 1,2,11,13,36-43 ONLY.
2. SKIP LINE AFTER EACH DAY.
3. ON DAYS WITH NO HAULS, ENTER DATE, NOON POSITION IN BOTH 15-23 AND 27-35, HAUL NO. = 0. NOTE REASON.

* Adjusted ship's estimate on 9/13 because of non-reporting of rattails.

DATE MO. (11 12)	DATE DAY (13 14)	NOON POSITION (N) LATITUDE (15 16 17 18)	E/W (19)	NOON POSITION (I) LONGITUDE (20 21 22 23)	HAUL NO. (24 25 26)	TRAWL POSITION (N) LATITUDE (27 28 29 30)	E/W (31)	TRAWL POSITION (I) LONGITUDE (32 33 34 35)	FISHING TIME NETS ON BOTTOM (36 37 38 39)	FISHING TIME NETS OFF BOTTOM (40 41 42 43)	AVERAGE HAUL DEPTH (M) (44 45 46)	AVG. SPEED (KNOT) (47 48)	TOTAL CATCH (MT WITH DECIMAL PT.) (49-54)	WEATHER CODE (55)	SEA CODE (56)	WATER TEMP. °C SURFACE (57 58 59)	WATER TEMP. °C BOTTOM (60 61 62)	Observer estimate with Dec. Pt. (64-69)	Original ship est. with Dec. Pt.* (70-75)
09	09	5824	W	7614	100	5834	W	7600	1545	2235	200	3.8	40.0	2	4	10.8	1.0		
	10	5837		7619	101	5838		7624	2345	0525	146	3.5	16.0	2	4	10.0	1.0	38.9	
					102	5837		7630	0610	0920	156	3.6	35.0	2	4	10.2	1.0		
					103	5837		7607	1015	1435	150	3.8	20.0	1	3	10.2	1.0	44.7	
	10	5837		7619	104	5838		7647	1530	1850	147	3.6	12.0	1	3	10.5	1.0	12.9	
	11	5832		7620	0	5832		7620	NO FISHING – ROUGH SEAS					6	8	10.2			
	12	5836		7647	105	5836		7653	2000	0000	186	3.6	8.0	2	4	10.0	1.5	8.0	
					106	5834		7625	0145	0745	182	3.5	20.0	2	5	10.5	1.5	20.6	
					107	5836		7711	0830	1100	276	3.6	7.0	3	4	10.6	1.3		
					108	5836		7646	1200	1300	166	3.5	10.0	3	4	10.4	1.2		
09	12	5836	W	7647	109	5914	W	7810	1800	2350	156	3.8	30.0	2	5	10.4	1.0	32.3	
09	13	6121	W	7903	110	6003	W	7836	0133	0810	201	3.5	28.26	3	4	10.3	1.1		18.0
					111	6042		7858	0924	1503	236	3.5	36.3	3	3	10.1	1.0	25.0	22.0
					112	6111		7900	1700	2045	287	3.7	18.84	4	3	9.9	.9		12.0
09	13	6121	W	7903	113	6120	W	7901	2136	2349	293	3.6	15.62	3	3	10.0	.9	15.7	11.0
09	14	5940	W	7759	114	6045	W	7850	0240	0330	223	3.5	0.0	3	6	10.2	.9		
09	14	5940	W	7759	115	6110	W	7855	2120	2330	246	3.6	20.0	3	4	10.2	.9	20.2	

ADJUSTING THE SHIP'S ESTIMATE

It may be necessary for the observer to adjust the ship's estimate if one or more species in the catch are not being included in the total catch estimate. A common nonreporting problem arises from the fact that foreign vessels are not required to report the catch of species in the "nonallocated" group. (For a definition of this group for the particular area you are fishing in, see the list given in "Instructions for Weekly Radio Messages" in the DATA FORMS section.) Your letter of introduction to the ship's captain, however, includes a request that the observer be provided with an accurate estimate of the total catch including the non-allocated species. As some officers have been reluctant to provide the observer with total catch estimates and the estimation of non-utilized species on some ships has been a problem, this section provides information by vessel type on when and how to adjust the ship's estimate. If an adjustment is made, mark the catch data forms (1, 1L, or 2) as instructed so that corrected ship's estimates, original ship's estimates, and observer estimates are legible and clearly defined.

In deciding whether or not to adjust the ship's estimate, the magnitude of the underestimation should be taken into account. If the non-reported species make up more than 10% of the catch in any particular haul, then that haul should be adjusted and its adjustment factor, as defined below, would be 1.1 or more.

The decision to adjust the ship's estimate can be made on a haul-by-haul and day-by-day basis or all the hauls in an entire cruise may be adjusted. In some instances, your sample weight may exceed the ship's estimate for that haul. This may happen because you have weighed the entire catch, as sometimes occurs on a small trawler when the catch is less than one metric ton. Another example of when you might want to adjust only a particular haul would be if there were an unusually large percentage of rattails or other nonutilized species in a certain haul.

If, after reading the instructions, you are uncertain whether or not to adjust the ship's estimates or how to make the adjustment, then do not adjust the estimates. Discuss the problem with NMFS personnel upon your return, and at that time it can be determined whether an adjustment should be made and how it should be done.

Longline vessels

This is the most common vessel type to require an adjustment of the ship's estimate. The first step is to determine what is being reported. Find out whether only utilized species are reported, and if so, which species are utilized. (This may vary from day to day depending on whether they are catching enough of a given species to warrant processing them.) Normally the ships do not include prohibited species in the total catch weight estimate.

To adjust the ship's estimate for a given set, use the following formulas:

$$\text{adjustment factor} = \frac{\text{observer's total sample weight}}{\text{weight of reported species in sample}}$$

$$\text{corrected ship's estimate} = \text{original ship's estimate} \times \text{adjustment factor}$$

Record each adjustment factor in your logbook. On form 1L, enter the corrected ship's estimate in the columns for total catch (col. 39-41), and the original ship's estimate in columns 73-75. The corrected ship's estimate is the figure that you should also use on all of your other forms requiring the ship's estimate (i.e., whole haul sample weights on Form 3, haul weights and total daily catch on radio message forms). If you are filling out an old form 1L, which is missing columns 73-75, the observer's estimate goes in unmarked columns 67-69, and the original ship's estimate should be written in the margin next to column 69.

Use the above formula to adjust the estimates only when the ship personnel do not make any attempt to estimate the weight of a species for a given set. Sometimes ships make an approximation of the amount of rattails caught and include this figure in the total catch. If the estimate of the rattails is not very accurate but it cannot be subtracted from the total catch, then do not adjust the ship's estimate for non-reporting of rattails. Similarly, do not adjust the ship's estimate if the ship is calculating whole weight of a target species using a recovery factor you do not feel is correct. Include this information in your reports when you return.

Stern trawlers

Observers on some stern trawlers, especially Japanese small stern trawlers, have noted difficulty in obtaining accurate ship estimates of total catch. As for longline vessels, the first step is to determine what species are being reported, which are reported on occasion, and which are not reported at all. If the ship includes in a given haul estimate only some of a particular species or species group, you will not be able to adjust the estimate unless you can determine the percentage that was not reported.

To adjust the hauls that you sampled, use the same formula given in the longline vessel section. Correct each haul individually using your sampling data for that haul, and write the adjustment factors in your logbook. To calculate a factor for the hauls that you did not sample, sum the adjusted ship's estimate for the hauls you sampled that day and divide the resulting figure by the sum of the original ship's estimates for those hauls. This should yield an adjustment factor for the day which is weighted by the size of the sampled haul. Use this factor for the day to adjust the ship's estimates of the hauls that you did not sample that day.

From form 2 example:

Sampled hauls for 9/13/83

Haul #	ship's estimate		adjustment factor	adjusted ship's estimate
111	22.0 mt	x	1.65	36.30
113	+ 11.0	x	1.42	+ 15.62
	33.0			51.92

(51.92 ÷ 33.0 = 1.57, the adjustment factor you should use to correct hauls 110 and 112 on 9/13/83 which you did not sample)

If you whole-haul sample for species composition, the sample weight is dependent on the ship's estimation of the catch. If the ship is only reporting some of the species, and you are counting and weighing all of the non-reported species for the haul, add the total weight of the non-reported species to the ship's estimate to obtain the adjusted haul weight. This may then be used as the sample weight for both species composition and incidence as well as the corrected ship's estimate on Form 2. Divide the corrected ship's estimate by the original ship's estimate to get the adjustment figure, which is used in calculating the figure by which non-sampled hauls can be adjusted.

Similar computations may be necessary to adjust the ship's estimate if you partial whole-haul sample. In addition, sample size must be adjusted by taking the appropriate percentage of the ship's reported catch estimate and adding the actual weight of the non-reported species in your sample. Remember, do not bother to adjust sample weights or ship's estimates unless the non-reported species make up 10% or more of the catch. If you change the sample weight, make sure that the adjusted sample weight does not exceed the ship's estimate on Form 2.

On Form 2, enter the adjusted ship's estimate in the columns for total catch (Col. 49-54). If you are filling out an old form 2, which is missing the columns 70-75, the observer's estimate goes in unmarked columns 64-69, and the original ship's estimate should be written in the margin next to column 69.

Joint ventures

Observers on joint venture fishing operations have, at times, noted a need to adjust catch estimates. The preferable way to correct the estimates would be to adjust the catch for each codend separately, following the directions for stern trawler observers. If this is not possible, follow the directions for longline observers, calculating a single adjustment factor based on all of the species composition data for the day and using this to adjust the total daily catch.

FORM 3--SPECIES COMPOSITION AND INCIDENCE FOR ALL VESSEL TYPES

Forms 3 and 3L are two-sided forms encompassing data on the GMT day's catch and the samples taken from that catch. The front side is concerned with monitoring for incidence of crab, halibut, and salmon, and the reverse side is for data on species composition. Each side is divided into a left and right section; the left sides are keypunched and the right sides are used by the observer to record estimated weights, viability data, calculated totals, and average weights.

Species Composition - Forms 3(2) and 3(2)L

General Instructions for All Vessel Types

1. Enter the identifying information at the top of the page and the haul, sample, or set-sample number according to your vessel type.

2. Remember that the date of the sample should correspond to the information on Forms 1, 1L, or 2. The date should thus be the day the trawl began to be hauled in or the retrieval of the longline set was completed.

3. Enter the number of baskets collected during the sampling period (normally 6-10 on stern trawlers, 8-10 on motherships, 5 on longliners).

4. Enter the time you began sampling.

5. The total basket weight or sample weight (the combined weight of all the baskets for a given sampling period), treated as if it was a species, is entered on the first line of the species list and assigned the code number 999.

6. All weights placed in these columns (columns 41-49, 56-64, 71-79), should have a well-defined decimal point as the decimal point itself will be keypunched and must be present even if the weights are not carried to a tenth or a hundredth of a kilogram (see the examples of Form 3).

7. Below the basket weight row, each species is listed by the specific common name and the corresponding species code found in the list of alphabetically arranged species on the following pages. Look up a species under its group name--rockfish, sculpin, sole, etc. Crabs should be identified to species for the species composition--*C. bairdi*, *C. opilio*, *C. angulatus*, and *C. tanneri* Tanner crab; red, blue, golden, and *Lithodes couesi* king crab. Most fish, especially the commercially important species, should also be identified to species, if possible. Try not to use categories such as "flatfish unidentified" and "rockfish unidentified." If you have been unable to identify, for example, two species of rockfish, keep the

data for the two species separate by labeling them "rockfish A" and "rockfish B." If you are later able to determine their identity, then it would be possible to substitute the species name and code. On the other hand, for non-commercially important species (sculpins, eelpouts, pricklebacks, rattails, etc.), a designation such as "sculpin, unident." is fine.

8. Items such as seaweed, old boots, pieces of wood, etc., should be combined under "miscellaneous items" code 900, and given a "number" of 1. (We are only interested in the total weight for all miscellaneous items within a haul.)

9. If there is no species code for a given species or family in the basket samples, enter the accepted common name, leave the species code blank, and put the scientific name and reference source in the "remarks" section. A new code will be assigned after you return.

10. The number of individuals and weight of each species group are then placed in the appropriate columns for each sampling period in which they were found. Every number must have a weight (even a few shrimp weigh something) and every weight must have a number.

11. Total the number of specimens from each sampling period and enter the sum in the appropriate columns in line 999 (columns 35-40 for the first sample, 50-55 for the second, and 65-70 for the third).

12. For any given sampling period, sample the total of the weights of individual species must equal the sample weight. As mentioned for basket sampling, there are two methods for doing this: preferably all species groups should be weighed and the total of the species weights should be entered as the sample weight. The other method is to obtain the weight of the dominant species by subtraction of the total weight of the other species from the weight of the unsorted baskets. If this method is used, mark the weights obtained by subtraction with an asterisk as is shown on the sample forms.

13. The three columns on the far right are used to total the numbers, weight, and average weights of the species found in the basket samples for the day. This information will be of use at NWAFC and also for checking the observer's math.

14. Doublecheck all calculations. After entering the totals for the day, check the math of the keypunch portion by comparing the sum of the total basket weights (sum of weights in line 999) with the sum of the species weight totals (in "weight" column on righthand side of form). Also check the sum of the numbers of specimens in a similar fashion.

15. There should be no leading zeros in the species codes, haul numbers, or weights. Leading zeros should appear in the cruise number, month, and day numbers only, as needed (columns 1, 2, 10, 12).

16. Do not put commas in large numbers (i.e. 12900).

17. The "remarks" section should include anything unusual about the catch or sampling method. If you had only two sampling periods during that GMT day, or were unable to take the usual number of basket samples, note the reason in this section.

18. If you have more than 27 species and you need to go to another page, make sure that you enter the entire heading (columns 1-27) on the new page. It is especially important to enter the haul/sample numbers in the same columns as on the first page. The additional species codes, numbers, and weights should then be entered in the proper columns matching the haul/sample numbers. Write "continued from previous page" in the "remarks" section. On the reverse side of the second page, enter the page number, but otherwise the page may be left blank.

19. If you have more than 3 species composition samples in a given GMT day, you will need to go to another page. Enter only the species codes for the species that were found in the additional samples--in this case the "totals for the day" will actually be just the totals for the page.

20. Do not skip any columns on Form 3(2) in an attempt to make species composition samples match with incidence samples (i.e., if you sample hauls 3, 4, and 5 for incidence of prohibited species, but only 3 and 5 for species composition, enter the haul 5 species composition data right next to the haul 3 data--do not leave a blank set of columns).

Recording Species Composition on Motherships

1. There may be problems in attributing species composition data to the day that the fish were caught since the hauls from various boats are often mixed in large bins. Most catcher boats, however, deliver their fish to the mothership on the day they are caught, so that should not be too much of a problem.

2. Instead of haul number, the sample number should be entered in columns 17, 22, and 27. The first sample for each GMT day should be numbered 1; the second - 2; the third - 3; and so on. The next day start over again with sample number 1. Therefore, if you want to refer to a particular sample in your report, you must give both the date and sample number.

Recording Species Composition on Hake Fishing Vessels
(or on other vessels in which whole-haul sampling or one of its variations is used to obtain species composition data)

1. The total sample weight is entered on the form in place of the total basket weight. (In almost all cases, this will be the ship's official estimate of the haul weight.)

2. Standard whole-haul method of sampling: (see SAMPLING PROCEDURES section) Remember--if you get prohibited species in the haul, these should be *included in the species composition of whole-haul samples.*

   a. The weight of the target species is obtained by subtraction of the total weight of the incidentals from the official ship's estimate of haul weight. Mark this weight with an asterisk.

b. The numbers, weight, and calculated average weight of the target species obtained from the basket samples must be put on a part of the form that is not keypunched--possibly next to the haul number as in the example.

$$\frac{129.4 \text{ kg}}{170 \text{ hake}} = .76 \text{ kg (calculated average weight)}$$

c. Using the calculated average weight and the total weight of the target species (obtained by step a), calculate the total number of hake that weight represents, and enter in the number column. Calculate daily totals as before.

$$\frac{15893.8 \text{ kg}}{.76 \text{ kg}} = 20913 \text{ (number of hake)}$$

3. Partial whole - haul sampling: (Calculate and record in similar manner as in the standard whole-haul method of sampling.)

4. Whole-haul sampling with two major species: (see SAMPLING PROCEDURES section)

The following directions are to be used when recording data from a given haul in which a mixture of whole-haul sampling and basket sampling for species composition has been used; (see the second sample on the "Form 3 example of data from a large stern trawler).

a. Enter the number of individuals and weights of the species which were obtained from the whole haul--in this example--sablefish, arrowtooth flounder, rex sole, dogfish shark, and Pacific halibut.

b. Subtract the total combined weight of the above species groups from the ship's estimate of haul weight. The figure you obtain will be the combined weight of the species you basket sampled for--in this example--pollock and Pacific cod: 19,905.4 kg.

c. Record the numbers and weights of the basket sampled fish in a non-keypunched portion of the form. Using the proportionate weights of the species in the basket samples, divide the combined weight so that you obtain the estimated weight of each species in the whole haul.

In this example--
the basket samples yielded: 151 pollock = 117.2 kg, avg. wt = .78 kg
20 P. cod = 20.4 kg, avg. wt = 1.02 kg
total basket sample weight = 137.6 kg

$$\frac{\text{kg pollock in baskets}}{\text{total basket sample wt}} = \frac{117.2 \text{ kg}}{137.6 \text{ kg}} = .85 \text{ (85\% pollock by weight)}$$

$$\frac{\text{kg P. cod in baskets}}{\text{total basket sample wt}} = \frac{20.4 \text{ kg}}{137.6 \text{ kg}} = .15 \text{ (15\% P. cod by weight)}$$

.85 x 19,905.4 = 16919.6 kg = wt. of pollock in whole haul
.15 x 19,905.4 = 2985.8 kg = wt. of P. cod in whole haul

Record the above two figures on the data form opposite each species.

d. Using the average weights of these species obtained from the basket samples, calculate the number of fish each weight represents.

In this example--

$$\frac{16,919.6}{.78} = 21692 \text{ pollock} \qquad \frac{2,985.8}{1.02} = \cancel{2972}\ 2927 \text{ P. cod}$$

Enter the above numbers on the data form.

5. As we don't want commas keypunched, don't put them in numbers in the keypunch part of the form.

6. In the "remarks" section of the data form, note what type of sampling system you used for each haul.

Recording Species Composition on Longliners

1. Set numbers should be recorded in columns 15, 20, and 25 and sample numbers should be recorded in columns 17, 22, and 27. The first sample of each set should be numbered 1; the second - 2; the third - 3; and so on. The next set, start over again with sample number 1. Therefore, if you want to refer to a given sample in your report, you must give both the date and the set-sample number.

2. Note the number of hachi that it took to fill all of the baskets for each sampling period, and place in columns 18-19, 23-24, and 28-29.

3. Note in "Remarks" especially heavy predation on the set catch by sea lions or killer whales.

4. If the tally system was used to count the dominant species in the catch, record the number of fish tallied in columns 35-40. In a non-keypunched portion of the form (see example form), record the data on the baskets of dominant species that were collected at about the same time as each sampling period--note the sample number, the number of fish in the baskets, the weight of those fish, and the calculated average weight. Multiply that average weight times the number of that species tallied during that sampling period and record the weight in columns 41-49, opposite the tallied number. Enter the species names, species codes, numbers and weights of the nondominant species in the basket samples taken during the sampling period. Total the weights of all the species to get the estimated weight of all the organisms that came up on the line during the sampling period and enter this figure in columns 41-49, opposite the species code 999 (see example form). Total the numbers of specimens in each sample at the top of the column, in line 999.

   If all species were placed in the baskets during the sample period, record the actual counts and weights in columns 35-40 and 41-49, as you would for basket sampling on a stern trawler.

SPECIES CODE LIST

CODE	NAME	REVISED 3-7-84
2	KING (RED, BLUE, GOLDEN) CRAB UNID.	CODE FOR INCIDENCE OF SPECIES ONLY
3	TANNER (BAIRDI, OPILIO) CRAB UNID.	CODE FOR INCIDENCE OF SPECIES ONLY
999	TOTAL BASKET WEIGHT	SPECIES COMPOSITION ONLY
106	ALASKA PLAICE	PLEURONECTES QUADRITUBERCULATUS
462	ALLIGATORFISH, ALEUTIAN	ASPIDOPHOROIDES BARTONI
454	ALLIGATORFISH, SMOOTH	ANOPLAGONUS INERMIS
610	ANCHOVY, NORTHERN	ENGRAULIS MORDAX
55	ANEMONE, SEA - UNIDENT.	ACTINIARIA
617	ARGENTINE, PACIFIC (RACE)	ARGENTINA SIALIS
620	ARGENTINE - UNIDENT.	ARGENTINIDAE
43	ASCIDIANS	UROCHORDATA
204	ATKA MACKEREL	PLEUROGRAMMUS MONOPTERYGIUS
770	BARRACUDINA, - UNIDENT.	PARALEPIDIDAE
772	BARRACUDINA, SLENDER	LESTIDIUM RINGENS
773	BARRACUDINA, RIBBON	NOTOLEPIS RISSOI RISSOI
621	BARREL EYE	MACROPINNA MICROSTOMA
48	BARNACLES	CIRRIPEDIA
289	BIGSCALE, - UNIDENT.(SEE MELAMPHIDI)	MELAMPHAEIDAE
998	BIRDS - UNIDENT.	AVES
612	BLACKSMELT, - UNIDENT.	BATHYLAGIDAE
615	BLACKSMELT, EARED	BATHYLAGUS OCHOTENSIS
615	BLACKSMELT, POPEYE (M L)	BATHYLAGUS OCHOTENSIS
260	BLENNY, - UNIDENT.	PHOLIDAE, STICHAEIDAE
302	BOCACCIO	SEBASTES PALCISPINIS
27	BRACHIOPOD	
32	BRYOZOANS	
604	CAPELIN	MALLOTUS VILLOSUS
44	CHITON - UNIDENT.	AMPHINEURA
199	CHUB MACKEREL	SCOMBER JAPONICUS
29	CLAMS MUSSELS OYSTERS SCALLOPS	PELECYPODA
211	COD, ARTIC (RACE)	BOREOGADUS SAIDA
203	COD, BLACK (SABLEFISH)	ANOPLOPOMA FIMBRIA
202	COD, PACIFIC	GADUS MACROCEPHALUS
208	COD, SAFFRON	ELEGINUS GRACILIS
213	COOLING, BERING SEA	LAEMONEMA LONGIPES
214	CODLING, - UNIDENT.	MORIDAE
32	CORALS	
1	CRAB, - UNIDENT.	
6	CRAB, BLUE KING	PARALITHODES PLATYPUS
11	CRAB, BOX	LOPHOLITHODES FORAMINATUS
10	CRAB, BROWN KING CRAB (RACE)	PARALITHODES BREVIPES
16	CRAB, COLESI KING	LITHODES COLESI
39	CRAB, DECORATOR	OREGONIA GRACILIS
12	CRAB, DUNGENESS	CANCER MAGISTER
8	CRAB, GOLDEN KING	LITHODES AEQUISPINA
15	CRAB, HERMIT - UNIDENT.	PAGURIDAE
7	CRAB, KOREAN HORSEHAIR	ERIMACRUS ISENBECKII
9	CRAB, LYRE -- SHARP SPINED	HYAS LYRATUS
37	CRAB, LYRE -- ROUNDED SPINED	HYAS COARCTATUS ALUTICUS
17	CRAB, PARALOMIS MULTISPINA	PARALOMIS MULTISPINA
38	CRAB, PARALOMIS VERILLI	PARALOMIS VERILLI
13	CRAB, RED KING	PARALITHODES CAMTSCHATICA
31	CRAB, SCALED	PLACETRON WOSNESSENSKII
19	CRAB, TANNER, ANGULATUS	CHIONOECETES ANGULATUS
4	CRAB, TANNER, BAIRDI	CHIONOECETES BAIRDI
5	CRAB, TANNER, OPILIO	CHIONOECETES OPILIO
18	CRAB, TANNER, TANNERI	CHIONOECETES TANNERI
23	CRAB, TELMESSUS CRAB	TELMESSUS CHEIRGONUS
53	CRINOIDS - UNIDENT.	CRINOIDEA
255	CUSK-EEL, BASKETWEAVE	OPHIDION SCRIPPSI
256	CUSK-EEL, SPOTTED	CHILARA TAYLORI
144	DAB, LONGHEAD (SANDDAB)	LIMANDA PROBOSCIDEA
679	DAGGERTOOTH	ANOTOPTERUS PHARAO
799	DRAGONFISH, - UNIDENT.	MELANOSTOMIATIDAE
801	DRAGONFISH, HIGHFIN	BATHOPHILIUS FLEMINGI
800	DRAGONFISH, LONGFIN	TACTOSTOMA MACROPUS
690	DREAMER, - UNIDENT.	ONEIROIDIDAE
691	DREAMER, BULBOUS	ONEIRODES ESCHRICHTI
250	EELPOUT, - UNIDENT.	ZOARCIDAE
257	EELPOUT, BIGFIN	APRODON CORTEZIANUS
254	EELPOUT, BLACK	LYCODES DIAPTERUS
261	EELPOUT, BLACKBELLY	LYCODOPSIS PACIFICA
262	EELPOUT, KAMCHATCA	LYCENCHELYS KAMCHATICA
258	EELPOUT, PALLID	LYCODAPUS MANDIBULARIS
252	EELPOUT, POLAR	LYCODES TURNERI
259	EELPOUT, SHORTFIN	LYCODES BREVIPES
249	EELPOUT, SPARSE FEATHED LYCOD	LYCODES RARIDENS
253	EELPOUT, THOLINE	BOTHROCARA BRUNNEUM
251	EELPOUT, WATTLED	LYCODES PALEARIS
601	EULACHON (CANDLEFISH)	THALEICHTHYS PACIFICUS
901	FISH - UNIDENT.	OSTEICHTHYES
100	FLATFISH, - UNIDENT.	
210	FLATNOSE, PACIFIC	ANTIMORA MICROLEPIS
141	FLOUNDER, ARROWTOOTH	ATHERESTHES STOMIAS
146	FLOUNDER, ARCTIC	LIOPSETTA GLACIALIS
145	FLOUNDER, BERING	HIPPOGLOSSOIDES ROBUSTUS
147	FLOUNDER, KAMCHATKA	ATHERESTHES EVERMANNI
142	FLOUNDER, STARRY	PLATICHTHYS STELLATUS
650	FROGFISH	BENTHODESMUS ELONGATUS (SIMONYI)
390	GREENLING, - UNIDENT.	HEXAGRAMMIDAE
392	GREENLING, KELP	HEXAGRAMMOS DECAGRAMMUS
394	GREENLING, MASKED	HEXAGRAMMOS OCTOGRAMMUS
393	GREENLING, ROCK	HEXAGRAMMOS LAGOCEPHALUS
391	GREENLING, WHITESPOTTED	HEXAGRAMMOS STELLERI
80	GRENADIER, - UNIDENT. (SEE RATTAIL)	MACROURIDAE
430	GUNNEL - UNIDENT.	PHOLIDAE
77	HAGFISH, - UNIDENT.	MYXINIDAE
206	HAKE, PACIFIC	MERLUCCIUS PRODUCTUS
102	HALIBUT, GREENLAND (TURBOT)	REINHARDTIUS HIPPOGLOSSOIDES
101	HALIBUT, PACIFIC	HIPPOGLOSSUS STENOLEPIS
777	HATCHETFISH, SILVERY	ARGYROPELECUS LYCHNUS LYCHNUS
611	HERRING, PACIFIC	CLUPEA HARENGUS PALLASI
902	INVERTEBRATE - UNIDENT.	
418	IRISH LORD, UNIDENT.	HEMILEPIDOTUS, SP.
410	IRISH LORD, BROWN	HEMILEPIDOTUS SPINOSUS
407	IRISH LORD, RED	HEMILEPIDOTUS HEMILEPIDOTUS
414	IRISH LORD, YELLOW	HEMILEPIDOTUS JORDANI
33	ISOPOD	ISOPODA
207	JACK MACKEREL	TRACHURUS SYMMETRICUS
35	JELLYFISH, - UNIDENT.	SCYPHOZOA
608	KING-OF-THE-SALMON	TRACHIPTERUS ALTIVELIS
725	LAMPFISH, - UNIDENT.	MYCTOPHIDAE
79	LAMPREY, PACIFIC	LAMPETRA TRIDENTATUS
785	LANCETFISH, LONGNOSE	ALEPISAURUS FEROX
700	LANTERNFISH, - UNIDENT.	MYCTOPHIDAE

703	LANTERNFISH, BLUE	TARLETONBEANIA CRENULARIS
701	LANTERNFISH, CALIF HEADLIGHT	DIAPHUS THETA
702	LANTERNFISH, NORTHERN	STENOBRACHIUS LEUCOPSARUS
603	LINGCOD	OPHIODON ELONGATUS
45	LIMPET, - UNIDENT.	
14	LITHODID - UNIDENT. (RACE)	LITHODID CRAB UNIDENT.
809	LOOSEJAW, SHINING	ARISTOSTOMIAS SCINTILLANS
525	LUMPSUCKER, - UNIDENT.	CYCLOPTERIDAE
532	LUMPSUCKER, LEATHERFIN	EUMICROTREMUS DERJUGINI
530	LUMPSUCKER, PACIFIC SPINY	EUMICROTREMUS ORBIS
531	LUMPSUCKER, SMOOTH	APTOCYCLUS VENTRICOSUS
204	MACKEREL, ATKA	PLEUROGRAMMUS MONOPTERYGIUS
199	MACKEREL, CHUB (PACIFIC)	SCOMBER JAPONICUS
207	MACKEREL, JACK	TRACHURUS SYMMETRICUS
774	MANEFISH	CARISTIUS MACROPUS
776	MEDUSAFISH	ICICHTHYS LOCKINGTONI
289	MELAMPHID, - UNIDENT.	MELAMPHAEIDAE
291	MELAMPHID, CRESTED	PORONITRA CRASSICEPS
290	MELAMPHID, HIGHNOSE	MELAMPHAES LUGUBRIS
710	MIDSHIPMAN, PLAINFIN	PORICHTHYS NOTATUS
900	MISC - UNIDENT.	(ROCKS, MUD, BOOTS, BARRELS, ETC)
29	MUSSELS CLAMS OYSTERS SCALLOPS	PELECYPODA
25	NUDIBRANCH	NUDIBRANCHIATA
810	OCEAN SUNFISH	MOLA MOLA
60	OCTOPUS, - UNIDENT.	OCTOPODA
61	OCTOPUS, PELAGIC	
297	OPAH	LAMPRIS GUTTATUS (L. REGIOUS)
295	OREO, OXEYE	ALLOCYTTUS FOLLETTI
29	OYSTERS CLAMS MUSSELS SCALLOPS	PELECYPODA
617	PACIFIC ARGENTINE (RACE)	ARGENTINA SIALIS
199	PACIFIC MACKEREL (CHUB)	SCOMBER JAPONICUS
301	PACIFIC OCEAN PERCH	SEBASTES ALUTUS
680	PEARLEYE, NORTHERN	BENTHALBELLA DENTATA
450	POACHER, - UNIDENT.	AGONIDAE
457	POACHER, BIGEYE	BATHYAGONUS (ASTEROTHECA) PENTACANTHUS
455	POACHER, BLACKFIN	BATHYAGONUS NIGRIPINNIS
460	POACHER, BLACKTIP	XENERETHUS LATIFRONS
459	POACHER, DRAGON	PERCIS JAPONICUS
456	POACHER, GRAY STARSNOUT	BATHYAGONUS (ASTEROTHECA) ALASCANUS
458	POACHER, NORTHERN SPEARNOSE	AGONOPSIS VULSA (KEMPELANE)
453	POACHER, SAWBACK	SARRITOR FRENATUS
461	POACHER, SPINYCHEEK STARSNOUT	BATHYAGONUS (ASTEROTHECA) INFRASPINATUS
452	POACHER, STURGEON	AGONUS ACIPENSERINUS
451	POACHER, WARTY	OCCELLA VERRUCOSA
54	POLYCHAETE - UNIDENT.	POLYCHAETA
201	POLLOCK, WALLEYE	THERAGRA CHALCOGRAMMA
775	POMFRET, PACIFIC	BRAMA JAPONICA
778	POMFRET, ROUGH	TARACTES ASPER
790	POMPANO, PACIFIC	PEPRILUS SIMILLIMUS
750	PRICKLEBACK, - UNIDENT.	STICHAEIDAE
752	PRICKLEBACK, ARTIC SHANNY	STICHAEUS PUNCTATUS
753	PRICKLEBACK, DALBED SHANNY	LUMPENUS MACULATUS
756	PRICKLEBACK, LONGSNOUT	LUMPENELLA LONGIROSTRIS
754	PRICKLEBACK, PEARLY	BRYOZOICHTHYS MARJORIS
751	PRICKLEBACK, SNAKE	LUMPENUS SAGITTA
755	PRICKLEBACK, WHITEBARRED	POROCLINUS ROTHROCKI
205	PROWFISH	ZAPRORA SILENUS
280	RAGFISH	ICOSTEUS AENIGMATICUS
99	RATFISH, SPOTTED	HYDROLAGUS COLLIEI
80	RATTAIL, (GRENADIER) - UNIDENT.	MACROURIDAE
83	RATTAIL, FILAMENTED	CORYPHAENOIDES FILIFER
82	RATTAIL, PECTORAL (GIANT)	ALBATROSSIA (CORYPHAENOIDES) PECTORALIS
81	RATTAIL, ROUGHSCALE (PACIFIC)	CORYPHAENOIDES ACROLEPIS
93	RAY, PACIFIC ELECTRIC	TORPEDO CALIFORNICA
300	ROCKFISH, - UNIDENT.	SCORPAENIDAE
334	ROCKFISH, AURORA	SEBASTES AURORA
337	ROCKFISH, BANK	SEBASTES RUFUS
306	ROCKFISH, BLACK	SEBASTES MELANOPS
319	ROCKFISH, BLACKGILL	SEBASTES MELANOSTOMUS
316	ROCKFISH, BLUE	SEBASTES MYSTINUS
302	ROCKFISH, CONCACCIO	SEBASTES PAUCISPINIS
332	ROCKFISH, BROWN	SEBASTES ALRICULATUS
314	ROCKFISH, CANARY	SEBASTES PINNIGER
340	ROCKFISH, CHAMELEON	SEBASTES PHILLIPSI
325	ROCKFISH, CHILIPEPPER	SEBASTES GOODEI
327	ROCKFISH, COPPER	SEBASTES CAURINUS
311	ROCKFISH, DARK BLOTCHED	SEBASTES CRAMERI
330	ROCKFISH, DUSKY	SEBASTES CILIATUS
341	ROCKFISH, FLAG	SEBASTES RUBRIVINCTIS
339	ROCKFISH, GREENSPOTTED	SEBASTES CHLOROSTICTUS
313	ROCKFISH, GREENSTRIPED	SEBASTES ELONGATUS
323	ROCKFISH, HARLEQUIN	SEBASTES VARIEGATUS
352	ROCKFISH, LONGSPINE THORNYHEAD	SEBASTOLOBUS ALTIVELIS
303	ROCKFISH, NORTHERN	SEBASTES POLYSPINIS
336	ROCKFISH, OLIVE	SEBASTES SERRANOIDES
301	ROCKFISH, PACIFIC OCEAN PERCH	SEBASTES ALUTUS
333	ROCKFISH, PINK ROSE	SEBASTES SIMULATOR
335	ROCKFISH, PYGMY	SEBASTES WILSONI
343	ROCKFISH, QUILLBACK	SEBASTES MALIGER
322	ROCKFISH, RASPHEAD	SEBASTES RUBERRIMUS
308	ROCKFISH, RED BANDED	SEBASTES BABCOCKI
324	ROCKFISH, REDSTRIPE	SEBASTES PROGINER
309	ROCKFISH, ROSETHORN	SEBASTES HELVOMACULATUS
312	ROCKFISH, ROSY	SEBASTES ROSACEUS
307	ROCKFISH, ROUGHEYE	SEBASTES ALEUTIANUS
304	ROCKFISH, SHARPCHIN	SEBASTES ZACENTRUS
316	ROCKFISH, SHORTBELLY	SEBASTES JORDANI
326	ROCKFISH, SHORTBANKER	SEBASTES BOREALIS
350	ROCKFISH, SHORTSPINE THORNYHEAD	SEBASTOLOBUS ALASCANUS
310	ROCKFISH, SILVERGRAY	SEBASTES BREVISPINIS
342	ROCKFISH, SPECKLED (RACE)	SEBASTES OVALIS
315	ROCKFISH, SPLITNOSE	SEBASTES DIPLOPROA
338	ROCKFISH, STARRY	SEBASTES CONSTELLATUS
328	ROCKFISH, STRIPETAIL	SEBASTES SAXICOLA
329	ROCKFISH, TIGER	SEBASTES NIGROCINCTUS
331	ROCKFISH, VERMILION	SEBASTES MINIATUS
305	ROCKFISH, WIDOW	SEBASTES ENTOMELAS
322	ROCKFISH, YELLOWEYE	SEBASTES RUBERRIMUS
320	ROCKFISH, YELLOWMOUTH	SEBASTES REEDI
321	ROCKFISH, YELLOWTAIL	SEBASTES FLAVIDUS
200	ROUNDFISH, - UNIDENT.	
240	RONQUIL, - UNIDENT.	BATHYMASTERIDAE
243	RONQUIL, ALASKAN	BATHYMASTER CAERULEOFASCIATUS
241	RONQUIL, NORTHERN	RONQUILUS JORDANI
203	SABLEFISH (BLACK COD)	ANOPLOPOMA FIMBRIA
220	SALMON, - UNIDENT.	ONCORHYNCHUS, SP.
221	SALMON, CHUM (DOG)	ONCORHYNCHUS KETA
222	SALMON, KING (CHINOOK)	ONCORHYNCHUS TSHAWYTSCHA
225	SALMON, PINK (HUMPBACK)	ONCORHYNCHUS GORBUSCHA
224	SALMON, RED (SOCKEYE)	ONCORHYNCHUS NERKA

223	SALMON, SILVER (COHO)	ONCORHYNCHUS KISUTCH
136	SANDDAB, - UNIDENT.	BOTHIDAE
144	SANDDAB, LONGHEAD	LIMANDA PROBOSCIDEA
137	SANDDAB, PACIFIC	CITHARICHTHYS SORDIDUS
40	SAND DOLLARS	ECHINOIDEA
239	SANDFISH	TRICHODON TRICHODON
670	SAND LANCE, PACIFIC	AMMODYTES HEXAPTERUS
614	SARDINE, PACIFIC	SARDINOPS SAGAX CAERULENS
607	SAURY, PACIFIC	COLOLABIS SAIRA
190	SCABBARDFISH, BLACK	APHANOPUS CARBO
29	SCALLOPS CLAMS MUSSELS OYSTERS	PELECYPODA
400	SCULPIN, - UNIDENT.	COTTIDAE
423	SCULPIN, ARCTIC STAGHORN	GYMNOCANTHUS TRICUSPIS
470	SCULPIN, ARMORHEAD	GYMNOCANTHUS GALEATUS
402	SCULPIN, BIGMOUTH	HEMITRIPTERUS BOLINI
411	SCULPIN, BLACKFIN	MALACOCOTTUS KINCAIDI
422	SCULPIN, BLOB	PSYCHROLUTES PHRICTUS
410	SCULPIN, BROWN IRISH LORD	HEMILEPIDOTUS SPINOSUS
412	SCULPIN, BUFFALO	ENOPHRYS BISON
415	SCULPIN, BUTTERFLY	HEMILEPIDOTUS PAPILIO
420	SCULPIN, CALICO	CLINOCOTTUS EMBRYUM
409	SCULPIN, CRESTED	BLEPSIAS BILOBUS
404	SCULPIN, DUSKY	ICELINUS BURCHAMI
405	SCULPIN, GREAT	MYOXOCEPHALUS POLYACANTHOCEPHALUS
429	SCULPIN, ICELUS CANALIEULATUS	ICELUS CANALIEULATUS
432	SCULPIN, ICELUS EURYOPS	ICELUS EURYOPS
418	SCULPIN, IRISH LORD - UNIDENT.	HEMILEPIDOTUS, SP.
427	SCULPIN, LEISTER	ENOPHRYS LUCASI
421	SCULPIN, MOSSHEAD	CLINOCOTTUS GLOBICEPS
440	SCULPIN, MYOXOCEPHALUS SP.	MYOXOCEPHALUS SP.
417	SCULPIN, NORTHERN	ICELINUS BOREALIS
424	SCULPIN, PACIFIC STAGHORN	LEPTOCOTTUS ARMATUS
399	SCULPIN, PLAIN	MYOXOCEPHALUS JAOK
431	SCULPIN, PSYCHROLUTES PHRICTUS	PSYCHROLUTES PHRICTUS
407	SCULPIN, RED IRISH LORD	HEMILEPIDOTUS HEMILEPIDOTUS
408	SCULPIN, RIBBED	TRIGLOPS PINGELI
471	SCULPIN, ROUGHSPINE	TRIGLOPS MACELLUS
419	SCULPIN, SAILFIN	NAUTICHTHYS OCULOFASCIATUS
425	SCULPIN, SCISSORTAIL	TRIGLOPS FORFICATA
406	SCULPIN, SHORTHORN (WARTY)	MYOXOCEPHALUS SCORPIUS
416	SCULPIN, SLIM	RUDULINUS ASPRELLUS
426	SCULPIN, SPECTACLED	TRIGLOPS SCEPTICUS
401	SCULPIN, SPINYHEAD	DASYCOTTUS SETIGER
413	SCULPIN, THORNY	ICELUS SPINIGER
403	SCULPIN, THREADFIN	ICELINUS FILAMENTOSUS
428	SCULPIN, THYRISCUS ANOPLUS	THYRISCUS ANOPLUS
398	SCULPIN, WARTY	MYOXOCEPHALUS GROENLANDICUS
414	SCULPIN, YELLOW IRISH LORD	HEMILEPIDOTUS JORDANI
55	SEA ANEMONE, - UNIDENT.	ACTINIARIA
550	SEABASS, - UNIDENT.	SCIAENIDAE
41	SEA CUCUMBER - UNIDENT.	HOLOTHURIOIDEA
689	SEA DEVIL - UNIDENT.	CERATIIDAE
59	SEA MOUSE	APHRODITE ACULEATA
42	SEA ONIONS - UNIDENT.	BOLTENIA, SP
58	SEA PEN, SEA WHIP - UNIDENT.	PENNATULA
57	SEA POTATO - UNIDENT.	HALOCYNTHIA, SP.
900	SEAWEED	MISC. ITEMS
58	SEA WHIP, SEA PEN - UNIDNET.	PENNATULA
242	SEARCHER	BATHYMASTER SIGNATUS
25	SEA SLUG, - UNIDENT.	NUDIBRANCHIATA
43	SEA SQUIRTS	UROCHORDATA
56	SEA SPIDER - UNIDENT.	PYCNOGONIDA
40	SEA URCHINS	ECHINOIDEA
54	SEA WORMS - UNIDENT.	POLYCHAETA
606	SHAD, AMERICAN	ALOSA SAPIDISSIMA
752	SHANNY, ARTIC	STICHAEUS PUNCTATUS
753	SHANNY, DALBED	LUMPENUS MACULATUS
65	SHARK, - UNIDENT.	SQUALIFORMES
69	SHARK, BLUE	PRIONACE GLAUCA
68	SHARK, BROWN CAT	APRISTURUS BRUNNEUS
76	SHARK, PACIFIC SHARPNOSE	RHIZOPRIONODON LONGURIO
62	SHARK, PACIFIC SLEEPER	SOMNIOSUS PACIFICUS
67	SHARK, SALMON	LAMNA DITROPIS
72	SHARK, SIXGILL	HEXANCHUS GRISEUS
64	SHARK, SOUPFIN	GALEORHINUS ZYOPTERUS
66	SHARK, SPINY DOGFISH	SQUALUS ACANTHIAS
63	SHARK, THRESHER	ALOPIAS VULPINUS
609	SHINING TUBESHOULDER	SAGAMICHTHYS ABEI
70	SHRIMP, - UNIDENT.	
72	SHRIMP, SIDESTRIPE	PANDALOPSIS DISPAR
71	SHRIMP, SPOT	PANDALUS PLATYCEROS
90	SKATE, - UNIDENT.	RAJIFORMES
88	SKATE, ALASKA	BATHYRAJA PARMIFERA
85	SKATE, ALEUTIAN	BATHYRAJA ALEUTICA
91	SKATE, EGG CASE, - UNIDENT.	
97	SKATE, BERING	BATHYRAJA INTERRUPTA
94	SKATE, BIG	RAJA BINOCULATA
89	SKATE, BLACK (ROUGHTAIL)	BATHYRAJA TRACHURA
87	SKATE, CALIFORNIA	BATHYRAJA INCERNATA
163	SKATE, COMMANDER	BATHYRAJA LINDBERGI
92	SKATE, DEEPSEA	BATHYRAJA ABYSSICOLA
86	SKATE, FLATHEAD	BATHYRAJA ROSISPINIS
160	SKATE, GOLDEN	BATHYRAJA SMIRNOVI
95	SKATE, LONGNOSE	RAJA RHINA
161	SKATE, OKHOTSK	BATHYRAJA VIOLACEA
98	SKATE, SANDPAPER	BATHYRAJA KINCAIDI
96	SKATE, STARRY	RAJA STELLULATA
164	SKATE, WHITEBLOTCHED	BATHYRAJA MACULATA
162	SKATE, WHITEBROW	BATHYRAJA MINISPINOSA
212	SKILFISH	ERILEPIS ZONIFER
625	SLICKHEAD, THREADFIN	TALISMANIA BIFURCATA
602	SMELT, - UNIDENT.	OSMERIDAE
604	SMELT, CAPELIN	MALLOTUS VILLOSUS
601	SMELT, EULACHON (CANDLEFISH)	THALEICHTHYS PACIFICUS
612	SMELT, NIGHT	SPIRINCHUS STARKSI
605	SMELT, RAINBOW	OSMERUS MORDAX DENTEX
613	SMELT, SURF	HYPOMESUS PRETIOSUS
618	SMELT, WHITEBAIT	ALLOSMERUS ELONGATUS
619	SMOOTHTONGUE, NORTHERN	LEURCGLOSSUS STILBIUS SCHMIDTI
30	SNAIL, - UNIDENT.	GASTROPODA
500	SNAILFISH, - UNIDENT.	LIPARIDIDAE
501	SNAILFISH, BLACKTAIL	CARERPROCTUS MELANURUS
502	SNAILFISH, LIPARIS MEGACEPHALUS	LIPARIS MEGACEPHALUS
503	SNAILFISH, LIPARIS OCHOTENSIS	LIPARIS OCHOTENSIS
506	SNAILFISH, LOBEFIN	POLYPERA GREENI
505	SNAILFISH, MARBLED	LIPARIS DENNYI
504	SNAILFISH, PINK	CAREPROCTUS RASTRINUS
507	SNAILFISH, RIBBON	LIPARIS CYCLOPUS
559	SNIPE EEL, - UNIDENT.	NEMICHTHYIDAE
561	SNIPE EEL, BLACKLINE (CLOSESPINE)	AVOCETTINA INFANS

560	SNIPE EEL, SLENDER	NEMICHTHYS SCOLOPACELS
109	SOLE, BUTTER	ISOPSETTA ISOLEPIS
117	SOLE, CURLFIN	PLEURONICHTHYS DECURRENS
118	SOLE, C-O	PLEURONICHTHYS COENOSLS
110	SOLE, DEEPSEA	EMBASSICHTHYS BATHYBIUS
107	SOLE, DOVER	MICROSTOMUS PACIFICUS
108	SOLE, ENGLISH	PAROPHRYS VETULUS
103	SOLE, FLATHEAD	HIPPOGLOSSOIDES ELASSODON
116	SOLE, HYBRID	INOPSETTA ISCHYRA
108	SOLE, LEMON	PAROPHRYS VETULUS
112	SOLE, PETRALE	EOPSETTA JORDANI
105	SOLE, REX	GLYPTOCEPHALUS ZACHIRUS
104	SOLE, ROCK	LEPIDOPSETTA BILINEATA
114	SOLE, ROUGHSCALE	CLIDODERMA ASPERRIMUM
115	SOLE, SAND	PSETTICHTHYS MELANOSTICTUS
111	SOLE, SLENDER	LYOPSETTA EXILIS
140	SOLE, YELLOWFIN	LIMANDA ASPERA
26	SPONGE, - UNIDENT.	PORIFERA
270	SQUARETAIL, SMALLEYE	TETRAGONURUS CUVIERI
50	SQUID, - UNIDENT.	DECAPODA
51	SQUID, GIANT	MORONTEUTHIS ROBUSTA
20	STARFISH, - UNIDENT.	ASTEROIDEA
21	STARFISH, BASKET	GORGONOCEPHALUS
22	STARFISH, BRITTLE	OPHIUROIDEA
24	STARFISH, SUNSTAR	SOLASTER SP.
226	STEELHEAD	SALMO GAIRDNERI
230	STURGEON, - UNIDENT.	ACIPENSERIDAE
231	STURGEON, GREEN	ACIPENSER MEDIROSTRIS
205	TOMCOD, PACIFIC	MICROGADUS PROXIMUS
113	TONGUEFISH, CALIFORNIA	SYMPHURUS ATRICAUDA
807	TUBESHOULDER - UNIDENT	ALEPOCEPHALIDAE
43	TUNICATES	UROCHORDATA
143	TURBOT, - UNIDENT.	
102	TURBOT, GREENLAND (HALIBUT)	REINHARDTIUS HIPPOGLOSSOIDES
805	VIPERFISH - UNIDENT.	CHAULIODONTIDAE
806	VIPERFISH, PACIFIC	CHAULIODUS MACDONI
757	WAREHOUSE, DECORATED	CHIROLOPHIS DECORATUS
771	WEARYFISH, SCALY	SCOPELOSAURUS HARRYI
780	WOLF-EEL	ANARRHICHTHYS OCELLATUS
783	WRYMOUTH, DWARF	LYCONECTES ALEUTENSIS
760	WRYMOUTH, GIANT	DELOLEPIS GIGANTEA

FORM 3 (2)

SPECIES COMPOSITION FROM BASKET SAMPLES

Leading zeros in columns 1, 2, 10, 12 only.

* Indicates weight obtained by subtraction from total sample weight.

EXAMPLE OF DATA FROM A MOTHERSHIP

CRUISE NO. (1–3)	VESSEL CODE (4–7)	YEAR (8–9)	MO. (10–11)	DAY (12–13)
459	NM05	83	08	31

FIRST HAUL OR SAMPLE			SECOND HAUL OR SAMPLE			THIRD HAUL OR SAMPLE		
Haul No. (15–17)	No. of baskets	Time	Haul No. (20–22)	No. of baskets	Time	Haul No. (25–27)	No. of baskets	Time
1	10	1250	2	10	1500	3	10	1900

REMARKS: Landing of fish did not start until 1200 hours, because of rough sea in morning.

SPECIES	SPECIES CODE (32–34)	FIRST HAUL NUMBER (35–40)	FIRST HAUL WEIGHT (kg, 41–49)	SECOND HAUL NUMBER (50–55)	SECOND HAUL WEIGHT (kg, 56–64)	THIRD HAUL NUMBER (65–70)	THIRD HAUL WEIGHT (kg, 71–79)	TOTALS FOR THE DAY No.	TOTALS FOR THE DAY Weight	TOTALS FOR THE DAY Avg. wt. (kg)
No. of specimens and total basket weight	999	167	278.8	164	272.3	168	280.17	5041	831.27	—
Yellowfin sole	140	164	* 253.1	159	*254.39	167	* 269.4	4835	776.89	.16
Alaska plaice	106	21	16.8	19	7.1	20	6.7	60	30.6	.51
Rock sole	104			1	.2	2	.5	3	.7	.23
Greenland halibut	102					1	.3	1	.3	.3
Great sculpin	405	13	5.0	16	6.7	4	1.6	33	13.3	.40
Warty sculpin	406	1	.5					1	.5	.5
Sturgeon poacher	452	11	.7	9	.55	8	.55	28	1.8	.06
Rainbow smelt	605					1	.03	1	.03	.03
Pollock	201	7	.2	2	.05			9	.25	.028
Pacific cod	202	3	.4	1	.10	1	.08	5	.58	.116
Starfish	20	24	1.4	15	2.4	18	.5	57	4.3	.075
Hyas crab	9	1	.1					1	.1	.1
Korean horsehair crab	7	1	.15					1	.15	.15
Misc (seaweed, wood)	900	1	.45	1	.80	1	.16	3	1.41	.47
Longhead dab	144					2	.35	2	.35	.175
Shrimp	70			1	.01			1	.01	.01

EXAMPLE OF DATA FROM A LONGLINE VESSEL

FORM 3L (2)

SPECIES COMPOSITION FROM BASKET SAMPLES ON LONGLINERS

Leading zeros in columns 1, 2, 10, 12 only.

* Indicates weight obtained by subtraction from total sample weight.

CRUISE NO. (1–3)	VESSEL CODE (4–7)	YEAR (8–9)	MO. (10–11)	DAY (12–13)
475	NL06	83	10	20

REMARKS: SEALIONS WERE PRESELECTING SABLEFISH IN FIRST SAMPLE. BREAKS OCCURED DURING THE 2ND & 3RD SAMPLES

FIRST SAMPLE					SECOND SAMPLE					THIRD SAMPLE				
Set No. (15)	Sample No. (16–17)	No. of hachi (18–19)	Time		Set No. (20)	Sample No. (21–22)	No. of hachi (23–24)	Time		Set No. (25)	Sample No. (26–27)	No. of hachi (28–29)	Time	
1	1	40	0845	No. of baskets = 5	1	2	35	1430	No. of baskets = 8	1	3	50	1820	No. of baskets = 4

SPECIES	SPECIES CODE (32–34)	NUMBER (35–40)	WEIGHT (in kg with decimal pt.) (41–49)	NUMBER (50–55)	WEIGHT (in kg with decimal pt.) (56–64)	NUMBER (65–70)	WEIGHT (in kg with decimal pt.) (71–79)	TOTALS FOR THE DAY No.	Weight	Avg. wt. (kg)
No. of specimens and total basket weight	999	443	1431.09	488	1303.33	808	2097.45	1739	4831.87	
SABLEFISH	203	214	778.96	221	640.9			435	1419.86	3.26
SHORTSPINE THORNYHD	350	36	40.6	10	6.3	56	52.5	102	99.4	.97
PECTORAL RATTAIL	82	181	579.2	227	590.2			408	1169.4	2.87
UNIDENT. SKATE	90	6	14.8					6	14.8	2.47
PACIFIC HALIBUT	101	6	17.53	17	48.03	12	33.55	35	99.11	2.83
RED KING CRAB	13			1	1.2	2	6.48	3	7.68	2.56
ROUGHSCALE RATTAIL	81			5	5.0			5	5.0	5.00
SHORTRAKER ROCKFISH	326			7	11.7			7	11.7	1.67
GREENLAND TURBOT	102					675	1858.4	675	1858.4	2.75
WALLEYE POLLOCK	201					35	108.5	35	108.5	3.10
GOLDEN KING CRAB	8					1	1.02	1	1.02	1.02
ARROWTOOTH FLOUNDER	141					27	37.0	27	37.0	1.37

*1 47 SABLEFISH = 150.4 kg
avg = 3.64 kg
*1 38 P. RATTAILS = 138.3 kg
avg = 3.20 kg

*2 51 SABLEFISH = 147.9 kg
AVG = 2.90
*2 33 P. RATTAILS = 85.8
avg = 2.60 kg

*3 62 COD = 167.4 kg
avg = 2.70 kg

GPO 989-454

Incidence of Crab, Halibut and Salmon - Forms 3(1) and 3(1)L

General instructions for all vessel types

This form must be filled out for every vessel type, even for hake vessels and longliners.

1. The species name and code for king crab, Tanner crab, Pacific halibut, and salmon (total of all species) are already entered. Note the use of the combined codes--red, blue, golden, and *Lithodes couesi* king crab are lumped as species code 2, the Tanner crabs *Chionoecetes opilio*, *C. bairdi*, *C. angulatus*, and *C. tanneri* are designated code 3, and all species of salmon are given the code 220. These combined codes should be used for *incidence* data only; on all other forms the codes for the particular species should be used.

2. Steelhead, if seen during the cruise, should be recorded on a lower line with code 226 as shown on the example form. The code and sample weight for steelhead should be recorded on each page of the form 3(1)'s of the cruise in which steelhead were seen.

3. King crab, Tanner crab, halibut, salmon, and steelhead are the only species that should be recorded on this side of Form 3 unless instructed otherwise.

4. Data for the first, second, and third sampling periods should always be in the same species order for a given page as the codes are entered only once.

5. Calculate the catch sampled by the methods outlined earlier for each sample period observed and enter under sample weight. The weight of the basket samples should be included in the sample weight since that weight was also examined for incidence.

6. The sample weight must always be entered for all species, even, for example, if no Tanner or king crab are seen during the whole cruise.

7. The sample weight may not always be the same for each species in a *particular sampling period (see third sample, example Form 3)*. In some cases, for example, Tanner crabs may be too numerous to count accurately in a conveyor belt, so some other method such as additional basket sampling may be used just to get the incidence of crabs. If a different sample weight is used, or for some reason a species was not monitored, note this on a non-keypunched part of the form. (See example.)

8. Record under "number observed" all of the incidentals seen in the sample weight. Include here any that were found when basket sampling for species composition during the same haul or sampling period.

FORM 3 (I) INCIDENCE OF CRAB, HALIBUT AND SALMON

CRUISE NO.			VESSEL CODE				YEAR		MO.		DAY		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
4	5	9	N	M	0	5	8	3	0	8	3	1	1

page 1 of ____

*A = ACTUAL DATA OBTAINED BY WEIGHING OR MEASURING E = ESTIMATED WEIGHT

FIRST HAUL OR SAMPLE *Mothership Example*

SPECIES	SPECIES CODE 17	18	19	HAUL NUMBER 20	21	22	SAMPLE WEIGHT (MT) 23	24	25	26	NUMBER OBSERVED 28	29	30	31	NO. EST. OR WEIGHED 32	33	TOTAL WEIGHT (KG) 35	36	37	38	39	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT	VIABILITY NO. OBSERVED	VIABILITY NO. ALIVE
KING CRAB			2			1			2	8																	
TANNER CRAB			3						2	8																	
PACIFIC HALIBUT	1	0	1						2	8																	
SALMON	2	2	0						2	8																	

SECOND HAUL OR SAMPLE

SPECIES	40	41	42	43	44	45	46	48	49	50	51	52	53	55	56	57	58	59	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT	VIABILITY NO. OBSERVED	VIABILITY NO. ALIVE
KING CRAB			2	1	5	3	8				4		4			3	4	0	.85	A	4	3.40		
TANNER CRAB				1	5	3	8			4	0	3	8			6	1	0	.16	A	38	6.10		
PACIFIC HALIBUT				1	5	3	8			1	0	1	0		2	0	3	0	2.03	A	9	18.3		
																				E	1	2.0		
SALMON				1	5	3	8																	

THIRD HAUL OR SAMPLE

SPECIES	60	61	62	63	64	65	66	68	69	70	71	72	73	75	76	77	78	79	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT	VIABILITY NO. OBSERVED	VIABILITY NO. ALIVE
KING CRAB			3	2	0	0	0				1		1				8	0	.80	A	1	.80		
TANNER CRAB				1	0	0	0		2	3	7	9	9		1	7	8	4 *	.18	A	237	42.71		
PACIFIC HALIBUT				2	0	0	0				1		1			8	1	3	8.13	A	1	8.13		
SALMON				2	0	0	0																	

* SUBSAMPLED FOR TANNER CRABS

FORM 3(1) INCIDENCE OF CRAB, HALIBUT AND SALMON

CRUISE NO.	VESSEL CODE	YEAR	MO.	DAY
1 2 3	4 5 6 7	8 9	10 11	12 13 14
5 3 0	N S 7 8	8 3	0 9	1 0 1

page 2 of ____

FIRST HAUL OR SAMPLE STERN TRAWLER EXAMPLE

*A=ACTUAL DATA OBTAINED BY WEIGHING OR MEASURING E=ESTIMATED WEIGHT

SPECIES	SPECIES CODE (17 18 19)	HAUL NUMBER (20 21 22)	SAMPLE WEIGHT (MT) (23 24 25 26)	NUMBER OBSERVED (28 29 30 31)	NO. EST. OR WEIGHED (32 33)	TOTAL WEIGHT (KG) (35 36 37 38 39)	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT	VIABILITY NO. OBSERVED	VIABILITY NO. ALIVE
KING CRAB	2	1 0 1	1 6.0 0									
TANNER CRAB	3		1 6.0 0	1 6 0	9 9	1 5 6.5	.16	A	160	25.3		
PACIFIC HALIBUT	1 0 1		1 6.0 0	2	2	6.2 0	3.10	A	1	4.0		
								E	1	2.2		
SALMON	2 2 0		1 6.0 0	3	3	5.4 8	1.83	A	3	5.48		
STEELHEAD	2 2 6		1 6.0 0									

SECOND HAUL OR SAMPLE

SPECIES	HAUL NUMBER (40 41 42)	SAMPLE WEIGHT (MT) (43 44 45 46)	NUMBER OBSERVED (48 49 50 51)	NO. EST. OR WEIGHED (52 53)	TOTAL WEIGHT (KG) (55 56 57 58 59)	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT	VIABILITY NO. OBSERVED	VIABILITY NO. ALIVE
KING CRAB	1 0 3	2 0.0 0									
TANNER CRAB		2 0.0 0									
PACIFIC HALIBUT		2 0.0 0	1	1	5.0 0	5.00	A	1	5.0		
SALMON		2 0.0 0									
		2 0.0 0									

THIRD HAUL OR SAMPLE

*Subsampled for TANNER CRABS

SPECIES	HAUL NUMBER (60 61 62)	SAMPLE WEIGHT (MT) (63 64 65 66)	NUMBER OBSERVED (68 69 70 71)	NO. EST. OR WEIGHED (72 73)	TOTAL WEIGHT (KG) (75 76 77 78 79)	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT	VIABILITY NO. OBSERVED	VIABILITY NO. ALIVE
KING CRAB	1 0 4	1 2.0 0									
TANNER CRAB		3.0 0	1 1 6	9 9	1 7.8 2	* .18	A	116	20.88		
PACIFIC HALIBUT		1 2.0 0	1 1	1 1	7 1 2.0	6.47	A	9	60.7		
							E	2	10.5		
SALMON		1 2.0 0	4	3	1 3 1 7	4.39	A	3	13.17		
		1 2.0 0	1	1	1.2 0	1.20	A	1	1.20		

FORM 3L (1) INCIDENCE OF CRAB, HALIBUT, AND SALMON ON LONGLINERS

Cruise No. (1–3)	Vessel Code (4–7)	Date YEAR (8–9)	MO. (10–11)	DAY (12–13)	(14)
4 7 5	N L 0 6	8 3	1 0	2 0	1

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*A = Actual data obtained by weighing or measuring
E = Estimated weight

LONGLINER EXAMPLE

FIRST SAMPLE

SPECIES	SPECIES CODE (17–19)	Set No. (20–21)	Sample Number (22)	SAMPLE WEIGHT (MT) (23–26)	No. Hachi (27–29)	No. Observ (30–31)	No. Est or Weigh (32–33)	TOTAL WEIGHT (KG) (35–39)	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT
KING CRAB	2	1	1	1.43	40							
TANNER CRAB	3			1.43	40							
PACIFIC HALIBUT	101			1.43	40	6	6	1753	2.92	A	6	17.53
SALMON	220			1.43	40							

SECOND SAMPLE

SPECIES	Set No. (40–41)	Sample Number (42)	SAMPLE WEIGHT (MT) (44–46)	No. Hachi (47–49)	No. Observ (50–51)	No. Est or Weigh (52–53)	TOTAL WEIGHT (KG) (55–59)	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT
KING CRAB	1	2	1.30	35	1	1	120	1.20	A	1	1.20
TANNER CRAB			1.30	35							
PACIFIC HALIBUT			1.30	35	17	16	4520	2.83	A	14	39.2
									E	2	6.0
SALMON			1.30	35							

THIRD SAMPLE

SPECIES	Set No. (60–61)	Sample Number (62)	SAMPLE WEIGHT (MT) (64–66)	No. Hachi (67–69)	No. Observ (70–71)	No. Est or Weigh (72–73)	TOTAL WEIGHT (KG) (75–79)	AVG. WEIGHT	A/E*	NO.	TOTAL WEIGHT
KING CRAB	1	3	2.10	50	3	3	750	2.50	A	3	7.50
TANNER CRAB			2.10	50							
PACIFIC HALIBUT			2.10	50	12	12	3355	2.80	A	12	33.55
SALMON			2.10	50							

9. If no members of a particular incidental species are observed during a given sampling period, leave the "number observed" column blank rather than entering a zero.

10. If you make a real attempt to weigh or measure all of the incidental species observed, the number in the "number estimated or weighed" column will equal the figure in the "number observed" column.

    If, however, an individual is thrown overboard before it can be weighed, enter an estimate of the weight in the "total weight" column; include the number in "number est. or weighed" column; and on the right side of the form, enter the estimated weight, the number estimated, and label the estimated data "E."

    If you cannot estimate the weight, then the average weight of the ones that were weighed will be applied by the computer to the ones you could not weigh.

    If you were unable to weigh <u>any</u> of that particular species for a given sampling period, then the average weight of that species from a previous haul will have to be used, which is less than ideal--thus, an observer estimate of an unweighed specimen is much preferred.

11. Data on fish or crabs that are actually weighed should be labeled with an "A" on the right-hand side of the form. If large halibut are measured but not weighed, get the weight from the length-weight table for halibut in the Appendix and include it in the "total weight" column. Since the table is quite accurate for statistical averages, tabulate data obtained in this way as if the halibut had actually been weighed. (Weigh the halibut whenever possible, however).

12. At times, the numbers of incidentals may be too large to make weighing and measuring all of them practical (this usually occurs only with Tanner crabs). If this happens, take a subsample, but make sure that the subsample is representative of the total number.

13. If more than 99 individuals of a species are weighed from a given sampling period, there is a minor difficulty in recording it on the form. On the right-hand side of the form, record the total number and weight of the individuals that were actually weighed, then calculate and record the average weight. Enter the number "99" in "no. est. or weighed;" multiply 99 x the average weight and enter that weight in the "total weight" column. (This cannot be done on form 3(1)L.)

14. There should be leading zeros in the cruise number, month, and day <u>only</u> (columns 1, 2, 10, 12, as needed). No zeros in number observed--if nothing is observed, leave it blank, but fill in the sample weight. Places behind the decimal point in sample weight and total weight <u>should</u> be filled in.

<u>Recording incidence data on longliners</u>

1. Incidence on longliners should be reported in much the same way as on other vessels--so refer to those directions and to the example form.

2. Record the set number in columns 20, 40, and 60 and sample number in columns 22, 42, and 62.

3. Record the number of hachi sampled for each sampling period in the appropriate column.

FORM 4 - SPECIES COMPOSITION OF SALMON, KING CRAB, TANNER CRAB; VIABILITY OF HALIBUT

Part of Form 4 is used for recording the number of individuals and weight by species and sex for salmon, steelhead, king crab, and Tanner crab collected from the incidence sample or a random sample of the incidence sample. (See "Biological Data Collected from Prohibited Species.") Other portions of Form 4 are used in recording the data used in calculating the viability of halibut.

1. Fill in the cruise number (when known), vessel code, and date; start each day's data on a new side.

2. On stern trawlers, record the haul number in columns 14-16; on longliners, record the set in column 14 and the sample number in column 16; on mothership record the sample number in column 16. Sample numbers should correspond to the incidence sample from which the prohibited species were collected.

3. Enter the name and the corresponding code (from the species code list) of the particular species. Do not group species on this form.

4. Record all those weighed for each species by sex, code "M" for male and "F" for female. Record a "U" for unknown sex only for salmon, and only when the salmon were alive or the sex could not be determined. Include only individuals which you actually weighed--do not include estimated weights.

5. Enter the number of individuals of each sex for each species and the corresponding total weight of those individuals. Halibut numbers and weights do not have to be entered in columns 23-34 since there is only one species, the sex of the halibut no longer has to be determined, and the weight and numbers are recorded elsewhere.

6. All weights placed in columns 26-34 should have a well-defined decimal point as the decimal point itself will be keypunched and must be present even if the weights are not carried to a tenth or hundredth of a kilogram (see the Form 4 example). Do not carry weights to three decimal places on this form.

7. When recording halibut viability data, make certain to record the haul/set sample number and the species name and code. (As explained in item #5, one should not enter the sex, number of individuals or total weight of halibut.)

8. Under the heading "Halibut Condition," record the number of halibut judged to be in each category. For the definition of "excellent," "poor," and "dead" conditions, please refer to the table in the section "Biological Data Collected from Prohibited Species." The sum of the numbers recorded in those three categories should be the total number of halibut examined for viability.

9. If you recorded halibut condition, enter the "Probability of Sea Lion Predation" in the same line. Enter either a 1, 2, or 3 in column 44, depending on whether there was no predation, moderate predation, or high predation. Determination of the degree of predation should be based on the number of sea lions you believed to be present at the time of the release of the halibut in the viability sample. No predation (code 1) means no sea lions were observed; moderate predation (code 2) means one to three sea lions were present; and high (code 3) means that four or more sea lions were swimming around the ship. Do not record "probability of sea lion predation" for any species other than halibut.

10. Skip a line after recording the data for any one haul/set-sample.

11. Leading zeros should appear in the cruise number, month, and day only (columns 1, 2, 10, and 12 only, as needed). No leading zeros in haul number, species code, number, weight, or halibut viability data.

Form 4 – SPECIES COMPOSITION OF SALMON, KING CRAB, TANNER CRAB; VIABILITY OF HALIBUT

Page 2 of ____

Cruise No.			Vessel code				Date					
							Year		Mo.		Day	
1	2	3	4	5	6	7	8	9	10	11	12	13
5	3	0	N	S	7	8	8	3	0	9	1	0

1. Record all individuals from form 3(1) or a random subsample.
2. Leading zeros in columns 1,2,10 and 12 only as needed.
3. Sex: male = M; female = F; unknown = U.
4. Probability of predation; none (0 sea lions) = 1; moderate (1-3) = 2; high (≥4) = 3.
5. Skip a line after each haul/set sample.

Keypunchers: right-adjust all columns.

Set	Haul or sample number		Species Name	Species code	Sex	No. of indiv.	Total weight with decimal point	Halibut condition: Number excellent	Halibut condition: Number poor	Halibut condition: Number dead	Probability of sea lion predation
14	15	16		19 20 21	22	23 24 25	26–34	35 36 37	38 39 40	41 42 43	44
1	0	1	OPILIO TANNER CRAB	5	M	3	.43				
			" " "	5	F	1	.17				
			BAIRDI TANNER CRAB	4	M	71	12.07				
			" " "	4	F	85	12.63				
			PACIFIC HALIBUT	101				2			1
			KING SALMON	222	M	1	1.62				
			" "	222	F	1	2.1				
1	0	1	" "	222	U	1	1.76				
1	0	3	PACIFIC HALIBUT	101						1	3
1	0	4	OPILIO TANNER CRAB	5	M	8	1.4				
			" " "	5	F	8	1.65				
			BAIRDI TANNER CRAB	4	M	53	7.23				
			" " "	4	F	44	10.6				
			PACIFIC HALIBUT	101				4	3	2	2
			KING SALMON	222	F	3	13.17				
1	0	4	STEELHEAD	226	M	1	1.2				

FORM 7--LENGTH FREQUENCY OF MEASURED SPECIES

Form 7 is used for recording the data collected on the plastic measuring strips (primary and secondary species) and from other plastic forms (crab, halibut, and salmon caught incidentally).

1. Fill in the cruise number (when known), vessel code, and date; start each day's measurements on a new side.

2. Under species name, record the specific common name and the related species code from the same alphabetical code list as used for Form 3.

3. On stern trawlers, record the haul number in columns 17-19; on long-liners, record the set number only in column 17 (the sample number is not needed); and on motherships, leave columns 17-19 blank.

4. Record all those observed for each species by sex, coded "M" for male, "F" for female, and, if no sex is determined or the immaturity of the species makes sex identification impossible, code "U" for unknown.

5. The size group is the length measurement in centimeters for fish and to the nearest 5 millimeters for crab (1-5 mm = 3; 6-0 mm = 8). Record the size groupings in the shaded columns.

6. The frequency is the number observed in each size group. Include a size group only if there is a frequency of one or more. Record sequential data horizontally across the form.

7. Start a new row each time there is a change in sex, set/haul number, or species, or when there are more than 7 size groups in a grouping.

8. Sum the frequencies in each row and enter in the column "no. of individ(uals) in row."

9. Calculate the "sum of lengths in row" by multiplying each frequency times the appropriate size group and summing the products.

10. Note that more than one species can be recorded per page as long as each species is identified by name and code. Skip a line between species unless it means going to a new page.

11. Note that more than one haul can be recorded per sheet as long as the hauls all ended on the date written at the top of the page. Start each day's measurements on a new side.

12. Leading zeros should appear in the cruise number, month, and day only (columns 1, 2, 10, and 12 only, as needed). No leading zeros in species code, haul number, size, or frequency.

Cruise No.	Vessel Code	Date		
		Year	Mo.	Day
1 2 3	4 5 6 7	8 9	10 11	12 13
530	NS78	83	09	10

FORM 7—LENGTH FREQUENCY OF MEASURED SPECIES

(Includes halibut, salmon, and crab measurements)

NOTE:
1. Leading zeros in columns 1, 2, 10, and 12 only—as needed.
2. For motherships—*leave columns 17-19 blank*. For longliners—enter set no. in column 17.
3. Start a new row each time when entering data from a different sex, species, or haul.
4. Skip lines between species when space permits.
5. Start each day's measurements on a new side.

Page 2 of ____

M = male
F = female
U = unknown sex

Size groups: Fish by 1 cm.
Crabs by 5 mm
(1–5 = 3; 6–0 = 8)

Species Name	Species Code	Set/haul No.	Sex	No. of individ. in row	Sum of lengths in row	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.
	14-16	17 18 19	20	21-23	24-29	30-32	33-35	36-38	39-41	42-44	45-47	48-50	51-53	54-56	57-59	60-62	63-65	66-68	69-71
POLLOCK	201	101	M	15	523	32	1	33	2	34	5	35	2	36	2	37	2	39	1
			M	3	126	40	1	42	1	44	1								
			F	35	1265	33	4	34	9	35	12	37	4	38	1	43	2	45	3
POLLOCK	201		F	1	47	47	1												
C. opilio	5		M	3	244	73	1	83	1	88	1								
C. opilio	5		F	1	78	78	1												
C. bairdi	4		M	35	2415	48	1	53	1	58	3	63	4	68	10	73	8	78	8
			M	16	1448	83	6	88	3	93	4	98	1	103	1	113	1		
			F	40	2765	43	1	48	2	58	1	63	6	68	9	73	12	78	9
C. bairdi	4		F	23	2079	83	8	88	4	93	7	98	1	103	2	108	1		
HALIBUT	101		U	1	54	54	1												
KING SALMON	222		M	1	38	38	1												
	222		F	1	43	43	1												
KING SALMON	222	101	U	1	40	40	1												
POLLOCK	201	103	M	19	699	30	1	33	2	35	3	36	7	39	2	41	3	45	1
POLLOCK	201	103	F	14	487	32	5	33	2	36	3	37	1	38	2	40	1		
HALIBUT	101	103	U	1	76	76	1												
POLLOCK	201	104	M	43	1778	38	1	39	1	40	12	41	11	42	8	43	6	44	4
			M	3	135	45	3												
			F	27	1159	37	1	40	2	41	7	42	4	44	4	45	7	48	2
POLLOCK	201		F	2	104	50	1	54	1										
STEELHEAD	226	104	M	1	36	36	1												

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Cruise No.	Vessel Code	Date		
		Year	Mo.	Day
1 2 3	4 5 6 7	8 9	10 11	12 13
530	NS78	83	09	10

FORM 7—LENGTH FREQUENCY OF MEASURED SPECIES

(Includes halibut, salmon, and crab measurements)

NOTE:
1. Leading zeros in columns 1, 2, 10, and 12 only—as needed.
2. For motherships—leave columns 17-19 blank. For longliners—enter set no. in column 17.
3. Start a new row each time when entering data from a different sex, species, or haul.
4. Skip lines between species when space permits.
5. Start each day's measurements on a new side.

Page 3 of ____

M = male
F = female
U = unknown sex
Size groups: Fish by 1 cm.
Crabs by 5 mm
(1–5 = 3; 6–0 = 8)

Species Name	Species Code	Set/haul No.	Sex	No. of individ. in row	Sum of lengths in row	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.
	14-16	17 18 19	20	21-23	24-29	30-32	33-35	36-38	39-41	42-44	45-47	48-50	51-53	54-56	57-59	60-62	63-65	66-68	69-71
KING SALMON	222	104	F	3	145	47	1	49	2										
HALIBUT	101		U	9	698	47	1	51	1	68	2	83	1	91	2	92	1	107	1
C. opilio	5		M	8	314	23	1	33	2	38	2	48	2	53	1				
C. opilio	5		F	8	324	33	2	38	3	43	1	48	1	53	1				
C. bairdi	4		M	20	1059	38	1	43	1	48	1	53	2	58	5	63	2	68	6
			M	28	2454	73	4	78	3	83	4	88	6	93	4	98	5	103	2
			M	5	575	108	1	113	1	118	3								
			F	39	2722	43	4	53	8	68	4	73	7	78	4	83	5	88	7
C. bairdi	4	104	F	5	490	93	2	98	1	103	2								

GPO 989-455

13. To indicate the repetition of a number or letter, such as species code, haul, or sex, draw brackets and arrows as shown in example form.

14. Caution: Hand-selected fish (from your otolith or scale collection) should not be recorded on form 7.

*Special note for mothership and longliner observers: Since this form does not require data by sampling period (only by day for motherships, or by set for longliners), data for the different sampling periods should be combined. The easiest way to do this is to use one set of measuring strips for the whole day (or set), tabulating it only at the end of the day. Care must be taken to insure that the data are not scrubbed from the plastic forms between samples.

FORM 8 - PRODUCT RECOVERY RATES

This form is to be filled out if you are able to obtain the product recovery rates that the ship personnel are using, or have time to obtain your own product recovery rates (see "Obtaining Information on Factory Recovery Rates" in the Sampling Section):

A recovery rate represents the proportion of the organism that is used in the factory products. Recovery rates are commonly expressed as a percent or as a ratio. Fish frozen whole would have a recovery ratio of 1.00 to 1, or 100% recovery, while headed and gutted cod may have a recovery ratio of .62 to 1, or 62% recovery.

A conversion factor is a number which can be multiplied times the product weight to obtain the round weight (whole weight of the fish). A conversion factor is always greater than 1 (for example, the conversion factor of surimi weight to pollock weight may be 4.5). If you are given a conversion factor, divide the number 1 by the conversion factor to obtain the recovery ratio.

Additional points to note:

1. Enter the year and month in which the information was obtained and for which the data applied. The figures provided by the vessel personnel may be used all year, but enter only the month that you were aboard. If you were aboard the same ship for 2 or more months, enter the ship's data only once for one of those months. If you also gather your own recovery data, enter the information for the month in which it was collected.

2. Likewise, enter the code for the area in which you collected your own recovery data and the area for which the vessel data applies. Use the same two digit code for the area designation as for the radio messages

(see the map in the "Instructions for Weekly Radio Message"). If you know, however, that the ship's officers use the same recovery figures for fish caught in every area of a region (Bering Sea, Gulf of Alaska, or W-O-C coast) use the regional code. (See "Codes for Product Recovery Form 8".) Use the code for the smaller areas for any recovery data you determine, and for ship data which may be applied to fish of one area only.

3. Use a separate sheet for each area, month, or vessel reported.

4. Write the name of the species or species group which is processed and its appropriate code from the species code list. Observer-determined recovery data should be listed by each particular species, but figures supplied by vessel personnel are often applied to a group of species. "Unidentified fish" (code 901) may be used for the categories of fish and fish waste turned into fish meal and fish oil. Other possibly useful codes are flatfish unidentified (code 100), turbot unidentified (143), roundfish unidentified (200), and rockfish unidentified (300).

5. Describe the product and enter the matching product code (see "Codes used for Product Recovery Form 8"). If in doubt of the appropriate code, draw a picture. Record only those products which were actually produced while you were aboard.

6. Indicate in column 19 whether the product was primarily prepared by machine (M) (includes rotary saw) or by cutting by hand (H).

7. Enter, to 2 decimal places, the recovery ratio that was used. If you are given a range of recovery figures used for fish or varying sizes, enter the data twice, once for the lowest figure and once for the highest figure. Use "Example Form 8" as a guide.

8. The unit weight asked for in columns 24-27 and 32-35 is the weight of processed fish (before freezing) in a block of frozen fish, a bag of surimi, or a sack of fish meal. The unit weight is not the weight of a box containing 2 or more blocks of fish, but the weight of the fish making up one of those blocks.

9. Columns 20-27 ask for data obtained from ship personnel and columns 28-35 are for data determined by the observer. The unit weight obtained by the observer should be the average of weighing no less than 10 random samples of each particular unit type.

10. At the bottom of the form there is room for comments. Appropriate comments would include the sample size used for product recovery or unit weight determined by the observer and comments about the data collected from vessel personnel.

FORM 8 PRODUCT RECOVERY RATES

Page 1 of 1

Cruise Number (1–3)	Vessel Code (4–7)	Year (8–9)	Month (10–11)	Area (12–13)
5 3 2	N S 5 4	8 4	0 7	5 2

Species Name	Species Code (14–16)	Description of Product	Product Code (17–18)	H/M (19)	Vessel Data: Percent Recovery (20–22)	Vessel Data: Unit wt. to .1 kg (24–27)	Observer Data: Percent Recovery (28–30)	Observer Data: Unit wt. to .1 kg (32–35)
Pollock	2 0 1	Surimi	36	M	.25	10.0	.	.
		"	36	M	.34	10.0	.	.
(large fish)		dorsal fillets	30	H	.65	15.0	.	.
Pollock (large fish	2 0 1	skinless fillets	32	H	.40	.	.	.
Pacific Cod	2 0 2	headed + gutted	13	M	.50	.	.54	15.4
		" "	13	M	.60	.	.60	.
Pacific Cod	2 0 2	fillet-skin on one side	31	H	.43	.	.	.
Pacific Ocean Perch	3 0 1	headed + gutted	13		.60	.	.	.
Harlequin Rockfish	3 2 3	" "			.62	.	.65	.
Sharpchin Rockfish	3 0 4	" "			.62	.	.	.
Other Rockfish	3 0 0	" "	13		.60	.	.	.
Sablefish	2 0 3	headed + gutted with pect. girdle	15	H	.70	.	.70	14.8
Atka Mackerel	2 0 4	frozen whole	10	H	1.00	.	.	.
Greenland Turbot	1 0 2	headed + gutted	13	H	.55	.	.59	15.1
Flathead Sole	1 0 3	frozen whole	10	H	1.00	.	.	.
Other flatfish	1 0 0	headed + gutted	13	H	.70	.	.	.
Octopus	6 0	gutted	51		.80	.	.	.
Squid	5 0	mantles	52		.50	.	.	.
"	5 0	tentacles	53		.30		.	.
All skates	9 0	skate wings	26	H	.30	15.0	.42	.
All other fish + waste	9 0 1	fish meal	40	M	.20	20.0	.	.
All other fish + waste	9 0 1	fish oil	41	M	.05	.	.	.
					.	.	.	.
					.	.	.	.
					.	.	.	.
					.	.	.	.
					.	.	.	.
					.	.	.	.
					.	.	.	.
					.	.	.	.
					.	.	.	.

Comments: The ship provided a range of figures for surimi and headed, gutted Pacific Cod, so only the high and low values are entered here. A rotary saw was sometimes used for heading the turbot as well as the cod, but cutting by hand was more common. Observer recovery figures were based on approx. 70 kg of each species (whole wt) and the unit weight was based on 15 trays of each species.

Codes Used for Product Recovery Form 8

Area Codes (Column 12-13)

Regional Codes		Smaller Areas (refer to map)
Bering Sea/Aleutian Is.	= 50	Bering Areas 51 - 54
Gulf of Alaska	= 60	Gulf of Alaska 61 - 67
Wash-Oregon-Calif. Coast	= 70	Wash-Oregon-Calif. Coast 71 - 73

Product Codes (Column 17-18)

10 Whole fish
5 Fish with roe removed only
11 Gutted only
19 Headed (but not gutted)
12 Headed and tail removed
7 Pre-dressed - gutted, only part of head removed by diagonal cut (P. Cod specialty product)

13 Headed and gutted
17 Headed and gutted, stomachs included
18 Headed and gutted, roe included
15 Headed and gutted, pectoral girdle included
16 Headed and gutted, pectoral girdle and roe included
14 Headed and gutted, tail removed
9 Headed and gutted, tail removed, roe included
4 Headed and gutted, tail and skin removed
28 Headed and gutted, skinned; tail and fins removed
8 Headed and gutted, fins clipped by scissors (tail on)
6 Headed and gutted, fins clipped, tail removed (Tooshka - a Soviet product)
30 Dorsal fillets - the head and guts have been removed by a long diagonal cut, leaving the upper portion of the body, most of the backbone, and the posterior ventral portions (see sketch)
35 Otoshimi - type of minced fish flesh used for breaded fish sticks; also a component of surimi
36 Surimi - a product made from minced fish flesh mixed with sugar, polyphosphate, and other ingredients
37 Kirimi - (steaks) vertical slices made from headed and gutted fish (usually for yellowfin sole); (see sketch)
38 Caudal peduncle - caudal fin removed (usually for yellowfin sole); (see sketch)
34 Punched section - body section stamped out by means of a punching machine (usually for yellowfin sole on the Kashima)

20 Heads
3 Cheeks - (usually of turbots)
21 Pectoral girdle - a section of the throat and pectoral girdle
22 Livers
23 Stomachs
24 Ovaries - roe
25 Testes - milt
40 Fish meal
41 Fish oil
42 Bone meal
32 Skinless fillets
29 Skinless fillets, ribbed section removed (see sketch)
33 Deribbed skinless fillets - (ribs lifted out - flesh not removed)
31 Fillets with skin on one side
39 Deribbed fillet with skin on one side
43 Butterfly fillet - dorsal fillet with backbone and tail removed (see sketch)

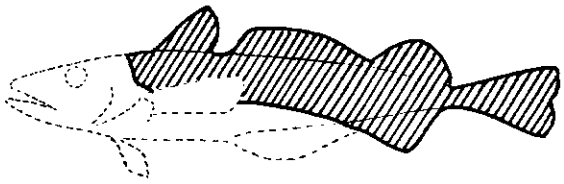
Codes Used for Product Recovery Form 8 (continued)

26 Skate wings
27 Skate - tips of wings, nose and tail removed

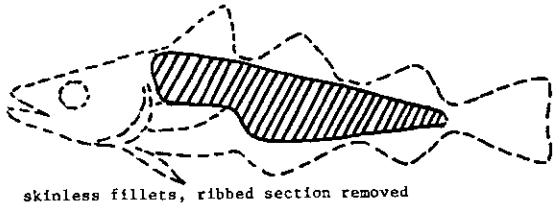
50 Whole squid or octopus
51 Gutted squid or octopus, beak removed
52 Head or mantle of octopus or squid
53 Arms or tentacles of octopus or squid
54 Skinned squid or octopus

Processing Codes (H/M) - (Column 19)

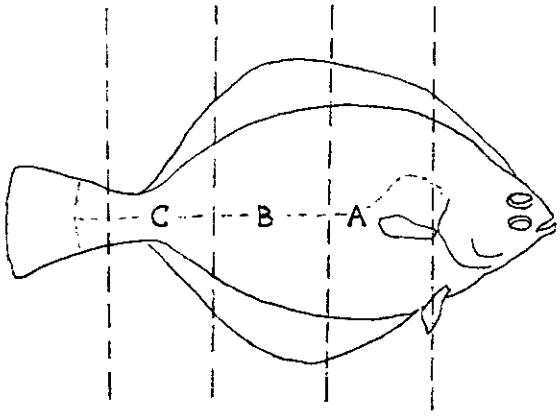
H Product was primarily processed using hand labor (cutting or filleting by hand)
M Product was primarily processed by machinery (includes cutting with a rotary saw)



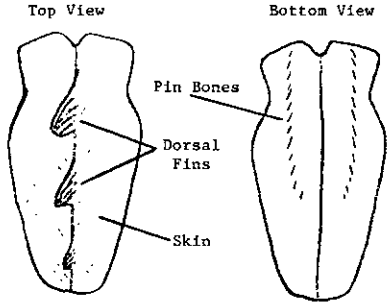
dorsal fillet from Pacific hake



skinless fillets, ribbed section removed



Kirimi steaks (A & B) and caudal peduncle (C) cut from yellowfin sole.



Butterfly fillet from pollock (backbone, tail and pectoral girdle removed)

FORM 9 - LIST OF OTOLITHS OR SCALES

Form 9 is used for recording the data on the stratified otolith or scale collections of the primary and secondary species you were instructed to take, plus data on scales of salmon caught incidentally.

1. Otolith and scale data sheets are filed separately by species and cruise. To make sure that you don't record flathead sole on the reverse side of a pollock sheet, keep separate groups of pages for each species. Start with page 1 for each new species.

2. At the top of the form, write the number of the area corresponding to the catches on the sheet. (Refer to the map in the radio message section.)

3. Circle "otoliths" or "scales" in the title of the form to indicate which structures were taken.

4. Fill out the vessel name, observer name, and species common name on each sheet. These data forms are duplicated, separated, given to different otolith/scale readers, and eventually filed and used by various groups at NWAFC. The different users cannot always be provided with current cruise number and vessel code lists.

5. Fill in the cruise number (when known), vessel code, species code, and date; start each day's measurements on a new side.

6. On stern trawlers record the haul number in columns 26-28; on longliners, record the <u>set</u> number only in column 26 (the sample number is not needed); and on motherships, leave columns 26-28 blank.

7. The otolith or scale number is the identifying number on the vial or scale envelope. There should not be any duplicate otolith or scale numbers within a species. The otolith/scale numbers should also be listed in sequential order, which should be the case if the sampling directions were followed. (We want to avoid having vials filled at random.)

8. It is also best if the otoliths are removed by sex group and recorded in the same fashion (see example form).

9. Record the sex of the fish using "M," "F," and "U" notation; not ♂ and ♀.

10. Record the length of the fish to the nearest cm--no decimal places.

11. The weight is to be filled out to two decimal places.

12. If the otoliths collected were from a fish not found among the fish used for length frequency, there should be a "hand selected" notation made next to the entry on the plastic sheet, and a "2" entered in column 60 ("special handling") on Form 9. In most cases, you will be taking scales from every salmon you see while incidence sampling, and you will be recording the lengths on Form 7, so it is seldom necessary to use a "2" in column 60 for salmon.

FORM 9 LIST OF OTOLITHS OR SCALES (CIRCLE ONE)

PAGE 2 OF 28

AREA 52

CRUISE NO.	VESSEL CODE	SPECIES CODE	DATE YEAR	DATE MO	DATE DAY
1 2 3	4 5 6 7	8 9 10	11 12	13 14	15 16
083	0521	201	83	05	15

VESSEL Uzbekistan

OBSERVER John Brown

SPECIES Pollock

	SET NUMBER (26 27 28)	HAUL NUMBER	OTOLITH OR SCALE NUMBER (34 35 36)	SEX (37)	LENGTH (cm) (38 39 40)	AGE (41 42)	WEIGHT (kg) (43 44 45 46 47)	special handling (59 60)	total age (61)	herring (65)	AGE REMARKS
1	154		26	M	32		.80				
2			27		40		.95				
3			28		35		.93				
4			29		34		.85				
5			30		34		.89				
6			31		42		.96				
7			32		44		.96				
8			33		33		.80				
9			34	M	35		.86				
10			35	F	34		.83				
11			36		34		.90				
12			37		35		.93				
13			38		33		.80				
14			39		43		.95				
15			40		68		1.82	2			
16			41		34		.91				
17			42		42		.96				
18	154		43	F	47		1.20				
19	158		44	M	43		.95				
20			45		32		.80				
21			46		40		.93				
22			47		28		.73				
23			48		31		.81				
24			49		43		1.15				
25			50	M	30		.80				
26			51	F	32		.87				
27			52		35		.91				
28			53		39		.93				
29			54		42		1.09				
30			55		35		.90				
31			56		37		.92				
32	158		57	F	43		1.05				
33							.				
34							.				
35							.				
36							.				
37							.				

13. If you took a scale sample from a salmon with a possible net scar, note the presence of the scar with a "9" entered in column 60.

14. If you are taking herring scales, record the maturity of females only (using the maturity index in the Appendix) in column 65.

15. Leading zeros should appear in the cruise number, month, and day only (columns 1, 2, 13, and 15 only, as needed).

16. Note that several hauls can be recorded per sheet as long as the hauls were begun to be retrieved on the date written on the top of the page and they were all taken from hauls in the same area. Go to a new side only when all 37 lines are filled, when you are starting a new day, or a haul is in a different numerical area.

17. If you transfer to another ship, you can continue with the same sequence of otolith numbers, but keep the Form 9's and the otoliths separate for the two different cruises.

18. If for some reason, some preservative other than ethyl alcohol was used (such as rubbing alcohol), note the preservative at the top of the first page of each set of Form 9's.

GENERAL DIRECTIONS FOR OBSERVERS

ON JOINT VENTURE CRUISES

Form 1 - Daily catch summary for joint ventures

This form, the daily catch summary for motherships, is also used to summarize the fishing effort of the various catcher boats in a joint fishing venture delivering fish to a processing vessel of a different nationality. (If the processing vessel also fished on its own, keep these data separate - see the note on a following page.) Group the catch data for the catcher boats each day and enter on a line of Form 1. In the past it has been difficult to obtain haul position data from U.S. fishing boats participating in joint venture, so the noon (GMT) position of the processing vessel should be the location recorded on Form 1. Note in your report if you hear of any hauls being dumped and not reported as tonnage caught. Points to note:

1. Under "vessel type" record the nationality of the catcher boats.

2. Record "3" in column 11.

3. The noon position, columns 18-26, should be the position of the processing vessel at noon GMT time, not the position of the catcher boats - thus, there should be only one noon position per day.

4. Check the latitude and longitude to make sure it is reasonable - i.e., 58°68' does not exist; doublecheck positions that indicate large movements if you haven't been aware of any.

5. The first digit of the longitude (1) is understood, so record only the following digits.

6. Record the average depth of the hauls if that information is available. If that information is not available, leave the average depth blank.

7. The average duration can be calculated from the Form 2 information. Figure out the total number of minutes each haul took and divide by the number of codends. If there are a few hauls that you could not get effort data for, add in an estimated number of minutes trawled. (If you were unable to get any effort information for the entire cruise, enter 1 minute in the average duration--a duration greater than zero is necessary for the computer program to run.)

8. The total daily catch should represent the weight of all of the fish and invertebrates delivered to the processing vessel. This includes any catch that is discarded.

9. If none of the catcher boats fished on a day, enter the noon position of the processing vessel as usual, leave average depth blank, put a "1" in duration, and enter 0 in no. of tows. In columns 27-34, comment on the reason there was no fishing--whether it was due to bad weather, cargo transfer, delivery of fish to U.S. processing facilities, or other reason.

10. The codes for weather and sea condition are given on a preceding page - use the processing vessel data for these, as well as water temperature, if available.

11. Leading zeros should be in columns 1, 2, 14, and 16 only.

12. Skip a line after each day.

Form 2 - Haul form for joint venture cruises

This form is not presently keypunched for joint ventures and is meant to supplement the information on Form 1. Refer to the example Form 2 for joint venture for one method of collecting catch data on the individual hauls. Various people at NWAFC use the catch per unit effort data and the haul location information is useful in pinpointing areas of high incidental catches of prohibited species. As U.S. fishermen are not required by law to furnish this

information, observers have not always been able to obtain it. If you are willing to provide the fishermen with information about their catches--i.e. species composition or amount of prohibited species--they might be more interested in giving you the information you want. Individual catch sizes can normally be obtained from joint venture representatives or the officers of the processing vessels and these may be used for your sample weights if you whole-haul sample individual codends.

Filling out this form (in addition to Form 1) is no longer optional, as it was in the past. Three items of information are essential:

1) The name of the catcher boat;

2) A measure of the fishing effort (either the starting and ending times or the total minutes trawled); and

3) The official ship's estimate of catch (or adjusted ship's estimate).

Also very useful is the trawl position--the retrieval position of the haul by the catcher boat if possible, but if not, use the position at which the codend was transferred to the processing ship (note which you were able to obtain on the forms). Try to make your own estimates of the codend deliveries. The average depth fished would be useful but is not essential--obtain it if you can without too much difficulty.

Form 3 for joint ventures

In most cases, observers on joint ventures have been able to sample individual codends and record the species composition and incidence of prohibited species data in the same manner as for an independent stern trawler. If the catches are relatively pure (consist mainly of one or two species), you may be able to use the whole-haul method of sampling or one of its variations. If the catches of two codends are mixed in the bins, handle the situation as you would on a trawler--sample the combined catches but divide

RADIO MESSAGE CHANGES

For All Vessel Types:

The prohibited species report (PARA 2 of the radio message) has been changed. The salmon (SAL) category has been split into two categories; "CHIN" and "OTH SAL". This means that five categories of prohibited species will be reported from now on. This does not effect form 3(1) or form 4, however you will have to modify form RM-3 to include the change in the salmon group.

Special Daily Radio Message:

While you are out at sea, you may receive a message from NMFS to begin sending daily radio messages. This is most apt to occur when your vessel's nation is approaching a species quota. These messages are to be sent in addition to your normal weekly radio message, and are to be sent daily. This daily message is similar to PARA 1 of the weekly catch report, except instead of giving the week-ending-date, give the day's date that the catch is for and label the date as such. Each day's catch is for a GMT day.

Example of a Daily Radio Message:

(This is an example of a daily radio messaage being sent from a vessel using the heading containing the noon position 55 degrees 11 mins. north and 148 degrees 33 mins. west. The message is being sent June 11, and the catch is from GMT day June 10.)

NOJ DE vessel call sign MSG CATCHREP K
TO: RUSS NELSON, NWAFC, SEATTLE, WA
INFO: NMFS AK REGION, JUNEAU AK
FROM: Your name,vessel name,vessel permit number, 55-11N 148-33W JUN 11

PARA 1/VESSEL PERMIT NUMBER/JUN 10 DAILY CATCH/

ALL JAPAN CATCH/A63/DG1D0P1/SQU 1D21P4/FLAT 2D17P10/

POLL 22D43P11/COD 0D22P4/SAB 0D02P2/ATKA 1D04P5/POP 0D21P3/

OROCK 0D28P10/HER 0D01P1/OTH 1D06P7/NON 2D14P7/TOTAL 30D79P19/

STOP.

the sampling data proportionally by codend size and enter the data as two separate samples (note this on the form).

Other data forms for joint venture cruises

Forms 4, 6, 7, 9, and 10 are to be filled out in the same manner as an independent stern trawler.

If the processing vessel received any codends from a joint venture operation during the week, it is important to sample at least some so that you will have species composition data to apply to the joint venture catch tonnage. Calculate and report joint venture catches separately from catches made if the vessel fished on its own.

If the processing vessel also fishes on its own:

If two different types of catches are being landed aboard the processing vessel - codends from catcher boats fishing on the U.S. quota, and hauls made by the processing vessel itself on a foreign allocation - the data from these two types of hauls must be kept separate. The two sets of data should

be like two separate cruises. If the processing vessel did not fish for itself on a given day because it was waiting to receive or process fish from the joint venture, enter this reason in columns 36-54 of Form 2 to distinguish that situation from a non-fishing day due to bad weather or cargo transfer.

If the processing vessel made any catches on its own during the week, it is important to sample at least some of it so that you will have species composition data to apply to the foreign catch tonnage. Calculate and report in your radio message non-joint venture catches separately from joint-venture trawls.

Form 1 Daily Catch Summary for ~~Motherships~~ JOINT VENTURE

Cruise No.	1	2	3	Vessel Code	4	5	6	7	Year	12	13
	1	2	3		Z	M	2	4		8	3

NOTE:
1. If remarks are necessary, record on separate page; Use vessel name and date as reference.
2. Leading zeros in columns 1, 2, 14 and 16 ONLY.
3. Columns 8-10, 42-46, 49-54 (not shown) are blank.
4. Skip line after each day.

Vessel Type	GEAR	DATE Mo.	DATE Day	Noon Position (N) Latitude	E W	Noon Position (1) Longitude	Tow Data Average Depth (M)	Tow Data Average Duration (Mins.)	No. of Tows	Total Daily Catch (MT)	Av. Sp. Knts.	Weather Code	Sea Code	Water Temperature °C Surface	Water Temperature °C Bottom
	11	14 15	16 17	18 19 20 21	22	23 24 25 26	27 28 29 30	31 32 33 34	35 36	37 38 39 40 41	47 48	55	56	57 58 59	60 61 62
US stern trawlers	3	07	02	4343	W	2436	searching but no catch 1		0	0.0	.	2	5	13.0	.
			03	4357		2442		176	4	61.2	.	2	4	13.0	.
			04	4355		2432		123	6	49.4	.	2	3	13.0	.
			05	4349		2435		311	4	28.9	.	1	3	13.0	.
			06	4348		2436		218	3	29.0	.	2	3	13.0	.
			07	4350		2437		745	3	9.5	.	2	4	13.0	.
			08	4420		2427		412	3	9.7	.	2	6	13.0	.
			09	4419		2434	all boats in port 1		0	0.0	.	2	5	13.0	.
			10	4544		2435	bad weather 1		0	0.0	.	2	7	15.5	.
			11	4426		2442		207	2	25.5	.	2	6	15.5	.
			12	4418		2508		510	1	9.2	.	2	3	15.5	.
			13	4528		2427		235	3	60.1	.	2	3	15.0	.
			14	4522		2424		148	3	63.4	.	2	3	15.0	.
US stern trawlers	3	07	15	4527	W	2425		200	2	23.6	.	2	5	15.0	.

GPO 987-303

AN EXAMPLE SHOWING HOW FORM 2 CAN BE MODIFIED TO COLLECT DATA ON THE INDIVIDUAL HAUL POSITIONS, FISHING TIMES, AND CATCH ESTIMATES. (INFORMATION TO SUPPLEMENT FORM 1).

FORM 2 HAUL FORM FOR ~~INDEPENDENT STERN TRAWLER~~ JOINT VENTURE

CRUISE NO. (1 2 3)	VESSEL CODE (4 5 6 7)	GEAR (8)	YEAR (9 10)
1 2 3	Z M 2 4	3	83

* The Big Dipper did not provide fishing times, but did give an estimate of fishing duration. The other catcher boats gave fishing times and these were used to figure fishing duration.

** Location at which mothership picked up codend.

DATE MO. (11 12)	DAY (13 14)	~~NOON POSITION~~ CATCHER BOAT (N) LATITUDE (15 16 17 18)	E/W (19)	(I) LONGITUDE (20 21 22 23)	HAUL NO. (24 25 26)	~~TRAWL POSITION~~ ** (N) LATITUDE (27 28 29 30)	E/W (31)	(I) LONGITUDE (32 33 34 35)	FISHING TIME NETS ON BOTTOM (36 37 38 39)	NETS OFF BOTTOM (40 41 42 43)	AVERAGE HAUL DEPTH (M) (44 45 46)	AVG. SPEED (KNOT) (47 48)	TOTAL CATCH (MT WITH DECIMAL PT.) (49-54)	WEATHER CODE (55)	SEA CODE (56)	~~WATER TEMP °C~~ ~~SURFACE~~ (57 58 59)	~~BOTTOM~~ (60 61 62)	Observer estimate with Dec. Pt. (64-69)	Original ship est. with Dec. Pt. (70-75)
07	03	BIG DIPPER			1	4347	W	2439	*	*	183	.	15.3			25.5	0300		
		BIG DIPPER			2	4350		2440	*	*	122	.	16.0			10.0	1200	15.4	
		CATALINA			3	4349		2440	1240	1430	125	.	12.7			11.0	1500	12.5	
	03	CATALINA			4	4353		2441	1600	2000	180	.	17.2			24.0	2015		
												.				.	.		
	04	RED BULL			5	4350		2426	0330	0630	175	.	8.4			18.0	0700	8.6	
		BIG DIPPER			6	4353		2429	*	*	200	.	5.9			7.0	0930		
		BIG DIPPER			7	4355		2431	*	*	222	.	10.0			19.0	1330	10.0	
		CATALINA			8	4354		2430	1330	1450	195	.	6.8			8.0	1515		
		RED BULL			9	4354		2430	1545	1835	210	.	9.0			17.0	1900	8.5	
	04	CONSTELLATION			10	4352		2428	1900	1950	220	.	9.3			5.0	2000		
												.				.	.		
	05	CATALINA			11	4250		2253	2245	0400	185	.	7.2			31.5	0430	7.0	
		CATALINA			12	4259		2258	0755	1545	170	.	6.0			47.0	1615		
		CATALINA			13	4350		2437	1700	2200	175	.	8.0			30.0	2230	8.9	
	05	RED BULL			14	4249		2303	1950	2230	200	.	7.7			16.0	2315	7.8	
												.				.	.		
	06	CATALINA			15	4307		2411	0110	0415	165	.	9.7			18.5	0600		
	06	CATALINA			16	4315		2418	0945	1245	163	.	9.8			18.0	1300	9.9	
	06	BIG DIPPER			17	4338		2427	*	*	200	.	9.5			29.0	2045	10.0	
												.				.	.		
	07	CATALINA			18	4257		2346	2230	0400	155	.	3.1			33.0	0430		
	07	CATALINA			19	4304		2401	0615	1010	168	.	3.0			23.5	1045	3.0	
	07	BIG DIPPER			20	4305		2403	*	*	170	.	3.4			18.0	1615	3.3	
												.				.	.		
	08	CONSTELLATION			21	4401		2407	1500	0145	165	.	3.2			64.5	0200	3.4	
	08	BIG DIPPER			22	4403		2406	*	*	220	.	2.0			12.5	0430		
	08	CATALINA			23	4400		2402	0515	1300	185	.	4.5			46.5	1315	4.5	
												.				.	.		
07	09	ALL BOATS IN PORT — NO					W	FISHING				.				.	.		

Fishing Duration (in minutes) (ignore decimal point)

Delivery Time (ignore decimal point)

FORM 3 (2)

SPECIES COMPOSITION FROM BASKET SAMPLES

Leading zeros in columns 1, 2, 10, 12 only.

* *Indicates weight obtained by subtraction from total sample weight.*

CRUISE NO. (1–3)	VESSEL CODE (4–7)	YEAR (8–9)	MO. (10–11)	DAY (12–13)
123	ZM24	83	07	07

EXAMPLE FORM FOR JOINT VENTURE

REMARKS: All hauls were whole-haul sampled.

FIRST HAUL OR SAMPLE			SECOND HAUL OR SAMPLE			THIRD HAUL OR SAMPLE		
Haul No. (15–17)	No. of baskets	Time	Haul No. (20–22)	No. of baskets	Time	Haul No. (25–27)	No. of baskets	Time
18	4	0100	19	4	0600	20	4	1900
	232 hake = 169.8 kg avg = .732			162 hake = 120.5 avg =			198 hake = 150.9 avg = .762	

SPECIES	SPECIES CODE (32–34)	NUMBER (35–40)	WEIGHT (in kg with decimal pt.) (41–49)	NUMBER (50–55)	WEIGHT (in kg with decimal pt.) (56–64)	NUMBER (65–70)	WEIGHT (in kg with decimal pt.) (71–79)	TOTALS FOR THE DAY No.	Weight	Avg. wt. (kg)
No. of specimens and total basket weight	999	272 6	2000.0	66 45	5000.0	3259	2500.0	12630	9500.0	—
Hake	206	271 6	*1987.96	66 14	*4920.6	3246	*2473.55	12,576	9382.11	.746
Jack mackerel	207	2	3.8	6	12.8	9	17.2	17	33.8	1.988
Pacific ocean perch	301	2	.8					2	.8	.4
Widow rockfish	305	5	4.64					5	4.64	.928
Chinook salmon	222	1	2.8					1	2.8	2.8
Bocaccio	302			18	41.3	3	6.85	21	48.15	2.29
Shortraker rockfish	326			2	6.8			2	6.8	3.4
Canary rockfish	314			5	18.5	1	2.4	6	20.9	3.48

GPO 989-453

FORM 10 - MARINE MAMMAL INCIDENTAL CATCH DATA

Each day, entries should be made on Form 10 concerning the occurrence of mammals caught incidentally, whether or not any marine mammals were actually caught. As in the incidence of other prohibited species, population managers need to be able to calculate the number caught per metric ton of groundfish observed. The front side of Form 10 is used for recording the marine mammals in a random sampling of the catch.

On stern trawlers, an entry should be made for every haul the observer monitors. Thus, the number of entries would be the number of hauls sampled. Record also the date, the haul number, the species caught (if any), the number observed, and their condition (column numbers 8-23, 25-27, 46-55, and species name). In the upper right-hand corner, record the total number of hauls made during the cruise (unobserved + observed).

On motherships an entry should be made each fishing day. The observer should enter the estimated tonnage in which it is known whether or not there were any mammals, the date, the species caught (if any), the number observed, and their condition (column numbers 8-19, 28-36, 46-55, and species name).

The back of Form 10 has space for remarks about entries on the front. In addition, ask the captain to have reported to you all mammals in catches which you did not intend to sample. As you did not plan to sample these hauls, do not enter these data on the front side of Form 10; log these mammals on the back of Form 10, giving the haul number, position, and time of day. If you can get access to any dead marine mammals in the catch, measure them according to the instructions in the Appendix, and log the data on the back of Form 10. Note whether canine teeth or jaws were taken.

NUMBER	CODE	YEAR
11 12 13	14 15 16 17	18 19
113	NS32	83
115	NMOG	

FORM 10 MARINE MAMMAL INCIDENTAL CATCH DATA

USE FORM 10-a, "REMARKS ON MARINE MAMMALS" ON THE REVERSE SIDE OF THIS FORM FOR ADDITIONAL COMMENTS REGARDING THE INCIDENTAL TAKE OF MARINE MAMMALS.

EXAMPLE FORM

Total no. hauls made while observer aboard 124

	ENTRY NUMBER (8 9 10)	DATE (MO/DAY) (20 21 22 23)	GEAR (24)	STERN TRAWLER HAUL NUMBER (25 26 27)	MOTHERSHIP TONNAGE OBSERVED (TO NEAREST METRIC TON) (28 29 30 31 32)	MOTHERSHIP DATE MONTH (33 34)	MOTHERSHIP DATE DAY (35 36)	STERN TRAWLER TOTAL HAUL WEIGHT (37 38 39 40)	MARINE MAMMAL SPECIES (IF NONE OBSERVED, WRITE IN NONE)	SPECIES CODE (41 42 43)	(44 45)	NUMBER ANIMALS IN CATCH: TOTAL CAUGHT SEEN BY OBS. (46 47)	NUMBER ALIVE AND RELEASED (48 49)	NUMBER KILLED BY CREW (50 51)	NUMBER DEAD IN CATCH (52 53)	NUMBER DECOMPOSED (54 55)	(N) LATITUDE (56 57 58 59)	E/W (60)	(1) LONGITUDE (61 62 63 64)
trawler example	1	1009		4					None										
	2	09		6					Steller sea lion			1		1					
	3	09		8					None										
	4	09		9					Steller sea lion			2	1		1				
	5	10		12					None										
	6	10		13					None										
	7	10		15					Decomposed body of small whale – unident.			1			1	1			
	8	1011		18					Dall porpoise			1			1				
mothership example	1				90	06	14		None										
	2				85		15												
	3				120		16												
	4				115		17												
	5				80		18		None										
	6				105	06	19		Steller sea lion			1			1				

GPO 888-743

FORM 10-a REMARKS ON MARINE MAMMALS IN THE CATCH

Instructions: Describe problems encountered in observations, identification, specimens collected, percentage of haul observed, discrepancies in reports, etc. Be complete in describing observations of dead or living animals.

ENTRY NO.	DATE	HAUL NO.	REMARKS
			EXAMPLE - STERN TRAWLER
2	10/9	6	The haul was dumped into the fish bin before it was realized that there was a sea lion in it. The sea lion was a large aggressive male which had to be shot since there was no safe way to remove it alive. It was 200 cm. standard length. I was unable to remove the canines because the captain was anxious to get it overboard.
4	10/9	9	The live sea lion was very weak, but after a few minutes it appeared to recover and was persuaded to leave. The crew threw the dead sea lion overboard before I had a chance to measure it.
7	10/10	15	The whale was 4 meters long and was in an advanced state of decomposition. It was a toothed whale but I was unable to note any other important features.
			EXAMPLE - MOTHERSHIP
	6/14		The fishing manager said that he would call me whenever a mammal is found in the bins so that I can at least note it on this side of Form 10 when I am not sampling, and I can obtain length measurements and teeth if it is dead.
1	6/14		During the course of the day I am quite sure that I would have been aware of any mammals in at least 1/4 of the catch, so I entered 90 tons as the tonnage observed. (All later tonnages were estimated similarly.)
6	6/19		The dead sea lion was a male; its standard length was 195 cm. Both canine teeth were removed intact by boiling the snout.

☆ GPO: 1978 -796-32[illegible]

FORM 11 - MARINE MAMMAL OBSERVATION LOG

This form is designed for information about marine mammals sighted other than those brought up in the fishing gear. At the top of each sheet, record the time system you use in recording the data as well as the usual identifying data such as cruise number, vessel code, and year. GMT or ship time may be used to record the time of the watch or sighting. If GMT time is used, circle "GMT:" if ship time is used, record the correction factor used by the radio officer to obtain GMT time (thus Anchorage is in the +9 time zone during daylight savings time). Most marine mammal sighting data are valuable, whether or not you were deliberately looking for mammals. Thus, if a crew member points out a mammal to you, or if you merely glance up from your work and see a mammal, write it down. ~~Record your watches, however, even if you did not see any marine mammals.~~ Record sightings only

We are interested in all species of marine mammals that you might encounter and will provide an identification guide to assist you in making identifications. If you are unable to positively identify an animal, then please indicate so in the log. Records of unidentified marine mammals in the logbook tend to lend credence to those records that include identification. Please feel free to make copious notes and illustrations when reporting a sighting of a species which you have not previously encountered during the cruise. Records of species which you have not previously encountered or fully documented will probably not be verifiable at a later date.

~~Whenever you deliberately look for mammals, make an entry whether or not any were observed.~~ We request that you spend at least three five-minute periods a day looking all around the ship for mammals, if possible.

If sea lions are a rare occurrence around your ship, log them whenever seen. If they are common, estimate their numbers only during the daily three five-minute observation periods. If possible, log their customary behavior and note the presence and number of adult males.

Some observers want to do extra mammal work, and one possibility is the taking of marine mammal transit observations.

Marine mammal transit observations

When the ship is steaming between fishing grounds or ports, you can stand mammal watches from the bridge or flying bridge. Record the following data on Form 11: date; ship speed; ship course; location of start of transit; time at start; whether you used binoculars; approximate height of your eye above the water; sea state; visibility; time of any changes in course or speed; species and quantity observed (or a description of the mammals); relative bearing and distance of mammal from ship at the time of first sighting; other information about behavior, etc; time and location of the end of the transit. Negative results (no sightings) are valuable if all of the time, weather, speed, etc., data are recorded. Twenty-minute or longer transits are valuable. For relative bearings, use the number of degrees to port or starboard (left or right) from dead ahead.

FORM 11 MARINE MAMMAL OBSERVATION LOG Year 83 Page 5 of 8

Cruise No. 250 Vessel Code NS32 Time recorded in (GMT)

DATE Mo/Day	TIME	LOCATION	SPECIES	NO.	NOTES: Behavior, sketches, photos, features used for I.D., size, associated species.
6-19	0940	57°14'N 164°21'W	Killer Whale	4	Ship Trawling. Whales about ¼ mile to starboard. They appeared to be swimming very slowly. One male in pod, he had a much larger triangular shaped dorsal fin. They were pointed out by a crew member.
6-19	1100	57°15'N 164°32'W	Sea lion	2	* Ship trawling. 3' waves, no white caps, 8 mile visibility, Overcast skys. Both are females or immature males.
6-19	1320	57°15'N 164°32'W	Fur Seal	1	No effort. I just glanced up from my work and saw it. Ship was steaming to new position to drop net. Appeared to be ♀ (small, triangular face, slender neck.).
6-19	1400	57°17'N 164°33'W	None		* Same Weather.
6-19	1800	"	None		* Same Weather.
6-20	0900	57°18'N 164°34'W			Began mammal transit observation. Ship underway to new fishing grounds. Speed 11.4 knots; course 270° T, 57°18'N; 164°34'W at start; 0900 Starboard, used binoculars. Height of eye above sea level ~50 ft. 6 ft. waves, scattered white caps, overcast, 5 mi. visibility. Sightings below:
	0910		Minke Whale	1	Whale 30° to starboard, 1 mile off. Small Whale, curved dorsal fin, no scarring on back. Dark grey, light patch between head and dorsal fin. Rounded back; couldn't see blow very well.
	0915		Fur Seal	1	Lone, adult, male — 10° to port, range 200 yds. Same type of small seal as seen yesterday, but thicker neck and white whiskers.
	0918		Unknown Species of Black Porpoise	3	Porpoise swimming fast, 45° to port, range 400 yds. Did not make distinctive forward splash like Dall's.
6-20	0930	57°18'N 164°42'W			End of Transit
					* Standard Unit of Effort = 5 minutes looking all around ship for mammals. Stayed on Bridge the whole time. Eye level approx. 50 ft. Did not use binoculars.

GPO 987-296

INSTRUCTIONS FOR WEEKLY RADIO MESSAGES

One of the primary tasks of the Observer Program is the estimation of the foreign catch of groundfish and prohibited species throughout the year to insure that these catches remain within the quotas established by the United States. In order to utilize your data before your return from the vessel, we require that each observer send a radio message each week to the Northwest and Alaska Fisheries Center summarizing each week's fishing activity. One part of the message will give the estimated catch by species group for each area and the other part will provide data on the prohibited species.

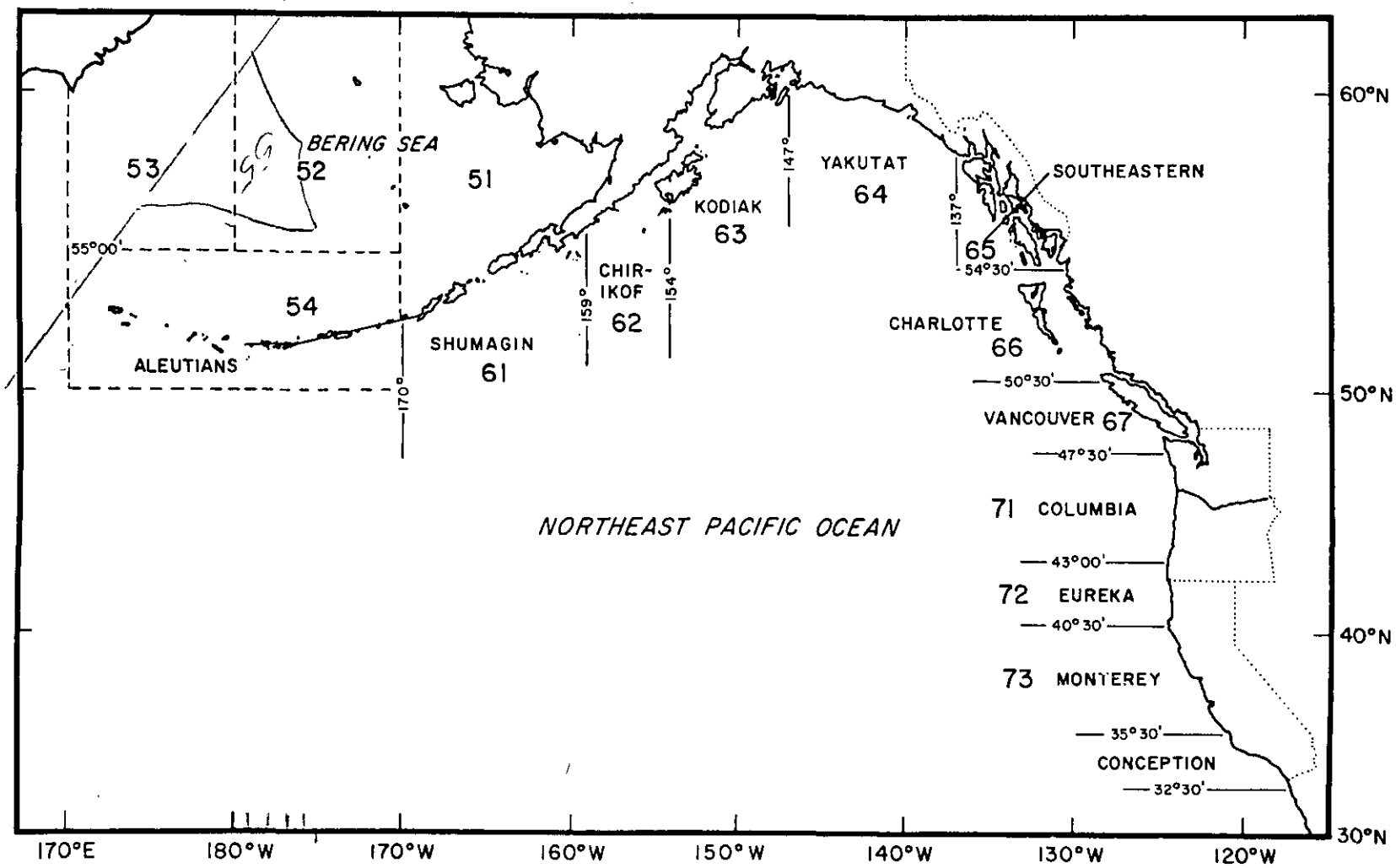
The report week for each message will always run from SUNDAY through SATURDAY, Greenwich Mean Time and date regardless of the date the message is actually sent. The reporting areas to be used for radio messages are shown in the map on the following page.

Instructions for Making Weekly Species Composition Catch Reports

This part of the message will give, by reporting area, the vessel days on the grounds and the estimated catch by your vessel of each of the species groups managed in the major fishing area (i.e., Bering Sea/Aleutians; Gulf of Alaska; or Washington-Oregon-California). The table "Reporting Groups for Species Composition Radio Messages" is correspondingly divided into the three regions. Each section indicates the report groups and abbreviations under which all species in the observer's species composition samples should be reported.

Form RM - For Independent Stern Trawlers and Joint Venture Vessels

On stern trawlers and joint venture ships, the relative importance of each haul you sample for species composition is dependent upon the size of the haul in relation to the size of other hauls that were sampled. In order to reflect the relative importance of each haul that is sampled in your daily calculation of catch, you must first determine the estimated weight for each species (or species group) from each haul sampled for your data in the following way.



AREAS USED IN WEEKLY RADIO MESSAGES

REPORTING GROUPS FOR SPECIES COMPOSITION RADIO MESSAGES

Bering Sea/Aleutians (Areas 51 - 54)

Species Group	Report Group	Abbreviation
Squid	Squid	SQU
Yellowfin sole	Yellowfin sole	YELL
Greenland turbot		
Arrowtooth flounder	Turbots	TURB
Kamchatka flounder		
Other flatfish (except halibut)	Other flatfish	OFLAT
Pollock	Pollock	POLL
Pacific cod	Pacific cod	COD
Sablefish	Sablefish	SAB
Atka mackerel	Atka mackerel	ATKA
Pacific ocean perch		
Rougheye rockfish		
Northern rockfish	Pacific ocean perch group	POP
Sharpchin rockfish		
Shortraker rockfish		
All other rockfish (*Sebastes* and *Sebastolobus* spp.)	Other rockfish	OROCK
Herring	Herring	HER
Sharks, skates, sculpins, eulachon, smelts, capelin and octopus only	Other fish	OTH
All remaining fish spp.		
Prohibited spp. (except herring)		
Invertebrates (except squid and octopus)	Non-allocated	NON
Miscellaneous items		

Gulf of Alaska (Areas 61 - 65)

Species Group	Report Group	Abbreviation
Squid	Squid	SQU
All flatfish (except halibut)	Flatfish	FLAT
Pollock	Pollock	POLL
Pacific cod	Pacific cod	COD
Sablefish	Sablefish	SAB
Atka mackerel	Atka mackerel	ATKA
Pacific ocean perch		
Rougheye rockfish		
Northern rockfish	Pacific ocean perch group	POP
Sharpchin rockfish		
Shortraker rockfish		
Thornyhead rockfish (shortspine and longspine thornyheads)	Thornyheads	THRN
Other rockfish (all other *Sebastes* spp.)	Other rockfish	OROCK

(continued next page)

Gulf of Alaska (continued)

Species Group	Report Group	Abbreviation
Sharks, skates, sculpins, eulachon, smelts, capelin octopus, only	Other fish	OTH
All remaining fish spp.		
Prohibited spp. (includes herring)		
Invertebrates (except squid and octopus)	Non-allocated	NON
Miscellaneous items		

Washington-Oregon-California Hake Fishery (Areas 71 - 73)

Species Group	Report Group	Abbreviation
Pacific hake	Pacific hake	HAKE
Jack mackerel	Jack mackerel	JACK
Pacific ocean perch	Pacific ocean perch	POP
Other rockfish	Other rockfish	RF
All flatfish (except halibut)	All flatfish	FLAT
Sablefish	Sablefish	SAB
All remaining fish spp. (except halibut and salmon)	Other fish	OTH
Squid and Octopus		
Prohibited spp.		
Invertebrates (other than squid and octopus)	Non-allocated	NON
Miscellaneous items		

Joint venture fisheries in the Wa.-Or.-Ca. hake fishery should report all discard of any species group, except hake, using the same above abbreviations (see example message). Any discard of hake should be included in the total hake catch.

At the end of each day, determine the correct statistical area of each haul sampled and place the following information on Form RM for the particular area:

1. For each haul that was sampled, record the date and haul number, the weight of the haul in metric tons (this should be the ship's estimate) (Column A), the total sample weight taken from the haul in kilograms (Column B), the weight of each species (or species group) in kilograms from the sample (Column C).

2. Calculate the total catch of each species (or species group) within the haul by multiplying the total haul weight by the species sample weight, and dividing the product by the total basket sample weight. Record the resulting answer in Column D in metric tons.

$$\text{Col D} = \frac{(\text{Col A}) \times (\text{Col C})}{(\text{Col B})}$$

3. Sum the weights of the hauls sampled (Column A) and the calculated weight of each species (or species group) (Column D), and record the information on the next line of Form RM for "Days Total" as shown in the example on the following page.

Form RM-1 - For all Vessel Classes

1. At the end of each day determine the correct statistical area of each haul from the information given under "Haul Position" on Form 2. For motherships and longliners, the noon position or set retrieval position from Forms 1 or 1L, respectively, will place the day's catch in the correct statistical area. (Longline observers must not only calculate their radio message information separately by area, but also by shallow or deep average depth--see #8 "for longline vessels only.") Place the following data on Form RM-1 for the statistical area:

FORM RM WEEKLY RADIO REPORT WORK SHEET AREA 52 *Extrapolation to Haul weight*

CRUISE NO. 530 VESSEL CODE N578

PAGE 1 OF

STERN TRAWLER EXAMPLE

DATE & HAUL No.	A HAUL WT MT	B TOTAL SAMPLE WT KG	C SQU KG SMPL	D SQU MT HAUL	YELL KG SMPL	YELL MT HAUL	TURB KG SMPL	TURB MT HAUL	OFLAT KG SMPL	OFLAT MT HAUL	POLL KG SMPL	POLL MT HAUL	COD KG SMPL	COD MT HAUL	SAB KG SMPL	SAB MT HAUL	ATKA KG SMPL	ATKA MT HAUL	POP KG SMPL	POP MT HAUL	OROCK KG SMPL	OROCK MT HAUL	HER KG SMPL	HER MT HAUL	OTH KG SMPL	OTH MT HAUL	NON KG SMPL	NON MT HAUL
9/9 #100	40.0	524.7	120.2	9.163							365.8	27.986	10.2	.778	8.4	.640			11.3	.861	3.7	.282					5.1	.389
9/10 #101	16.0	16000.0	3.6	.004			5.0	.005	1.45	.001	15857 .72	15.858			72.6	.073			3.65	.004	10.8	.011			6.8	.007	38.38	.038
#103	20.0	20000.0					5.9	.006	1.4	.001	16919.6	16.920	2985.8	2.986	78.5	.079									3.8	.004	5.0	.005
#104	12.0	460.9	51.8	1.349							350.0	9.113	23.8	.620	5.2	.135			20.5	.534	2.5	.065					7.1	.185
DAY'S TOTALS	48.0			1.353				.011		.002		41.891		3.606		.287				.538		.076				.011		.228
9/11	~ NO		FISH		ING ~																							
9/12 #105 (POLLOCK)	8.0	8000.0	20.1	.020			8.7	.009	4.1	.004	7059.0	7.059	645.8	.646	120.6	.121			40.3	.040	6.6	.007	17.8	.018	41.3	.041	35.7	.036
9/12 #106 (POLLOCK)	20.0	327.9					.55	.034	6.7	.409	291.3	17.768	13.2	.805	15.6	.952									.3	.018	.25	.015
DAY'S TOTAL POLLOCK HAULS	28.0			.020				.043		.413		24.827		1.451		1.073				.040		.007		.018		.059		.051
9/12 #109 (PACIFIC COD)	30.0	356.0									40.1	3.379	302.1	25.458	3.3	.278			7.6	.640	2.1	.177					.8	.067
DAY'S TOTAL (COD HAULS)	30.0											3.379		25.458		.278				.640		.177						.067

GPO 989-767

FORM RM-1 WEEKLY RADIO REPORT WORK SHEET AREA 52

CRUISE NO. _____ VESSEL CODE _____

Extrapolation to Day's Catch

PAGE 1 OF _____

STERN TRAWLER EXAMPLE

DATE	A DAY WT MT	B TOTAL SAMPLE WT KG	C SQU KG SMPL	D SQU MT DAY	YELL KG SMPL	YELL MT DAY	TURB KG SMPL	TURB MT DAY	OFLAT KG SMPL	OFLAT MT DAY	POLL KG SMPL	POLL MT DAY	COD KG SMPL	COD MT DAY	SAB KG SMPL	SAB MT DAY	ATKA KG SMPL	ATKA MT DAY	POP KG SMPL	POP MT DAY	OROCK KG SMPL	OROCK MT DAY	HER KG SMPL	HER MT DAY	OTH KG SMPL	OTH MT DAY	NON KG SMPL	NON MT DAY
9/9/83	40.0	40.0	9.163	9.163							27.886	27.886	.778	.778	.640	.640			.861	.861	.282	.282					.389	.389
9/10	83.0	48.0	1.353	2.340			.011	.019	.002	.003	41.891	72.437	3.606	6.235	.287	.496			.538	.930	.076	.131			.011	.019	.228	.394
9/11 NO FISHING																												
9/12 (Pollock)	35.0	28.0	.020	.025			.043	.054	.413	.516	24.827	31.034	1.451	1.814	1.073	1.341			.040	.050	.007	.009	.018	.023	.059	.074	.051	.064
9/12 (cod)	40.0	30.0									3.379	4.505	25.458	33.944	.278	.371			.640	.853	.177	.236					.067	.089
TOTALS FOR THE WEEK	198.0			11.528				.073		.519		135.862		42.771		2.848				2.694		.658		.023		.093		.936
	198.0			11.53				.07		.52		135.86		42.77		2.85				2.69		.66		.02		.09		.94
MOTHERSHIP EXAMPLE																												
8/31/83	718.0	831.27			776.89	671.030	.3	.259	31.65	27.337	.25	.216	.58	.501											13.83	11.946	7.77	6.711
9/1	668.0	990.75			920.8	620.837	23.7	15.979	27.2	18.339	1.25	.843	.8	.539											16.5	11.125	.5	.337
9/2		— NO	FISHING	—																								
TOTALS FOR THE WEEK	1386.0					1291.867		16.238		45.676		1.059		1.040												23.071		7.048
						1291.86		16.24		45.68		1.06		1.04												23.07		7.05
DEEP DEPTHS — LONGLINER EXAMPLE																												
10-19 #1	11.4	3723.7									11.7	.036	492.1	1.507	2913.1	8.918			27.4	.084	152.7	.467			94.6	.290	32.1	.098
10-20 #1	16.5	4831.87					1895.4	6.472			108.5	.371			1419.86	4.849			11.7	.040	99.4	.339			14.8	.051	1282.23	4.379
10-21 #1	8.6	2472.2									25.5	.089	600.3	2.088	1166.09	4.056			9.1	.032	11.7	.041			87.11	.303	572.4	1.991
10-21 #2	10.1	3264.6					1278.3	3.955	126.5	.391	7.3	.023	10.8	.033	702.7	2.174			1.7	.005	28.6	.088			167.2	.517	941.5	2.913
10-22 #1	~	NO FISHING	~																									
TOTALS FOR THE WEEK	46.6							10.427		.391		1.519		3.628		19.997				1.161		.935				1.161		19.381
	46.61							10.43		.39		.52		3.63		20.00				.16		.94				1.16		9.38

a. GMT Date

b. Record the total weight of catch landed by the vessel in the area that day in Column A "Day Wt. MT." For stern trawlers, this is the sum of all individual hauls in the area (both sampled and non-sampled hauls), for motherships, it is the day's catch, and for longliners, it is the set's catch. The ship's final estimate of landed catch (or adjusted estimate) should be used as the official daily total.

c. Record the total sample weight taken to determine species composition in the area in kilograms (or metric tons) in Column B "Total Sample Wt. KG." For stern trawlers this figure will be the sum of Column A from Form RM for the day. On motherships and longliners the total basket weight is the sum of all basket samples taken for species composition in the area that day or set from Form 3(2).

d. Record the total weight of each species (or species group) from the day's sample in the area in kilograms (or metric tons) in Column C "KG Sample." For stern trawlers, this figure will be the sum of Column D for each species (or species group) from Form RM for the day. On motherships and longliners, the weight is total weight for that species (or species group) found in the basket samples for the area from Form 3(2).

2. To determine the total daily catch of each species or species group, it is assumed that the proportion of each species in the catch is the same as found in your sampling for species composition. To calculate the total daily catch of each species (or species group) (Column D), multiply the total landed catch for the area (Column A) by the species sample weight (Column C), and divide the product by the total sample weight (Column B).

$$\text{Col D} = \frac{(\text{Col A}) \times (\text{Col C})}{(\text{Col B})}$$

3. At the end of each week, sum the estimated daily catch of each species group (sum Column D for the week) and the total landed catch (sum Column A for the week) by statistical area.

General Directions for Writing Radio Messages

1. Determine the number of vessel days on the grounds (DG) by statistical area for the week. This is simply the number of calendar days during the seven-day period (Sun-Sat) spent in each area. Both fishing and non-fishing days are counted. Days spent in transit are considered days on the grounds. If the ship traverses an area in which it does not fish, add to your radio messages the date, area, days on grounds, and reason. (Example: Aug 18/A62/DG1P1/traversing/). A whole day spent in port should not be considered a day on the grounds.

If the vessel fishes in two areas in one day, divide the day proportionally to the actual time spent in each area. For example, if on your vessel, 40% of the day occurred in area 51 and 60% in area 52, then 0.4 of the day is attributed to area 51, and 0.6 of a day to area 52.

During your first week on board each vessel you will only include the number of days beginning with your first day of sampling. The week that you get off a ship, days on grounds should end with your last sampling day. Days on grounds for all other weeks will add up to 7 or should be accounted for in the message. The ship's captain is required to accurately report changes in fishing area and should therefore be able to provide you the GMT time of the area change. In a proper radio message, all seven days will be accounted for and each area entered will only be listed once (exception: longliners give shallow and deep information for each area).

2. We require that you identify your first day of sampling on each new vessel. Use the following code at the end of your first two catch messages, "IDS NOV10." "IDS" stands for "Initial Day of Sampling." The IDS date is important to our program's data organization and, therefore, we ask that the IDS date be repeated in your second species composition radio message to insure that it is received correctly. [Note that the "days on grounds" for the first week begins with this day. Example: if you start sampling on a GMT Thursday, days on grounds will total 3 days for that week.]

3. If you are transferred to a new ship during the week, you must report the catch and effort data for the period spent on each ship separately. Your weekly message will include two reports, one for each ship, for that week.

4. Place the weekly catch and effort information in the proper message format as demonstrated in the following examples. Give the nation whose quota the catch will be applied against (even if you are not on a joint venture ship). Report the species in the same order as is given in the list of fish group abbreviations for that area. Species with zero catch do not need to be reported in the species composition portion of the radio message.

5. The following line of information should be written as the first entry of any radio message:

"NOJ DE vessel call sign MSG CATCHREP K"

This line identifies the message as a catch report from a foreign vessel.

6. The most recent GMT noon position and the date (month, day) of that position should be included in each radio message. This should be a routine part of the heading of every radio message so that the vessel's location can be monitored. Thus, it should be sent with the routine species composition and prohibited species messages, as well as any radio message sent at other times--i.e. to ask a question about sampling or inform us that the ship will be leaving soon. (See following examples.)

7. The GMT date and time of transfer from one sampling ship to another should be included in the first catch message on the ship that you transfer to. The time is not a critical item, but if there is a considerable delay between disembarkation of the first vessel and the embarkation of the second vessel, give the time and date of the arrival on the new vessel. (See following examples.)

8. Label the start of the species composition data as "PARA 1" for paragraph 1. The prohibited species data should be labelled "PARA 2." After "PARA 1", the vessels permit number and the Saturday date of the report week should be entered. Use the following 3 letter abbreviations for the month: JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC.

9. If your ship fishes outside of the FCZ in the Bering Sea, you should continue to sample and report the catch as coming from area 55.

10. Keep a copy of all weekly messages sent. You will be asked to transfer this information to keypunch forms for verification purposes upon your return to Seattle.

Example of a message sent from a fishery in Alaska:

(This is an example of the first species composition message sent from a second Japanese vessel fishing independently, using the heading containing the noon position 61°21'N 179°03'W for September 13.)

NOJ DE vessel call sign MSG CATCHREP K

TO: RUSS NELSON, NWAFC, SEATTLE WA
INFO: NMFS, AK REGION, JUNEAU AK
FROM: Your name, vessel name, and vessel permit number, 61-21N 179-03W SEP 13

TRANSFERRED TO TORA 0200 SEPT 8/PARA 1/VESSEL PERMIT NUMBER/SEP 12/ALL JAPAN

CATCH/SEP 9-12/A52/DG 4D0P4/SQU 11D53P10/TURB 0D07P7/OFLAT 0D52P7/POLL 135D86P23/

COD 42D77P20/SAB 2D85P15/ POP 2D69P17/OROCK 0D66P12/HER 0D02P2/OTH 0D09P9/

NON 0D94P13/TOTAL 198D0P18///

PARA 2/ (prohibited species message would be added at this point, refer to "Instructions for Making Weekly Prohibited Species Report")/IDS SEP 9/STOP.

Example of a message sent from a fishery off the Wash-Oreg-Calif. Coast:

(This is an example of the first species composition message sent from a second joint venture processor, using the heading containing the noon position 41°36'N 123°57'W for October 19.)

NOJ DE vessel call sign MSG CATCHREP K

TO: RUSS NELSON, NWAFC, SEATTLE WA
INFO: NMFS, NW REGION, SEATTLE WA
FROM: Your name, vessel name, and vessel permit number, 41-36N 123-57W OCT 19

TRANSFERRED TO KOLITRI 1900 OCT ~~19~~ 18/PARA 1/VESSEL PERMIT NUMBER/OCT 18/

ALL US CATCH/OCT 13-15,17/A71/DG 3D0P3/HAKE 96D73P25/JACK 15D21P9/POP 0D01P1/

RF 0D97P16/FLAT 0D25P7/SAB 0D12P3/OTH 3D20P5/NON 1D42P7/TOTAL 117D91P19/

SICK OCT 14-DID NOT SAMPLE DAYS CATCH OF 23MT///

OCT 16,18/A72/DG2P2/HAKE 42D71P14/JACK 5D22P9/SAB 0D44P8/OTH 1D27P10/NON 0D98P17/

TOTAL 50D62P13///

PARA 2/(prohibited species message would be added at this point, refer to "Instructions for Making Weekly Prohibited Species Report".)/IDS OCT 13/STOP.

*Remember--

A represents area

DG represents days on grounds

D represents decimal point (put in each catch figure, even if tonnage is a whole number; i.e. 125 mt should be sent as 125DOP8).

P represents the numerical check which is the sum of the actual value of the digits in the weight shown for the species.

Specific Directions for Longline and Joint Venture Radio Messages

1. For longline vessels only: Longline observers should calculate and report the catch data for the radio messages separately according to the target species of the fishery. The species composition of the catch has been found to vary largely due to the depth fished. When a set is retrieved from shallow water (water less than 500 meters), the catch is largely Pacific cod, and when the set is made in deep water, sablefish, rattails, or flatfish usually predominate. Determine whether the majority of the catch for a given day is typical of shallow water or deep water fishing and list the days on ground and catch data on separate RM-1 forms. If you have a shallow set and a deep set on the same day, extrapolate the catch data separately, but attribute the day on the ground to the depth at which most of the fishing was done. Your message format will look like the following:

/April 13-14/A63 SHALLOW DG2P2/FLAT ....
/April 15-19/A63 DEEP DG5P5/FLAT ....

2. For joint venture vessels: As it is usually possible to sample individual codends and obtain the ship's final estimate of the sampled hauls, the radio message information can be calculated in the same manner as for stern trawlers, using both Forms RM and RM-1. This is especially important when codends vary considerably in species composition. Catch data should be assigned to a particular area for radio message calculation according to the codend delivery position on Form 2.

3. For joint venture vessels in the hake fishery only: In joint venture operations in the hake fishery, it is important to determine the amount of bycatch species (species other than hake) that are discarded and not utilized. In this fishery only, discards of these species are not counted toward the quota. Calculate the quantity of bycatch species as is done with the other species on RM forms, estimate the percentage that was discarded, and for each species subtract the discarded amount from the tonnage caught. Your radio message should contain the estimated quantity of hake caught, the quantities of bycatch species retained, and the amount of bycatch species discarded. The total for each area should be the total caught (amount retained + amount discarded). All hake caught must be applied to the quota whether discarded or not. The example in #4 "for joint venture vessels which also fish on their own" illustrates how to report bycatch discards.

4. For joint venture vessels which also fish on their own: If you are on a vessel which has a permit to fish under a foreign quota as well as process fish that were caught by U.S. boats fishing under a U.S. quota, the catch data information for the two types of catch must be calculated and reported separately. Report the IDS (initial day of sampling) separately for foreign and joint venture catches. The following radio message illustrates how to designate foreign and U.S. catches taken by the same ship and how to report bycatch discards (DIS) from the joint venture catches in the hake fishery:

PARA 1/vessel permit number/NOV 16/POLISH CATCH/NOV 10-14/A71/DG5P5/ HAKE 61D62P15/JACK 10D90P10/POP OD14P5/RF 1D21P4/FLAT 1D11P3/SAB 3D44P11/ OTH 1D72P10/NON OD88P16/TOTAL 81D02P11/IDS NOVIO/// US CATCH/NOV13,15-16/ A71/DG3P3/HAKE 25D31P11/JACK 2D11P4/JACK DIS 1D22P5/POP 1D73P11/POP DIS OD89P17/RF 2DO4P6/RF DIS OD76P13/SAB 1D32P6/FLAT DIS OD32P5/OTH DIS OD42P6/NON DIS OD24P6/TOTAL 36D36P18/NOV 14-NO JV FISHING-ALL CATCHER BOATS IN PORT/IDS NOV 13/STOP.

Special Problems Involving the Weekly Species Composition Radio Message

1. Lack of Species Composition Data From an Area for a Day Fished. If, during the middle of a cruise you did not sample at all for a given fishing day due to illness, severe weather problems, or other reasons, do not extrapolate catch data for that period. In your weekly radio message, include only the days on the grounds and the catch data for the days you did sample, indicate the reason for not sampling, and report the dates and total catch tonnage of the non-sampled days. See previous example of a message sent from a fishery off the Wash-Oreg-Calif coast. (Remember, if no fishing occurs you will not have an estimated catch for the day, but it should be included in "days on the grounds.")

If, however, the ship fished in two or more areas in a day that you sampled, but you were unable to sample the catch for all of the areas in which the vessel fished that day, an extrapolation may be possible. Apply the sampling data (percent composition by weight) of the hauls from the previous or following day from that same area to the catch from that area for the day.

2. Two Distinct Types of Fishing Strategy Within a Day. In those cases where the vessel uses two distinct fishing strategies during the day to target on two different types of fish (i.e. flatfish during the day and rockfish at night), the observer may use the following method to calculate the daily catch for the weekly catch message.

a. Both types of hauls must be sampled each day and you must be able to designate each haul as one of the two types.

b. Within each area fished during the day, treat the two types of hauls separately on Form RM and Form RM-1 so that you estimate the catch of each species group separately for each type of haul. Within each area you will have two separate daily estimates of catch by species on Form RM-1.

c. At the week's end, sum all estimates from both types of hauls for each species (Column D). There is no need to separate the week's total into two types of hauls.

3. Ship's Trawl/Set Estimate Does Not Include Nonallocated Species. Due to the fact that vessel officers do not have to report the tonnage of non-allocated species in the cumulative catch log, they are often very reluctant to include the weight of this group in the total estimate of the trawl or set on Form 2 or 1L. Rattails, invertebrates, and sometimes prohibited species make up a sizable proportion of the catch. If these species are not included in the catch size estimate, this may seriously affect the accuracy of catch estimates by species. The translated letter of introduction which explains this situation should assist the observer in discussions with the captain over the inclusion of this group.

If the observer is unable to get the weight of the nonallocated species included in the catch weight, and the observer decides not to adjust the ship's estimate, it may still be possible to adjust the calculation of the radio messages so that the underestimation of the total catch will not affect the estimations of the other species groups. Using the species composition data from your samples, add up the weights of the non-reported species (use only those in the nonallocated group) and subtract that weight from the total sample weight. Enter this adjusted sample weight on the RM and RM-1 worksheets and do not enter the nonallocated group. If you use this method, let us know by adding the phrase "catch adjusted for nonallocated" to the end of each radio message.

4. Captain Objects to Data Included in Message. Some observers have encountered problems with vessel officers over the data contained in the observer's weekly radio message. In most cases, the problems have occurred over catches of species that are either not reported or are under-reported by

the vessel. You are not to arbitrate the data to be included in your radio message, and it is illegal for vessel personnel to interfere with the transmission of any message. If severe problems continue over the sending of data pertaining to particular species you may try one of the several options listed below.

a. The captain may agree to the sending of the message if a qualifying statement is added such as "The captain feels that the pollock catch is not representative of the true catch."

b. Send the proportion that the species makes up of the total catch in the following manner:

"HERRING OD003P3 OF TOTAL CATCH"

This will allow the staff at NWAFC to calculate the estimate from data you have sent showing the total landed catch for the area.

Instructions for Making Weekly Prohibited Species Report

The following set of instructions pertains to the data you have collected on the incidental catch of prohibited species (king crab, Tanner crab, halibut, and salmon) and their inclusion at the end of the weekly radio message. The information to be included in the message should be recorded on Form RM-3 "Weekly Radio Report Worksheet-Prohibited Species". The data required to complete this form are recorded on Forms 1 and 3(1) for motherships, Forms 2 and 3(1) for stern trawlers, and Forms 1L and 3L(1) for longliners. Instructions for completing Form RM-3 and placing that information in the correct message format are listed below.

1. Entry of data on Form RM-3 will be made for every haul on stern trawlers, day on motherships, or set on longliners which you sample for the incidence of prohibited species (<u>even if none are found in your samples</u>).

2. All data should be separated by area (i.e. 51, 52, 53, etc., see map) and each area recorded on separate sheets of Form RM-3. Longline observers should also report their data by depth (shallow--less than 500 m; deep--greater than 500 m).

FORM RM–3 Weekly Radio Report Worksheet · Prohibited Species Area 52 Cruise No. _____ Vessel Code _____ Page 1 of _____

			King Crab					Tanner Crab					Halibut					Salmon				
		A	B	C	D	E	F	B	C	D	E	F	B	C	D	E	F	B	C	D	E	F
	Date & Haul No.	Haul or Day Wt. (mt)	Sample Wt. (mt)	No. Observ. (nos.)	Ave. Wt. (kg)	Est. Nos. (nos.)	Est. Wt. (kg)	Sample Wt. (mt)	No. Observ. (nos.)	Ave. Wt. (kg)	Est. Nos. (nos.)	Est. Wt. (kg)	Sample Wt. (mt)	No. Observ. (nos.)	Ave. Wt. (kg)	Est. Nos. (nos.)	Est. Wt. (kg)	Sample Wt. (mt)	No. Observ. (nos.)	Ave. Wt. (kg)	Est. Nos. (nos.)	Est. Wt. (kg)
STERN TRAWLER EXAMPLE	9-9 #100	40.0	.52	0				.52	1	.13	76.9	10.00	.52	1	1.20	76.9	92.28	.52	0			
	9-10 #101	16.0	16.00	0				16.00	160	.16	160.0	25.60	16.00	2	3.10	2.0	6.20	16.00	3	1.83	3.0	5.49
	" #103	20.0	20.00	0				20.00	0				20.00	1	5.00	1.0	5.00	20.00	0			
	" #104	12.0	12.00	0				3.00	116	.18	464.0	83.52	12.00	11	6.47	11.0	71.17	12.00	4	4.39	4.0	17.56
	9-11 NO FISHING																					
	9-12 #105	8.0	8.00	0				8.00	123	.17	123.0	20.91	8.00	4	1.90	4.0	7.6	8.00	0			
	#106	20.0	20.00	0				20.00	15	.09	15.0	1.35	20.00	0				20.00	0			
	#109	30.0	15.00	0				15.00	0				15.00	0				15.00	1	3.20	2.0	6.40
	WEEK'S TOTAL	146.0				0	0				838.9	141.38				94.9	182.25				9.0	29.45
MOTHERSHIP EXAMPLE	8-31	718.0	35.66	5	.84	100.7	84.59	25.66	277	.18	7750.8	1395.14	35.66	11	2.58	221.5	571.47	35.66	0			
	9-1	668.0	87.78	2	.98	15.2	14.90	87.78	81	.19	616.4	117.12	87.78	3	3.77	22.8	85.96	87.78	0			
	9-2 NO FISHING																					
	WEEK'S TOTAL	1386.0				115.9	99.49				8367.2	1512.26				244.3	657.43					
LONGLINER EXAMPLE	DEEP DEPTHS																					
	10-19 #1	11.4	3.72	1	1.52	3.1	4.71	3.72	12	1.18	36.8	43.4	3.72	7	1.72	21.5	36.98	3.72	0			
	10-20 #1	16.5	4.83	4	2.18	13.7	29.87	4.83	0				4.83	35	2.83	119.6	338.47	4.83	0			
	10-21 #1	8.6	2.47	0				2.47	3	.17	10.4	1.77	2.47	3	2.94	10.4	30.58	2.47	0			
	10-21 #2	10.1	3.26	3	1.07	9.3	9.95	3.26	0				3.26	12	2.21	37.2	82.21	3.26	0			
	10-22 #1	~	NO	FISHING	~																	
	WEEK'S TOTAL	46.6				26.1	44.53				47.2	45.17				188.7	488.24					

3. Enter GMT date and the haul number of stern trawlers or set number on longliners. Remember the week runs from Sunday through Saturday GMT.

4. Column A. Enter the haul weight for stern trawlers, day's total catch for motherships, or the set catch for longliners. Enter the weight in metric tons (mt), not kilograms.

5. Column B. Enter the weight of groundfish catch sampled for each of the prohibited species to the nearest 0.01 mt. The data will be recorded by haul on stern trawlers. A total sample weight for the day (motherships) or set (longliners) will have to be computed by summing the sample weight over all sampling periods.

6. Column C. Enter the number observed of each prohibited species. The data will be recorded by haul on stern trawlers. A total number observed for the day (motherships) or set (longliners) will have to be computed by summing over all sampling periods.

7. Column D. Enter the average weight to the nearest 0.01 kg for each of the prohibited species. The average weights by haul are found on Form 3(1) for stern trawlers but a daily average will have to be computed for motherships and a set average for longliners. To compute the daily or set average, divide the sum of the weights of those individuals estimated or weighed during all sampling periods by the sum of the number of individuals estimated or weighed during all sampling periods.

8. Column E. Compute the estimated number of individuals caught of each species and record the result to the nearest 0.1.

$$\text{Column E} = \frac{\text{Column A} \times \text{Column C}}{\text{Column B}}$$

9. Column F. Compute Column F, the estimated weight of each species caught and record the result to the nearest 0.01 kg.

$$\text{Column F} = \text{Column D} \times \text{Column E}$$

10. At the end of each week sum columns A, E, and F by area for each species.

11. Use the following abbreviations and format for your weekly prohibited species catch report. Report all four species groups in the order given, even if none are seen.

Abbreviation	Meaning
A	area, see map in previous section
HW	sum of Column A
KNG	king crab
TAN	Tanner crab
HBT	halibut

SAL	salmon
NOS	sum of Column E
WT	sum of Column F
D	represents decimal point
P	represents numerical check (see previous section)

Sample of complete radio message (including a prohibited species report)

NOJ DE VESSEL CALL SIGN MSG CATCHREP K
TO: RUSS NELSON, NWAFC, SEATTLE WA
INFO: NMFS, AK REGION, JUNEAU AK
NMFS, NW REGION, SEATTLE, WA (for ships off Wash-Oregon-Calif)
FROM: your name, vessel name, and vessel permit number, 61-21 N 179-03W
SEPT 13 (most recent GMT noon position and date)

TRANSFERRED TO TORA 0200 SEPT 8/PARA 1/VESSEL PERMIT NUMBER/SEP 12/ALL JAPAN CATCH/SEPT 9-12/A52/DG 4D0P4/

SQU 11D53P10/TURB 0D07P7/OFLAT 0D52P7/POLL 135D86P23/COD 42D77P20/SAB 2D85P15/

POP 2D69P17/OROCK 0D66P12/HER 0D02P2/OTH 0D09P9/NON 0D94P13/TOTAL 198D0P18///

PARA 2/ALL JAPAN CATCH/SEPT 9-12/A52/HW 146D0P11/KNG 0D0P0/TAN NOS 838D9P28

WT 141D38P17/HBT NOS 94D9P22 WT 182D25P18/SAL NOS 9D0P9 WT 29D45P20/IDS SEPT 9/

STOP///

12. As with the species composition radio messages, keep a copy of all weekly prohibited species messages for verification upon your return to Seattle.

SENDING RADIO MESSAGES

The normal procedure for sending radio messages is to give them to the radio operator (after first clearing it with the captain at the start of the cruise), who then sends it to the Coast Guard. The Coast Guard relays it to NMFS Enforcement Division in Alaska, California, or Seattle, and the message, in telegram form, is mailed to the observer program headquarters in Seattle. If the message contains timely information about a transfer or disembarkation, the message is sometimes phoned from the Enforcement Division to our office, but keep in mind that messages take time to reach us.

Weekly catch radio messages should be sent on Sunday for Japanese small trawlers, Monday for all other Japanese vessels, and Tuesday for all non-Japanese vessels.

Transfers and disembarkations are normally arranged by NMFS with the vessels, the fleet commander, or fishing agency. Messages sent by NMFS to the vessel usually contain the phrase "information for master and observer" to insure that the observer is notified of dates and times of departure. Let us know, however, if the ship you are on is planning to leave the fishing area before your intended date of departure, or if it is planning to spend over five days transferring cargo or undergoing repairs. Try to notify us well in advance of any possible change in plans - give us at least five working days, and remember that no one will be in the office on Saturdays or Sundays. Make all messages short and to the point. No idle comments or personal business, please, as the Coast Guard does not like to pass on information of that nature.

In the event of a real emergency, such as a major injury requiring hospitalization, contact the Coast Guard via voice radio (or if that fails, via radio telegram), and they will attempt a rescue. Most minor illnesses and injuries, however, can be treated aboard ship. Seasickness sometimes

hampers an observer at the beginning of a cruise, but give it time - most seasick victims recover after a few days; in any case, it may take five days or more to arrange for the vessel to drop the observer off at the nearest port, and this is done only for extreme cases.

Past observers have asked for instructions on the proper use of the radio-telephone in calling the Coast Guard or notifying a land station that your ship is coming in to the pilot pickup point to disembark the observer. In many cases the transfer boat will not come out until the ship is readily visible or a message is sent indicating you are there. Refer to "Radio telephone procedure" in the Appendix for instructions and examples.

LOGBOOK ENTRIES

The observer logbook is not intended to be a personal diary but a record book of data not noted on any of the forms. Include in here anything that you may later want to include or summarize in your final report; anything unusual that occurs on the cruise; or anything else that you feel may be of interest to us. Changes in sampling procedure, sampling problems, calculation of bin dimensions, a detailed description of unidentified species, and conversations with the captain or officers on fishing strategy are all appropriate entries. Observer catch estimates, labeled with the date, haul, or set number should be recorded here, along with a description of how the estimate was obtained. It is also a good idea to keep a copy of all messages sent and received. Short comments on hauls sampled can go in the "remarks" section of Form 3, but additional explanation on anything unusual, such as a high percentage of rockfish in a hake ship trawl, or comments on hauls not sampled, can be entered in the logbook. Some observers have noted details on factory processing, or on the biology of the target species. Very little, for instance, is known about jack mackerel - what part of the water column they concentrate in or whether any ships actively target on them. Other observers have noted a high incidence of tumors on pollock in certain areas of the Bering Sea. At the end of the cruise, important entries should be summarized and entered in the final report.

It is essential that all suspected violations be fully documented in the logbook as soon after the occurrence as possible. Even if you can rely on your memory of the event, it is important that it be written down as soon as the problem is discovered. Although a complete report may be written upon your return, the original notes may be needed as evidence.

REPORT FORM NO. 2

Copies of Report Form No. 2 are provided to observers before going out on the foreign vessels so that the copies can be used as a draft if there is enough time at sea to work on them. Upon return, the drafts should be completed and very neatly written in ink on the final copies of the report form. The reports will not be retyped at the Center, so make them neat. Use complete sentences, not a telegraphic style, any time comments are requested. Please check spelling, grammar, and sentence structure. Observer reports are continually referred to by many people for a wide variety of reasons, so it is necessary for them to be well written, yet concise. The information revealed by the report is also one way NMFS personnel evaluate the performance of a particular observer.

A Report Form No. 2 is given on the following pages which was put together from the reports of several observers on various vessel types. It is intended to act as a guide in completing the forms and it should serve as an illustration of some of the items that can and should be included in this final report. See also "Logbook Entries" for a list of some of the topics that are of particular interest to NMFS personnel. Advice to future observers on the host vessel or suggestions for improvement in any aspect of the observer program can also be included in this report. Additional pages can be used for summary graphs, tables, discussion of sampling problems and data bias, observations on fishing technique, special projects, or vessel diagrams.

The report form example illustrates a cruise in which the observer boarded his host vessel via the transit boat from Dutch Harbor and at the end of approximately one month, he was transferred to a second vessel. The report for the second vessel would repeat the first four lines in the

itinerary but would give the arrival and departure dates for the second vessel. Other points to note:

1. Contracting Agency - This should be the agency which issues the salary checks. This will usually be the University of Washington, Oregon State University, or Frank Orth and Associates, but it could also be the Alaska Dept. of Fish and Game, the Halibut Commission, National Marine Fisheries Service, or another agency.
2. Enter local and GMT dates and times as indicated on the itinerary page.
3. U.S. Transfer Co. - The name of the agency or company which either took you out to the vessel or brought you back to port. It may be the Dutch Harbor Transit, The Alaska Tug and Salvage Company, the U.S. Coast Guard, or some other organization. If the ship came into dock, write "None, boarded/debarked at dock." If a joint venture catcher boat transports you in or out of a port, write "J.V. catcher boat" and the boat's name.
4. Fill out the gear diagram which most closely resembles the gear used on your host ship, and indicate modifications in the general design where necessary. The otter trawl diagram can be used to describe a pair trawler net, for example.
5. Remember to fill out a "List of Catcherboats for Motherships" form for all motherships. Joint venture motherships would list the U.S. catcher boats that fished for them.
6. Make vessel and factory diagrams fairly neat - preferably trace them onto plain white paper, 8 1/2" x 11".

Report #2 CRUISE # 025 VESSEL CODE RS15

Vessel Name The Rising Star

Observer John Borden Contracting Agency Univ. of Wash., FRI

Itinerary : (Local dates and time)

Depart Seattle June 3, 1981 (18:05) Return Seattle August 7, 1981 (23:35)

Depart Port for Vessel June 5 (9:30) Return to Port from Vessel Aug. 6, (10:30)

Port of Departure Dutch Harbor Port of Return Dutch Harbor

U.S. Transfer Co. Dutch Harbor Transit U.S. Transfer Co. Dutch Harbor Transit

Arrival Aboard Vessel June 5 (10:15) Depart Vessel July 9 (14:00)

Dates Not Sampled (if any, and reasons why) June 21-22, transporting cargo;

July 5, rough seas - no fishing

Date Sampling Began June 6, 1981 Date Sampling Ended July 8, 1981

Total # Days Sampled 30

Sampling on Other Ships : Cr.# 31

Vessel Name Mys Svobodny

Dates Aboard July 9 - Aug. 4, 1981

Name and Dates Aboard Ships Used as Transport Only : Mys Grina, Aug. 5 - Aug. 6

GMT dates and time

Customs Check : Location Dutch Harbor Date Aug. 6, 1981 Time 12:30
(Local dates and time)

Vessel Statistics Permit # UR-81-9995 Vessel Type Large stern trawler (BMRT)

Length 83.31 m Width 14.03 m Draft 5.65 m

Gross Tonnage 2336.0 Net Tonnage 842.0

Engine Type Diesel Horsepower 2000 H.P.

Year Commissioned 1975 Radio Call Sign EUDS

Company Korsakovskaia Baza Okeanicheskogo Rybolovstva

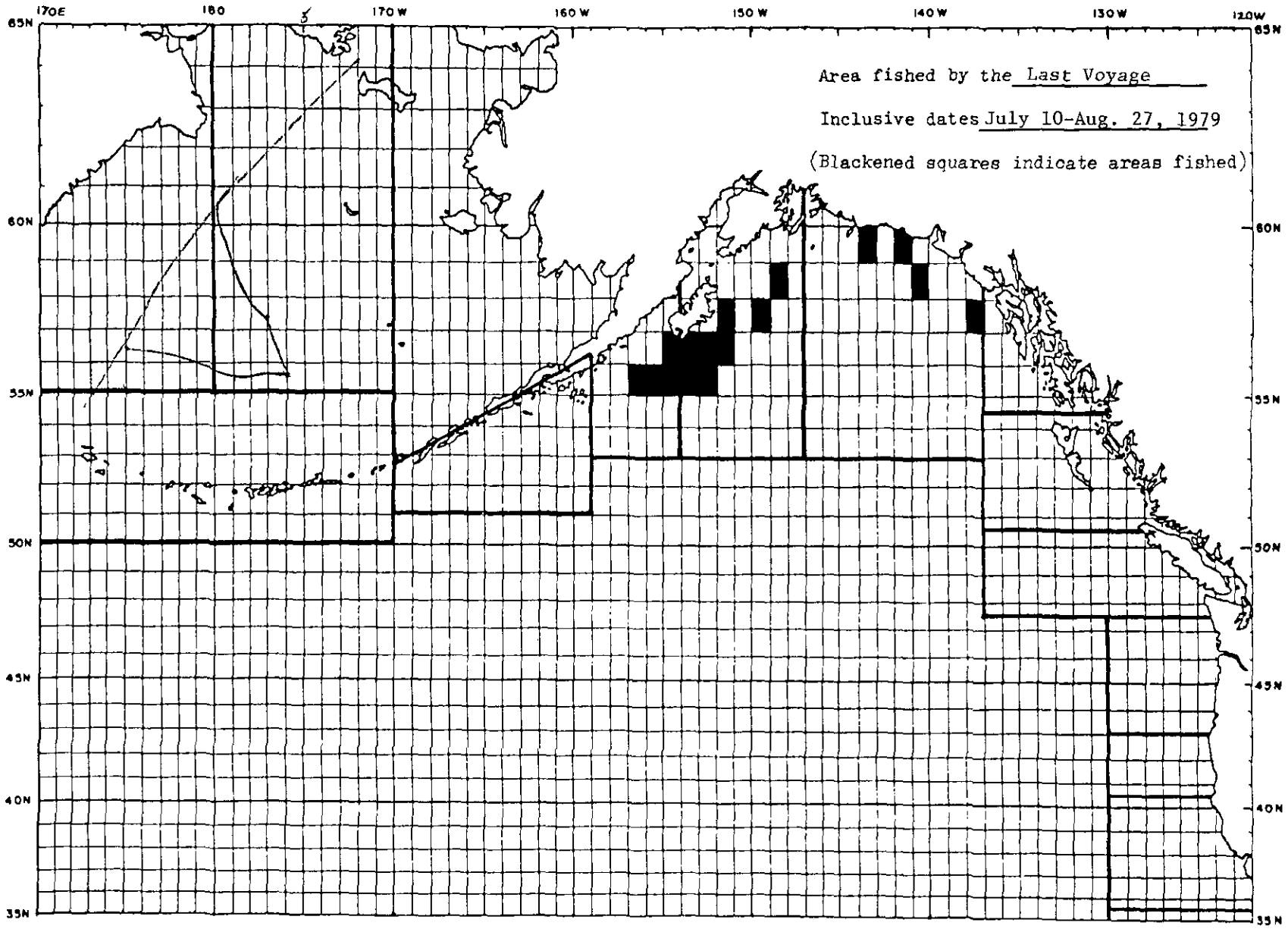
Home Port Korsakov, Sakhalin Island, USSR

Name and position of officers important in fishing operation, factory, sampling :

Captain Vladimir Petrenko Ivan Timoshenko, vessel manager

Boris Ksheminskyi, factory manager

Officers 22 #Crew 44 #Processing 26 Total Ship Complement 92


170E
180
170W
160W
150W
140W
130W
120W
65N
60N
55N
50N
45N
40N
35N
Area fished by the Last Voyage
Inclusive dates July 10-Aug. 27, 1979
(Blackened squares indicate areas fished)

List Of Catcher Boats For Mothership Mineshima Maru

Vessel Type Pollock Mothership

Observation Period 9/5 - 11/12/78 **Observers** George Jones

	Vessel Name	Hull No.	Permit No.	Vessel Owner	Gross Tons	Horse Power	Length (m.)	Date Commissioned	No. In Crew
Danish Seiners	Kaiko Maru #8	109537	JA-77-0090	Nakazimaishizo Shoten	124.79	1300	31.46	10-71	19
	Ebisu Maru #21	102586	JA-77-0091	Maruhon Suisan Co.	124.66	1200	31.49	11-70	19
	Kaiun Maru #25	116697	JA-77-0092	Kaium Suisan Co.	124.53	1400	31.57	01-74	19
	Shosei Maru #15	110037	JA-77-0094	Showo Suisan Co.	124.50	1300	31.20	09-71	19
	Mitsu Maru #50	109535	JA-77-0095	Shuichi Nishimura	124.10	1300	31.51	09-71	19
	Heikyu Maru #25	110034	JA-77-0098	Sato Gyogyobu	124.59	1300	31.21	09-71	19
Pair Trawlers	Hakurei Maru	110939	JA-77-0018	Nippon Suisan	214.46	1400	36.50	05-71	13
	Shuyo Maru	109752	JA-77-0110	" "	154.51	1200	34.95	08-70	14
	Eiyo Maru	109753	JA-77-0111	" "	194.12	1200	34.95	08-70	13
	Koyo Maru	108837	JA-77-0112	" "	194.49	1200	34.95	06-70	14
	Fukuyo Maru	108838	JA-77-0113	" "	194.28	1200	34.95	07-70	13
	Katori Maru	108863	JA-77-0114	" "	194.69	1200	34.95	07-70	14
	Katsuki Maru	108864	JA-77-0115	" "	194.66	1200	34.95	07-70	13
	Aoba Maru	108865	JA-77-0116	" "	194.76	1200	34.95	09-70	14
	Wakaba Maru	108866	JA-77-0117	" "	194.97	1200	34.95	09-70	13
	Washima Maru	111168	JA-77-0122	" "	204.86	1200	36.54	11-71	14
	Toyoshima Maru	111169	JA-77-0121	" "	204.53	1200	36.50	11-71	13
Stern Trawlers	Otoha Maru	111081	JA-77-0010	" "	214.65	1400	36.50	06-71	14
	Kureha Maru	111082	JA-77-0011	" "	214.67	1400	36.50	07-71	13
	Hokkai Maru	110938	JA-77-0011	" "	214.77	1400	36.50	05-71	14
	Hokko Maru #77	116712	JA-77-0100	Hokkogyogyo Co.	349.62	3000	51.54	09-76	26
	Hokko Maru #57	116695	JA-77-0101	" "	348.77	2800	56.00	11-73	25

Bottom Trawl **Net Dimensions And Characteristics**

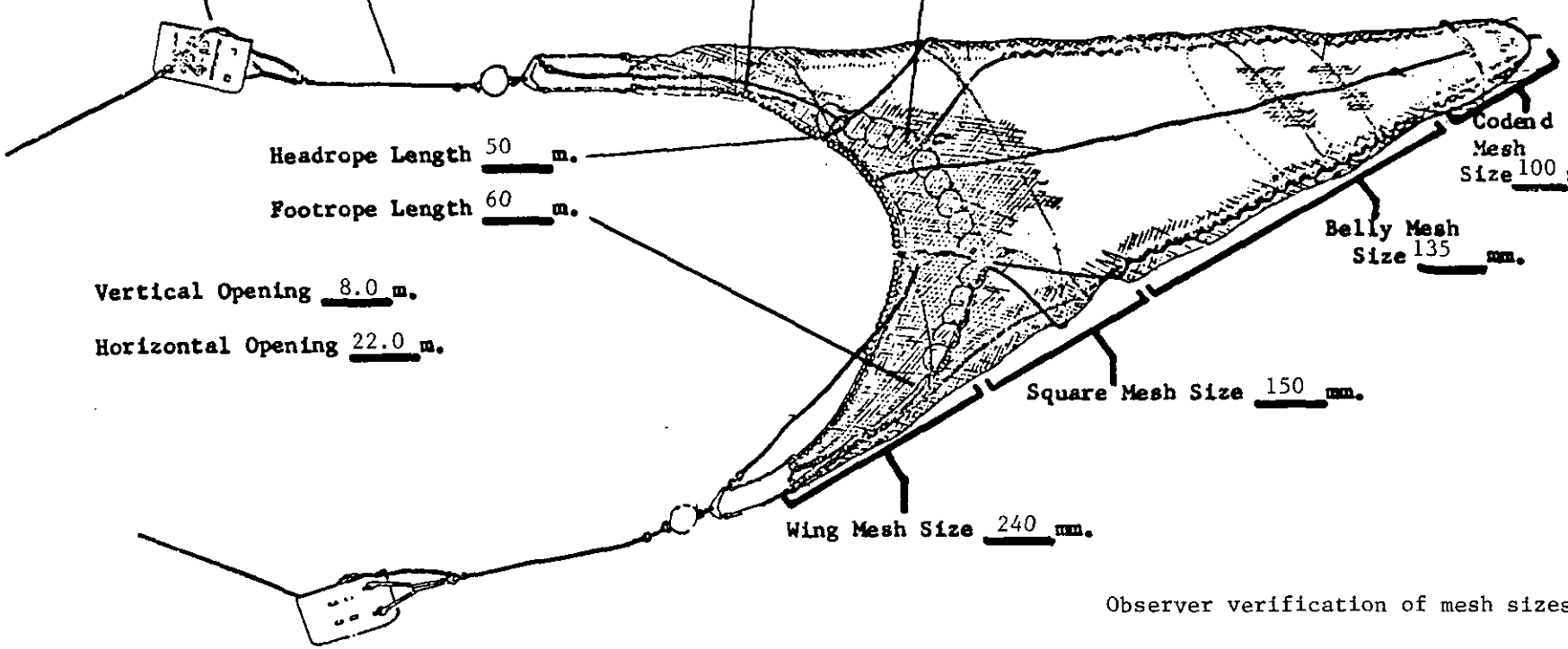
Vessel Type Large Stern Trawler **Observation Period** July 21 - August 28, 1981

Trawl Doors: Shape Rectangular, concave
Material Steel
Dimensions 3.8 m. x 2.4 m.
Weight 4000 kg

Dandyline Length 100 m.

Floats: Number 45
Size 36 cm.
Material plastic
Shape spherical

Bobbins: Number 23
Size 53 cm.
Material Steel
Shape spherical



Observer verification of mesh sizes

Yes XX No

Fish Finder
Name Sanken
Model Number TV-16
Frequency 28,80, 194 kc.
Paper Type (wet or dry)
Speed of Advance 12mm/min

Net Recorder
Name Furuno
Model Number FNR-100
Frequency 50 & 100 kc.

PELAGIC TRAWL NET DIMENSIONS AND CHARACTERISTICS

Vessel Type Large Stern Trawler

Observation Period July 16 - August 15, 1981

Wing section was composed of: (circle one)

ropelines (as illustrated)
large mesh

Trawl Doors: Shape Rectangular
Material Steel
Dimensions 2.4 m. x 5.2 m.
Weight 1500 kg.

Dandyline Length 80 m

Net Recorder: Name ELAC-LAZ
Model Number 28445
Frequency 30kHz. kc.

Floats: Number 20
Size 22 cm.
Material Aluminum
Shape Sphere

Headrope Length 112 m.

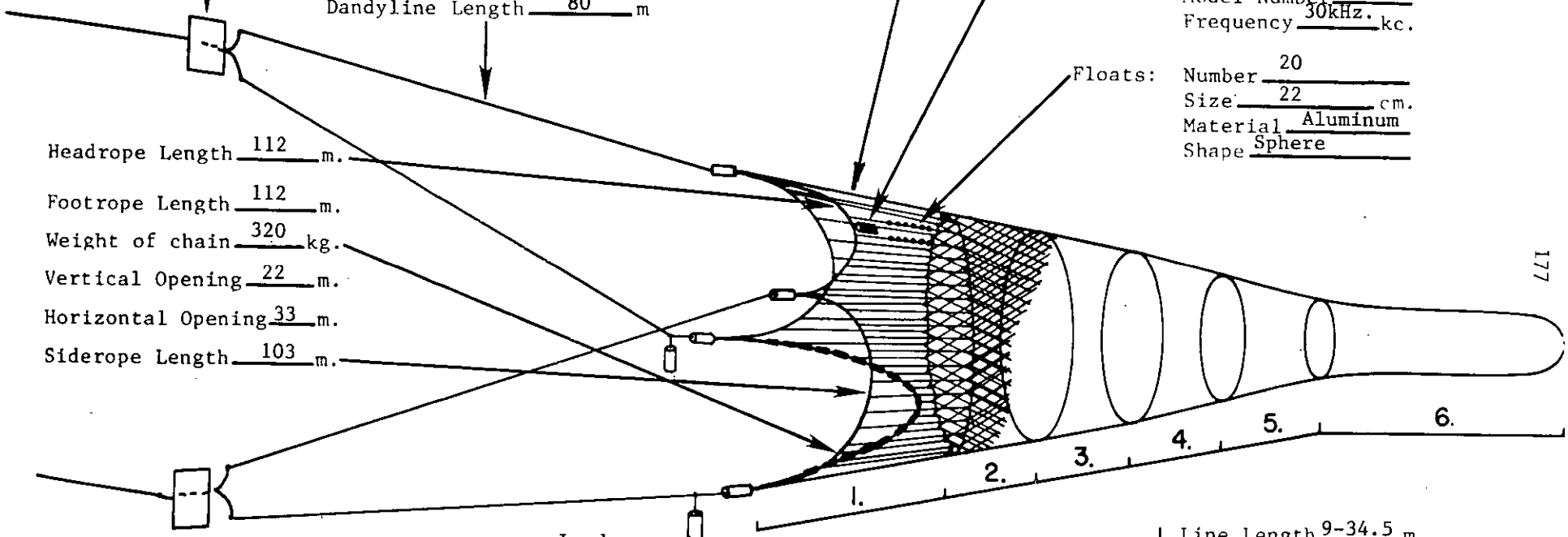
Footrope Length 112 m.

Weight of chain 320 kg.

Vertical Opening 22 m.

Horizontal Opening 33 m.

Siderope Length 103 m.



Weights: Lead
Number 2
Weight 1000 kg

Fish Finder
Name ELAC - Superlodar
Model No. LAZ-44 119
Frequency 50kHz kc.
Paper type: wet or dry
Speed of Paper Advance 1cm/min

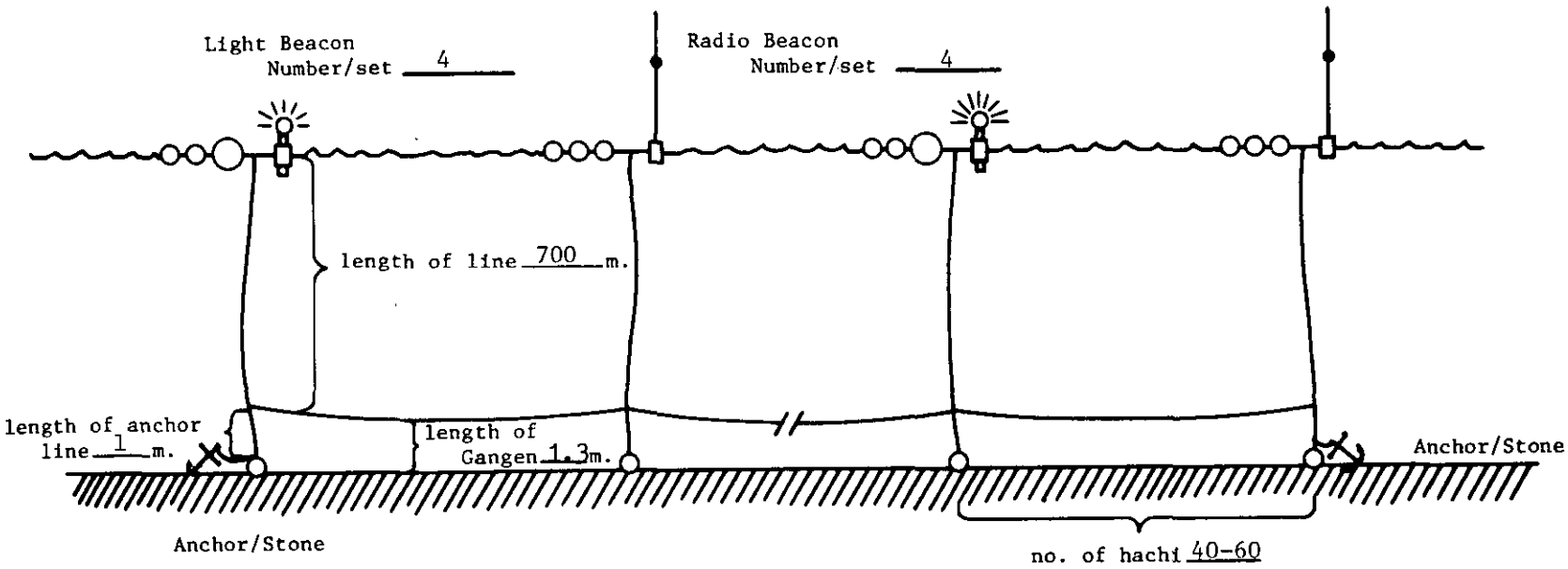
Observer verification of mesh sizes:

Yes XX Date 7/20/81
No

1. Line Length 9-34.5 m
2. Mesh size 600 mm
3. Mesh size 800 mm
4. Mesh size 400 mm
5. Mesh size 200 mm
6. Codend mesh size 120 mm

Net Length 65.2 m.

LONGLINE DIMENSIONS



Hachi Length 95 m

Average set Length 39.9 km.

Breaking strength of gangen 30 kg

Average number hachi/set 400

Average number hooks/hachi 40

Hook size #8

Explanation of sampling procedures and problems; validity of data results:

After a codend was landed on board, the fish were dumped into below-deck factory bunkers or into on-deck holding bins, if the factory bunkers were already full of fish. I sampled in the factory and used the whole-haul method. My sampling station was near the conveyor that emptied the bunker. I would monitor the belt for incidental species and periodically fill baskets (at random intervals throughout the emptying of the bunker) for average weight determination of the target species. I would use the hake from these baskets for length frequency and otolith collecting. I also used these baskets for determining density, which I applied to the bunker volume to make my estimate of the haul size. Bunker volume estimates had to be made immediately after dumping the codend since they would flood the bunkers soon after sealing them off.

Prohibited species sampling was accomplished during the whole-haul sorting process. The ship's usual procedure was to sort out prohibited species on the conveyor belt in the factory. Therefore, I recorded the condition of the halibut as soon as they appeared on the belt during my monitoring.

An average-sized haul usually took between 1-2 hours to monitor in the factory. I felt very confident that I had gotten all of the incidental species because there was no possible means of presorting or biasing my data, since I was the first one to see the fish as they flowed out of the sealed bunker. (I also was present when the codends were dumped into the bunkers.)

Incidental catch was extremely small and I gradually got the impression that anything but hake was a nuisance in the factory; the factory fish-cleaning machines work only on the relatively standard sizes and form of hake, and if the ship intended to use other species for any product but meal, new equipment would have to be installed. Incidental rockfish were eaten by the crew during the evening tea and only in very unusual trawls were there so much rockfish that they wouldn't be eaten that day. In these cases, the rockfish were frozen and saved for the many days when none turned up in the catch. All squid and dogfish were dumped overboard unused after my sampling.

The Lost Snail seemed to be well within the U.S. guidelines on incidental catch at all times. The Captain was well informed of all regulations and I experienced no problems whatsoever in sampling all incidental catch, unlike other observers I spoke to. All restricted areas were marked on charts and avoided and the ship stayed outside a 15-mile line from the coast that the officers said was their safety factory.

General comments and conclusions; use additional pages as necessary to comment on problems, observations. Suggested entries:

1. Report the use of any innovative net design, navigational equipment, fishing strategy, or processing machinery.
2. Recount any unusual occurrence such as an accident or injury at sea.
3. Describe anything unusual concerning the catches.
4. Report anything that you feel the next observer or NMFS should know.

This ship had an innovative double-net system which was designed to reduce the incidental catch of halibut and crab. The double-net system is composed of a regular midwater trawling net except that there is a false bottom on the net, and it is not entirely connected to the upper portion. This is designed to allow those species which are kicked up off the bottom to pass through the net, while those fish that are in the water column (in this case, schools of hake) are caught in the upper portions of the net and concentrated in the cod end. This net appeared to work quite well since we caught very few halibut, crab, or other bottom dwelling organisms (such as starfish) while I was on board.

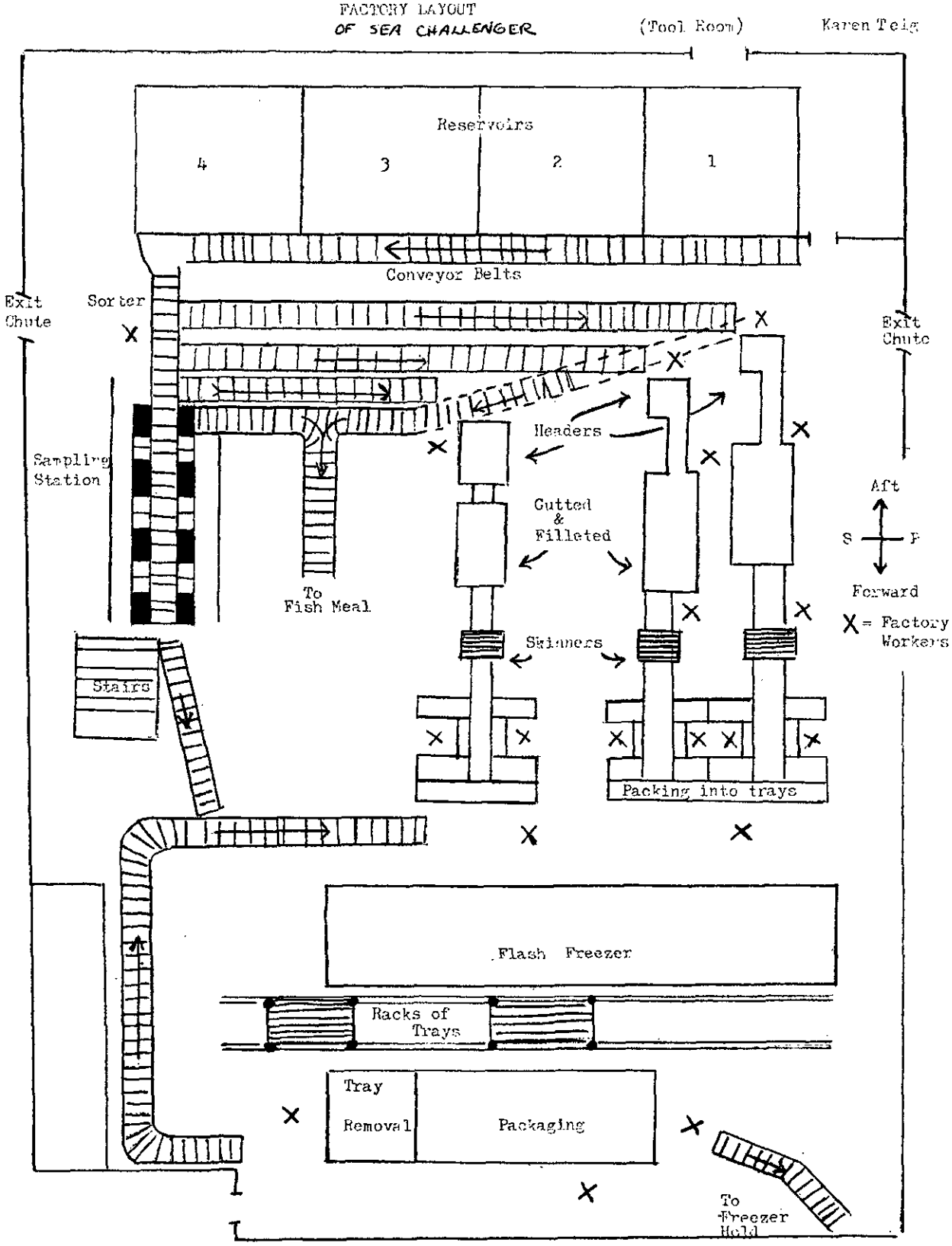
I noticed that on the few occasions when rockfish amounted to anything more than 1 or 2% of the catch that the fish finder showed an undersea rise in the area. On one occasion, the trawl snagged such a rise and ripped badly (haul #128). When the net was retrieved, I estimated that there were fifty or sixty rockfish in the cod end, and maybe fifty hake. This was the only instance I observed where there was a high percentage of rockfish.

During my stay on this ship there were two major injuries. Both occurred during rough seas on separate occasions, and one required a medical evacuation to Coos Bay on June 23 by the USCGC Righteous. Safety for the crew, and especially for the observer, was not taken lightly. I was reminded frequently to be careful while working on the deck or in the factory. Both accidents occurred while hauling in the net. In one incident a trawl cable snapped just like a rubberband and broke the leg of a crew member standing near the winch house. In the other case a crew member got his hand caught between the trawl cable and the winch drum, resulting in a badly broken hand. After these accidents I was especially careful on deck and always watched the net retrieval from a safe and protected vantage point inside the doorway leading from the factory to the trawl deck.

The friendliness of the people made my stay aboard the Lost Snail more enjoyable. My only regret was that I could not speak their native language. I knew only the essentials, not really enough to maintain a conversation, and since I was so busy, I did not normally have time to learn much more. The food was better than I had expected. I was given a supplemental meal at 11:00 a.m. (if I was not sampling), consisting of either fried eggs or a small piece of meat. As fruit and vegetables were seldom seen and protein is limited, it is still advisable to bring some supplemental food--a small jar of peanut butter, some dried fruit and raisins, and multivitamins. As cockroaches were present, all food should be kept in plastic containers or bags. Cockroach motels help cut down the roach population.

Hot showers were available only every ten days. A sign above the sink in the room warns not to drink the water, but mineral water and fruit juices were available. On a few occasions no water was available for washing up after returning from sampling--I learned to store a little just in case.

FACTORY LAYOUT
OF SEA CHALLENGER



Analysis of Utilization of Pollock

I wanted to do an analysis on the utilization of the pollock. That is why I collected the data on cargo unloaded off the Tomoto Maru. Also, I've obtained a pollock utilization scheme from the captain. The captain's scheme shows a 24.6% conversion factor of pollock to surimi. The viscera, head, and skin which are removed go into the production of fish meal and fish oil, while the fish paste is used to produce surimi.

I've put together a table showing the tons pollock landed while I was aboard, as well as the expected tons surimi produced and the actual amount of product offloaded to cargo vessels.

Since the boat had surimi aboard when I boarded, and they seldom completely emptied the ship of all its surimi on any one transport, I don't know how useful this data is. I've made the assumption that on 8/13 they offloaded almost all the product on the ship. I say almost emptied because inspection proves that during the fishing period of 8/13-8/17, we didn't land enough pollock to produce the 91.2 tonds unloaded. I made the same assumption that we did or almost completely emptied the Tomoto Maru again on 9/15.

With these two assumptions, a quick glance tells you that the pollock to surimi conversion factor given to me is pretty accurate.

Fishing period in local time	Approximate tons pollock landed	Conversion factor pollock to surimi	Estimation tons produced	Tons actually unloaded.
7/15-7/20	660.00	24.6%	162.36	80
7/21-8/02	1083.82	24.6%	266.62	182
8/03-8/12	778.67	24.6%	191.55	674
			620.53	936
8/13-8/17	191.81	24.6%	47.18	91.2
8/18-8/21	167.04	24.6%	41.09	30.8
8/22-8/24	339.68	24.6%	83.56	145
8/25-9/04	941.48	24.6%	231.60	136
9/05-9/09	522.56	24.6%	128.55	1.1
9/10-9/19	350.32	24.6%	86.18	238.7
	2512.89		618.16	642.8*

*Conversion factor would be 25.58% if indeed this were correct tonnage unloaded and if indeed 2512.89 was the amount of pollock brought aboard.

(Keep this separate from report 2)

Cruise# 456 Vessel Code NS28 Observer Name Clyde Herman

Ship Name Titanic Maru

Record the presence or absence of net-scarred salmon in the following table:

No. observered for net-scars		No. with net scars	
Chinook	57	Chinook	2
Coho	6	Coho	
Pink		Pink	
Sockeye		Sockeye	
Chum		Chum	

Describe the appearance of net-marks, if any, and give the location(lat.&long.) that the salmon was caught.

One salmon had a series of "x" marks on one side which appeared to be fresh and were possibly caused by being caught in the trawl net of this vessel. The other salmon had an old scar which was a straight line behind the operculum on both sides of the head and appeared to have been caused by escaping from a gill net sometime in the past.

Did you take any photos of net-scarred salmon?

Yes x No

Comments (if any):

Both fish were dead when I saw them and scale samples were taken for aging. The following data were taken and recorded on the appropriate data forms:

Species	Sex	Length	Weight	
King	Male	41 cm	1.2 kg	-- ("trawl net-type" scarred fish)
King	Male	67 cm	3.4 kg	-- ("gill net-type" scarred fish)

(This form is not to be included with report 2)

Observer Name: John Doe

Cruise No. 008 Vessel Code QS29 Ship Name: Pollock Princess

Estimate of amount of discarded netting by area:

	AREA 51	AREA 61	AREA 62
No. of net-mending operations monitored	12	4	7
Average no. of pieces discarded/net-mending operation	15/12 = 1.3	6/4 = 1.5	7/7 = 1
Average no. of net-mending operations/week	45/4 = 11.3	28/3 = 9.3	4/1 = 4

Approximate size composition of the discarded pieces of netting that you observed while monitoring net-mending:
(record the number of pieces observed in each category.)

	cod-end mesh	belly mesh	wing mesh
No. less than 0.1 m^2 (1 ft^2)	12	6	—
No. 0.1 m^2 to 0.37 m^2 (1 ft^2 to 4 ft^2)	—	—	—
No. 0.37 m^2 to 0.836 m^2 (4 ft^2 to 9 ft^2)	—	—	
No. larger than 0.836 m^2 (9 ft^2)	2 (See note on back)	—	—

Please answer the following questions, using the back where necessary.

1. To your knowledge during the period you were aboard, did your ship lose any trawl nets or discard any badly torn codends?
   Yes ✓ No____ (If yes, describe the circumstances.)

2. Did you observe any pieces of webbing in the catches?
   Yes ✓ No____ (If yes, describe the size of the pieces, the approximate mesh size, and whether you think the mesh was taken on the bottom or mid-water.)

3. Did you see any evidence of floating net material, observe a marine mammal with entangling matter, or hear of a propeller fouled by webbing?
   Yes____ No ✓ (If yes, please comment.)

4. What were the colors of the nets used on this vessel, and was the material used in mending of the same color? Medium – Dark Green. Yes.

Please place comments on any of the above on the back of this sheet.

(THIS IS THE REVERSE SIDE OF THE NET DISCARD FORM.)

1.) The Pollock Princess discarded damaged net pieces on several occasions. On 10/24/83 and 10/28/83 in area 51, I observed large pieces of netting being dumped into the sea. These pieces were damaged sides of their 4-sided net. I was unable to measure the pieces but the size of the pile dumped on 10/24/83 was about 10ft. round and 4 ft. high, consisting of 2 side pieces from the net.

On another occasion the entire codend was lost on 11/5/83 in area 61, when the net caught an underwater projection. Both cables snapped before they realized what was happening. They tried snagging the net with grappling hooks but to no avail.

2.) The only netting I found in the catches were small pieces of cord, 3-6 inches long. These were during midwater trawls and were probably pieces of the net lining of our own net.

OBSERVER RETURN AND COMPLETION OF DUTY

As previously mentioned in "Sending Radio Messages," disembarkation arrangements are arranged between NMFS and the vessel, fishery agency, or fleet commander, and the observer should be informed of the plans. Due to the difficulties inherent in making the arrangements, however, the observer often is not given much advance notice, so be prepared when the time draws near. Continue sampling as long as it is practical, but allow enough time to pack your gear. Return all borrowed items and equipment, doublecheck your inventory list to make certain that you do not leave anything of value behind, remember to get the information on the last hauls (Data Forms 1, 1L, or 2) - especially if you sampled them, and pack all water-sensitive items (especially data forms) in plastic bags. If the ship is going to be unable to meet the arranged disembarkation schedule, have the captain send a message as soon as possible with the new estimated time of arrival. Refer to "radio-telephone procedure" in the Appendix for the correct procedure used in notifying the Coast Guard or port of your arrival at the pilot pickup point. The Appendix also contains charts of commonly used ports in Alaska (Dutch Harbor, Kodiak, Seward, and Adak) showing the pilot pick-up points. If the transfer boat does not appear as scheduled, contact them according to the embarking/disembarking directions in the section "Transport to the Ship."

Upon arrival in the port, remember to report to the nearest Customs office (see "Customs"). Confirm your plane reservations, and arrange accommodations for yourself if you are unable to fly out the same day. You have an obligation to return directly to Seattle as soon as possible (exceptions can sometimes be made if prior arrangements have been made with NMFS approval). Report to the observer program on the first working day following your return.

If your flight arrives early in the morning and you have not had much sleep, at least call us to notify us of your return. Following your return to Seattle, you will continue to be paid for five working days. On return, you have an obligation to complete all paperwork to our satisfaction, and be available to answer any questions we may have concerning your data. All data forms must be turned in at least two full working days before the day you plan to leave and Report #2's must be turned in at least one full working day before leaving. The following list indicates some of the duties to be accomplished following your return:

1. Call the NMFS office (442-4990) on the first working day after your return to find out the location for your completion of duties. Debriefing will be held at either the Sand Point Control Tower or NWAFC.

2. If you are hired on contract, contact the contract organization as soon as possible, settle your expense account, and complete all required paperwork. For University of Washington contracts, call Diane Rubiano (9-543-9575); for Oregon State University, contact Virginia Veach (8-503-754-4531).

3. If you had an injury while at sea, report it to the contract organization, even if you expect no further problems from it.

4. Times for gear check-in will be arranged daily. All gear should be clean, and metal parts should be oiled. The equipment will be inspected for cleanliness and damage. Point out any malfunctioning items of equipment or rips in the raingear. Attach a note to the item explaining the problem.

5. During debriefing someone will glance over your forms to catch obvious errors in filling them out and to answer any questions you may have. At this time, point out any problems you had in sampling or anything unusual about the cruise. Cruise numbers and vessel codes will be given to you at this time.

6. Fill out an address card with your permanent address, your permanent phone number, your temporary address and phone number while staying in Seattle (if different from your permanent address), and the approximate dates you will be at the temporary address.

7. Turn in any salmon scales other than king salmon. Make sure they are properly labeled. (The king salmon scales should be turned in later--see #14.)

8. Fill out RM-2 and RM-4 forms (radio message keypunch forms for species composition and prohibited species). If you need to correct any of your previously sent radio messages, enter the corrected radio messages

on the keypunch forms and indicate in the margins that these are changes. If your last radio message did not include data from your final days on board, enter this information on the keypunch forms and label this as "last days' data." On form RM-4, when a given species was not seen, enter zeros in the appropriate columns. Turn in your radio message worksheets with your RM-2 and RM-4 forms. Be sure that they are easily understandable and completely filled out. Don't forget cruise numbers, vessel codes, page numbers, and your name and the ship name on the first page of each form.

9. Complete writing Report Form #1 (Enforcement Report). Neatly print it on new report forms in ink. This report should be turned in the first or second day of your return.

10. Add the cruise number and vessel codes to all of the forms and fill out the second number in the page numbering system if you have not done this already.

11. Glance over each data sheet to see that they are filled out correctly--all arrows and brackets in place, all sample weights and numbers entered properly.

12. Enter all observer estimates of catch in the designated column of Form 1L or 2, opposite the proper set or haul. (Remember to include in the final report a description of how the ship estimates and observer estimates are made, and possible reasons for any discrepancies.)

13. Write your name and the ship's name at the top of the first sheet of each group of data forms. Your name and ship name should thus be written at the top of the first sheet of Forms 1, 1L, 2, 3(1), 4, 7, 8, 9, 10, 11, and radio-report worksheets for each ship. If you need information from your data forms to complete your reports, tabulate or copy the data you need before turning in the forms. (Remember to fill out the map page of Report #2 before turning in your data.)

14. Turn in the boxes of otoliths, packets of scale envelopes, and completed Form 9's at the same time. Deliver them to the person who will check them for the proper organization and labeling. (Remember to fill in the area on each page of Form 9.)

15. Finish writing the Report Form #2 and print it on new report forms in ink. Do not leave for your home until someone has had a chance to look at it and accept it. Also turn in your logbook at this time.

16. A pre-keypunch check must be performed by Center personnel on all data forms before you leave.

17. Turn in any other supplies--calculators, books that were not turned in earlier. Clean up your work space before leaving at the end of each day.

18. Former observers have an obligation to answer questions that may turn up later as the data are being processed. Before leaving, make sure we have a phone number where you can be reached and a permanent mailing address.

19. All observer data collected are the property of the U.S. government. No observer can retain or copy any data or reports following their return unless granted express permission of the National Marine Fisheries Service. This includes information used as part of a school project, thesis paper, articles for publication, or interview with news media. The main reason for this restriction is due to the Privacy Act, which protects the privacy rights of the vessel owners. NWFS also reserves the right to review for accuracy the draft for any article or publication concerning your observer experiences. Any questions concerning this or requests for permission should be directed to Russell Nelson.

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CONVERSION TABLES
POUNDS TO KILOGRAMS

Lb.	Kg	Lb.	Kg.	Lb.	Kg.
.5	.2	34.0	15.4	77.0	35.0
1.0	.5	35.0	15.9	78.0	35.4
1.5	.7	36.0	16.3	79.0	35.9
2.0	.9	37.0	16.8	80.0	36.3
2.5	1.1	38.0	17.3	81.0	36.8
3.0	1.4	39.0	17.7	82.0	37.2
3.5	1.6	40.0	18.2	83.0	37.7
4.0	1.8	41.0	18.6	84.0	38.1
4.5	2.0	42.0	19.1	85.0	38.6
5.0	2.3	43.0	19.5	86.0	39.0
5.5	2.5	44.0	20.0	87.0	39.5
6.0	2.7	45.0	20.4	88.0	40.0
6.5	3.0	46.0	20.9	89.0	40.4
7.0	3.2	47.0	21.3	90.0	40.9
7.5	3.4	48.0	21.8	91.0	41.4
8.0	3.6	49.0	22.2	92.0	41.8
8.5	3.9	50.0	22.7	93.0	42.3
9.0	4.1	51.0	23.2	94.0	42.7
9.5	4.3	52.0	23.6	95.0	43.2
10.0	4.5	53.0	24.1	96.0	43.6
11.0	5.0	54.0	24.5	97.0	44.1
12.0	5.4	55.0	25.0	98.0	44.5
13.0	5.9	56.0	25.4	99.0	45.0
14.0	6.4	57.0	25.9	100.0	45.5
15.0	6.8	58.0	26.3		
16.0	7.3	59.0	26.8		
17.0	7.7	60.0	27.2		
18.0	8.2	61.0	27.7		
19.0	8.6	62.0	28.1		
20.0	9.1	63.0	28.6		
21.0	9.5	64.0	29.1		
22.0	10.0	65.0	29.5		
23.0	10.4	66.0	30.0		
24.0	10.9	67.0	30.4		
25.0	11.4	68.0	30.9		
26.0	11.8	69.0	31.3		
27.0	12.3	70.0	31.8		
28.0	12.7	71.0	32.2		
29.0	13.2	72.0	32.7		
30.0	13.6	73.0	33.1		
31.0	14.1	74.0	33.6		
32.0	14.5	75.0	34.1		
33.0	15.0	76.0	34.5		

metric ton = 1000 kg. = 2204.6 lb.

meter = 100 cm = 1000 mm = 3.2808 ft.
= .54681 fathoms

foot = .3048 meter = .1667 fathoms

nautical mile = 1.15078 miles (statute mile)
= 1 minute of latitude

statute mile = 5280 ft. = 1.609 km.

liter = 1.0567 U.S. quarts

Relationship of Pacific halibut lengths (CMS) to kilograms - round (live) weights

Length (cm)	Kilograms	Length (cm)	Kilograms	Length (cm)	Kilograms
10	.007	55	1.821	100	12.635
11	.010	56	1.930	101	13.049
12	.013	57	2.045	102	13.472
13	.017	58	2.163	103	13.905
14	.022	59	2.286	104	14.347
15	.027	60	2.414	105	14.799
16	.033	61	2.547	106	15.260
17	.040	62	2.685	107	15.731
18	.049	63	2.828	108	16.213
19	.058	64	2.976	109	16.705
20	.069	65	3.129	110	17.206
21	.080	66	3.288	111	17.718
22	.094	67	3.452	112	18.240
23	.108	68	3.621	113	18.773
24	.124	69	3.801	114	19.317
25	.141	70	3.978	115	19.871
26	.161	71	4.165	116	20.437
27	.182	72	4.358	117	21.013
28	.205	73	4.558	118	21.600
29	.229	74	4.763	119	22.200
30	.255	75	4.975	120	22.810
31	.284	76	5.193	121	23.431
32	.315	77	5.417	122	24.065
33	.348	78	5.649	123	24.710
34	.383	79	5.887	124	25.366
35	.421	80	6.132	125	26.035
36	.461	81	6.384	126	26.716
37	.504	82	6.642	127	27.409
38	.550	83	6.909	128	28.115
39	.598	84	7.182	129	28.832
40	.649	85	7.463	130	29.563
41	.715	86	7.751	131	30.306
42	.760	87	8.046	132	31.062
43	.820	88	8.350	133	31.831
44	.884	89	8.661	134	32.613
45	.950	90	8.981	135	33.408
46	1.021	91	9.307	136	34.216
47	1.095	92	9.644	137	35.038
48	1.172	93	9.987	138	35.874
49	1.253	94	10.340	139	36.723
50	1.337	95	10.700	140	37.586
51	1.426	96	11.070	141	38.463
52	1.519	97	11.447	142	39.354
53	1.615	98	11.834	143	40.259
54	1.716	99	12.230	144	41.178
				145	42.111

(cont'd)

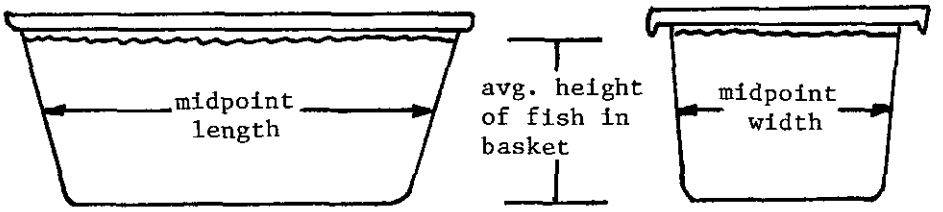
Relationship of Pacific halibut lengths (CMS) to kilograms - round (live) weights (cont'd)

Length (cm)	Kilograms	Length (cm)	Kilograms
146	43.060	198	116.003
147	44.023	199	117.450
148	45.000	200	119.373
149	45.993	201	121.318
150	47.001	202	123.284
151	48.024	203	125.273
152	49.062	204	127.283
153	50.115	205	129.316
154	51.184	206	131.371
155	52.269	207	133.448
156	53.370	208	135.548
157	54.486	209	137.671
158	55.618	210	139.817
159	56.767	211	141.985
160	57.932	212	144.177
161	59.113	213	146.392
162	60.311	214	148.631
163	61.526	215	150.893
164	62.757	216	153.179
165	64.005	217	155.489
166	65.271	218	157.822
167	66.553	219	160.180
168	67.830	220	162.562
169	69.170	221	164.968
170	70.505	222	167.399
171	71.858	223	169.854
172	73.229	224	172.334
173	74.617	225	174.840
174	76.024	226	177.370
175	77.448	227	179.925
176	78.891	228	182.506
177	80.353	229	185.112
178	81.833	230	187.745
179	83.332	231	190.402
180	84.850	232	193.085
181	86.387	233	195.795
182	87.943	234	198.531
183	89.518	235	201.293
184	91.113	236	204.081
185	92.727	237	206.897
186	94.360	238	209.739
187	96.014	239	212.607
188	97.688	240	215.503
189	99.109	241	218.426
190	101.095	242	221.376
191	102.829	243	224.354
192	104.576	244	227.359
193	106.359	245	230.392
194	108.155	246	233.452
195	109.972	247	236.541
196	111.810	248	239.658
197	113.668	249	242.803
		250	245.977

PROCEDURES TO OBTAIN CATCH SAMPLED AND TOTAL CATCH FROM BASKET SAMPLES, CONVEYOR BELT MONITORING, FISH-BIN VOLUME, AND COD-END VOLUME CALCULATIONS

1. Obtain the volume of the basket used in basket sampling. The basket sides are curved slightly, so use the midpoint width as the average width of the basket, and calculate the average height of fish in any one basket sample. Get the volume of the basket as follows:

Length X Height X Width = Total Volume

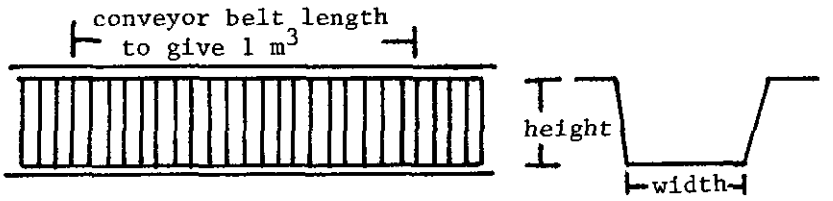


2. When conveyor belt monitoring is the only method to obtain catch sampled, use the following methods:

   A. 1) Measure the width and average height of fish in the belt trough.
   2) Calculate what length of the belt must be measured or sectioned to obtain one cubic meter of catch as follows:

   Length(unknown) X Height X Width = 1 cubic meter of catch

   3) Stop the belt and remove all the catch from the section calculated to give 1 cubic meter of catch. Weigh this amount to get weight per cubic meter.



   B. 1) Use the basket sample method shown above to calculate weight per cubic meter as follows:

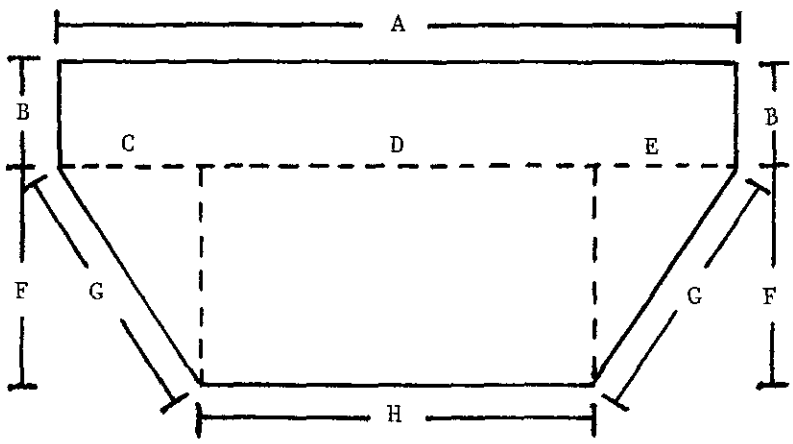
$$\frac{\text{Average basket sample weight for sampling period}}{\text{Volume per basket}} = \frac{\text{Weight}}{\text{1 cubic meter of catch}}$$

C. Using the weight per cubic meter calculated in 2B, use the following calculation to determine total catch sampled:

Belt width X Avg. depth of fish on belt X Belt speed = Cubic meters per minute

Cubic meters per minute X Minutes of observation X Calculated MT./M = Catch sampled

3. On independent stern trawlers, calculate catch per haul from the amount of fish in the fish holding bin. Many fish bins are irregularly shaped, in which case the area of the bin must be broken into sections which can be easily measured. The example below shows how one fish bin was broken into shapes easily calculated or measured to obtain floor area. By calculating the area of the fish bin, and then using the height of fish in the bin for each haul, a volume of fish can be calculated. Compare this volume with the weight/volume calculated for basket samples for that haul to get the total weight of the haul. Catch sample weight will be the haul weight or some fraction of the haul weight.



Area of a circle = πr^2 Circumference = $2\pi r$ (π = 3.1415)

Area of a square or rectangle = length x width (In diagram above: A x B)

Area of a triangle = ½ base x height (In diagram above: ½E x F)

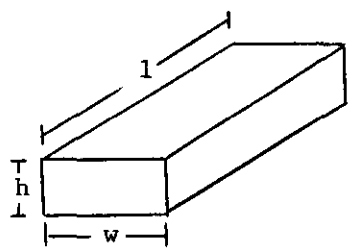
Volume of catch = sum of areas x height of fish in bin

Total catch or total sampled = volume of fish in the bin x weight per volume calculated from the avg. basket sample for the period

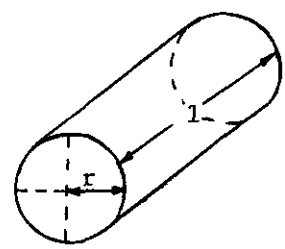
4. On certain stern trawlers it may be necessary to estimate the catch size by the volume of fish in the codend. On these ships, the fish bin may be enclosed and thus difficult to measure, the floor of the bin may be moveable, large quantities of water may be used to keep the fish cool until they are processed, or the bin shape may make volume estimates of the quantity of fish in the bin difficult.

The first step in the estimation of the volume of fish in the codend is to decide which geometric form a particular codend most closely resembles: a rectangular solid, a cylinder, an ellipsoidal solid, a semi-ellipsoidal solid, or some other form. Determine the needed dimensions for volume calculation of the chosen solid by measuring each codend of fish or by estimating the dimensions using premeasured deck lengths, heights of people, or other standards of reference. Calculate the volume in cubic meters using the appropriate formula, then multiply the volume times the density (weight per cubic meter) calculated from basket samples to obtain the metric tonnage of the catches.

In some cases, it may be easier or more accurate to estimate the volume of fish in each banded section and add them together instead of treating the whole codend as a single unit. Some observers have also added a factor to adjust for variation in the volume or density of the fish packed in each section of the net.

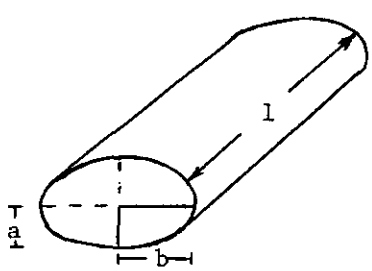


Rectangular solid
Volume = height x width x length
$V = hwl$

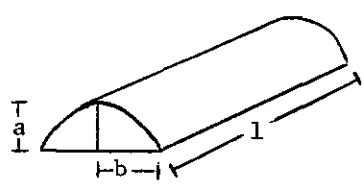


Cylinder
Volume = π x radius^2 x length
$V = \pi r^2 l$

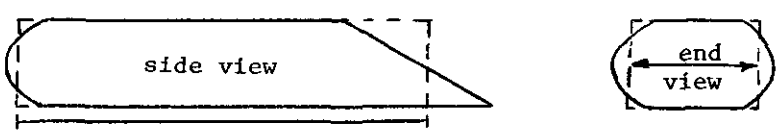
(π = 3.1415)



Ellipsoidal solid
Volume = π x short radius x long radius x length
$V = \pi abl$

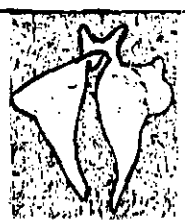
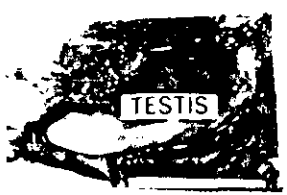


Semi-ellipsoidal solid
Volume = $\frac{1}{2}\pi abl$
$V = \frac{1}{2}\pi abl$



Allowances can be made for irregular shapes or partially filled portions of the net by the way in which the measurements are taken.

SEX DETERMINATION FOR SELECT TARGET AND INCIDENTAL SPECIES

	Walleye Pollock (Roundfish)	Pacific Halibut (Flatfish)	Pacific Ocean Perch (Rockfish)	Pacific Hake (Roundfish)
FEMALE				
Immature ovary	smooth, pink egg sacks; small, opaque eggs	triangular with a long tail lobe extending posteriorly	firm and yellow to flabby and red and gray	pinkish, small eggs not yolked
Gravid ovary	smooth, pink egg sacks, greatly enlarged; they fill cavity	same, white, eggs usually visible	firm and yellow; embryos present	pink, eggs yolked, some eggs translucent to all eggs translucent
MALE				
Immature testes	white, rippled membrane	same as female without tail lobe; pink, fibre texture		same as pollock
Ripened testes	white to pink ribbon-like folds, enlarged	same as immature male but soft, plump, pink to white and enlarged	all cases will be hard, finger-like projection extending to posterior; white	same as pollock
Spent testes	white to pink ribbon-like folds	same as immature male		same as pollock
DIAGRAMATIC				
Female				
Male				

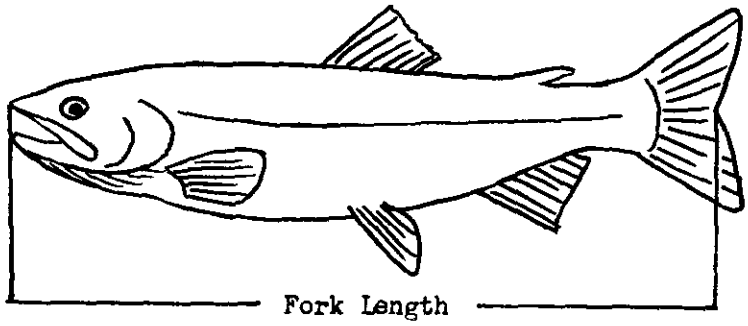
Maturity index for female herring. Place numbers 1-8 in column 65 of Form 9. (Male characteristics are given in parentheses for ease in distinguishing sex.)

Maturity Index	Key Characteristics
1	Virgin herring. Ovaries very small, threadlike, 2-3 mm broad, and wine red. (Testes whitish or grey-brown.)
2	Virgin herring with small sexual organs. The height of ovaries and testes about 3-8 mm. Eggs not visible to naked eye but can be seen with magnifying glass. Ovaries a bright red color. (Testes reddish-grey color.)
3	Ovaries occupying about half of the ventral cavity. Breadth of sexual organs between 1 and 2 cm. Eggs small but can be distinguished with the naked eye. Ovaries orange. (Testes reddish-grey or greyish.)
4	Ovaries almost as long as body cavity. Eggs larger, varying in size, opaque. Ovaries orange or pale yellow and fully vascularized. (Testes whitish.)
5	Ovaries fill body cavity. Eggs large, round, and some transparent. Ovaries yellowish, only partially vascularized. Eggs do not flow when pressure is applied. (Testes milkwhite.)
6	Ripe ovaries; eggs transparent and flow freely under pressure. (Testes white.)
7	Spent herring. Ovaries baggy, bloodshot, and empty or containing only a few residual eggs. (Testes may contain remains of sperm.)
8	Recovering spents. Ovaries firm and larger than virgin herring in Stage 2. Eggs not visible to naked eye. Walls of ovaries striated; blood vessels prominent. Ovaries wine red color. This stage passes into Stage 3. (Testes also wine red.)

LENGTH MEASUREMENTS FOR VARIOUS SPECIES

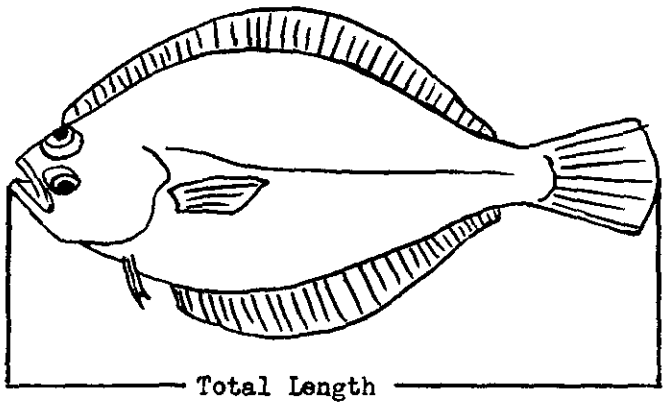
Fork Length Measure:

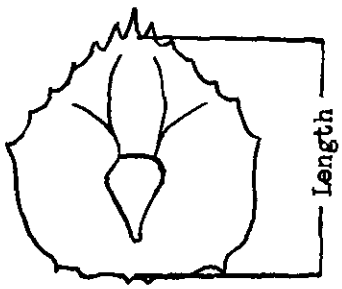
Roundfish
Rockfish
Salmon



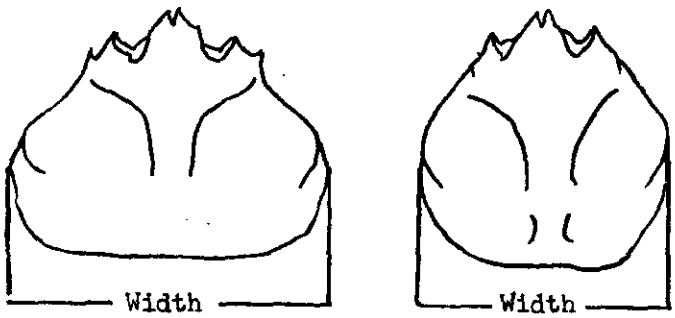
Total Overall Length:

Flatfish
From snout to middle
of tail.



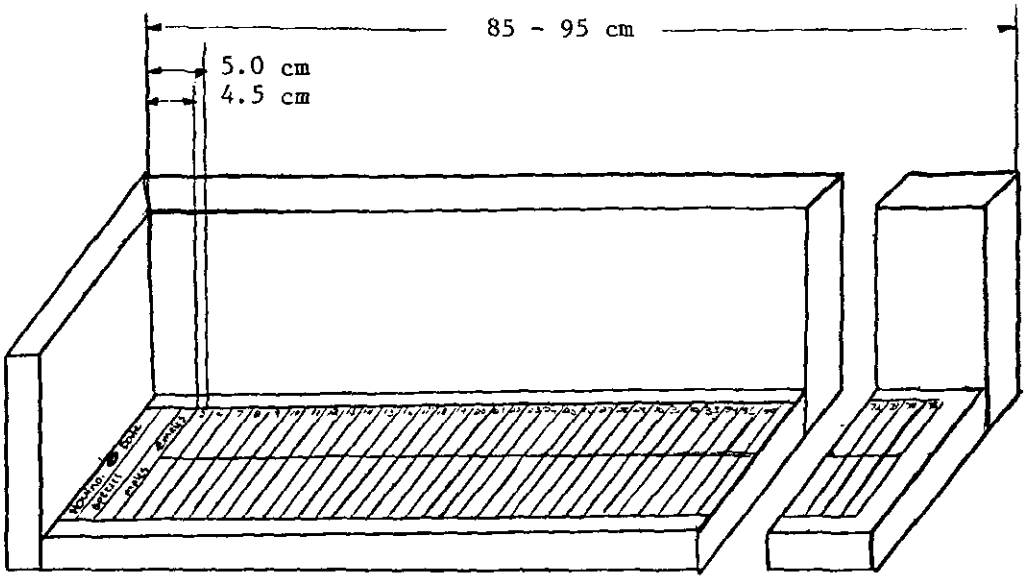


King Crab
Right eye socket to middle
of posterior margin.

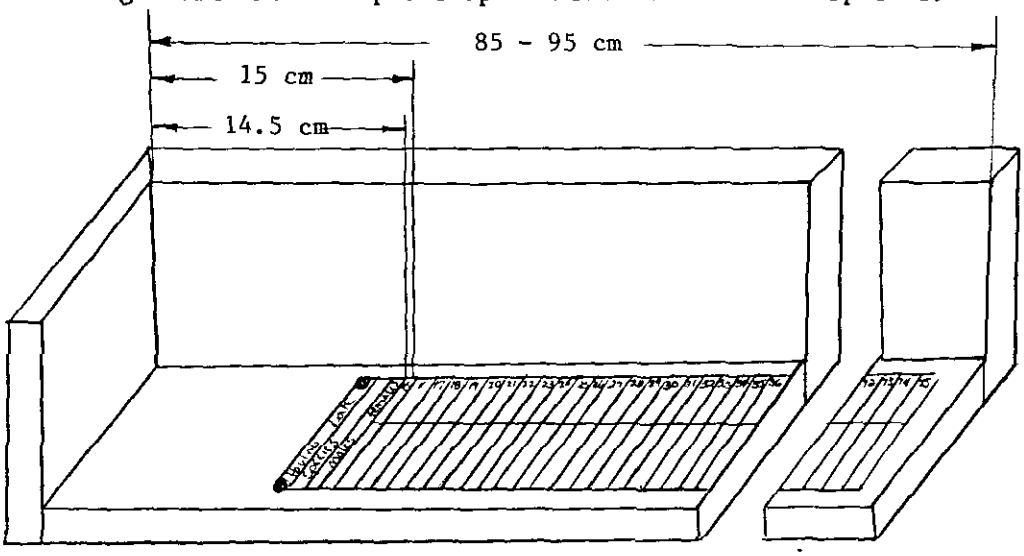


Tanner (Snow) Crab
C. bairdi C. opilio

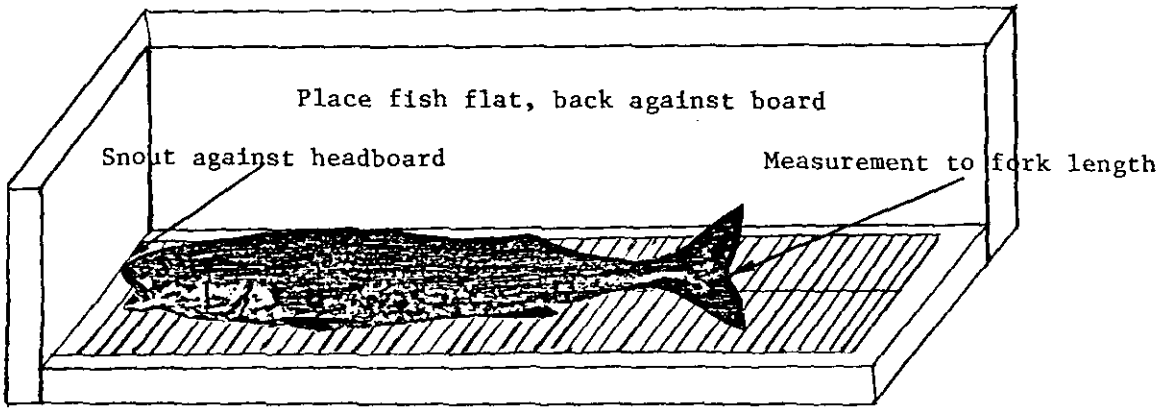
Length Frequency Measuring Board and Measurement



Measuring board with strip set up to measure most fish species.



Measuring board with strip offset in order to measure larger fish.

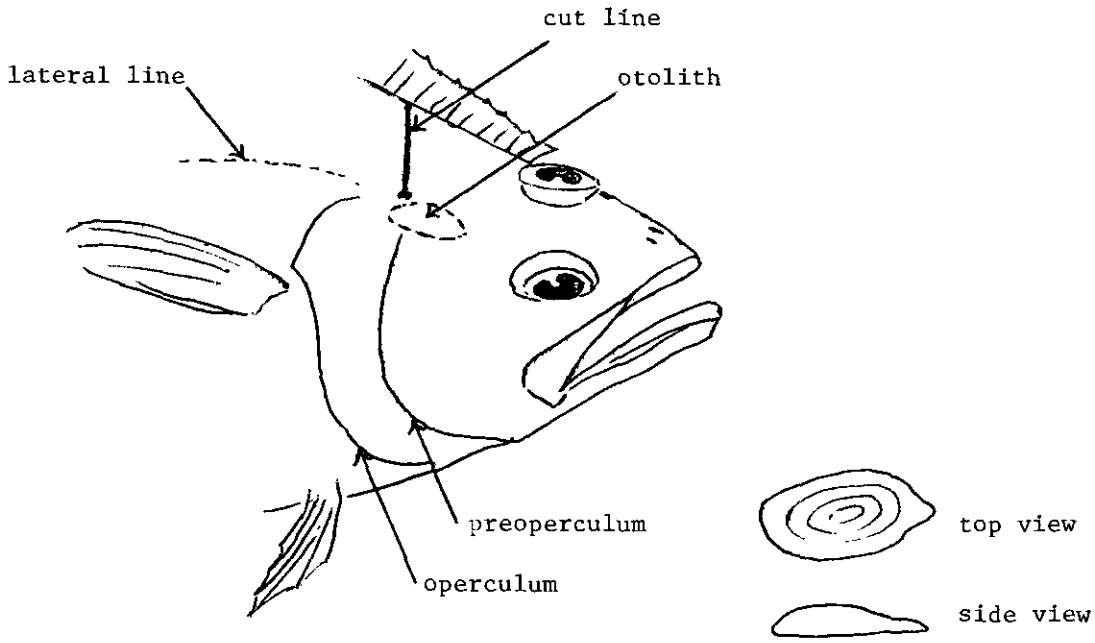


Measurement of a roundfish on measuring board.

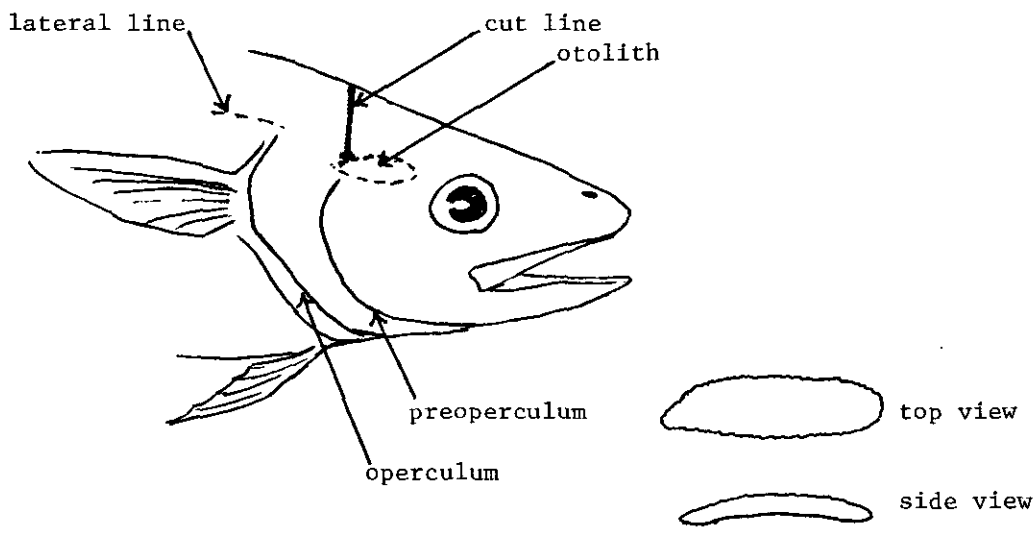
Otolith and Scale Collection for Select Species

Species	Length Range[1/]	Sample Type	Storage Container	Storage Media
Walleye pollock	15-75 cm	Otolith	Plastic vial	50% alcohol 50% water
Yellowfin sole (or other flatfish)	15-40 cm	Otolith	Plastic vial	Dry
Atka mackerel	15-42 cm	Otolith	Plastic vial	50% alcohol 50% water
Pacific cod	15-75 cm	Scale & otolith in same vial	Plastic vial	50% alcohol 50% water
Pacific hake	15-75 cm	Otolith	Plastic vial	50% alcohol 50% water
Jack mackerel	36-60 cm	Otolith	Plastic vial	Dry
Sablefish	15-75 cm	Otolith & scale in same vial	Plastic vial	50% alcohol 50% water
Salmon	All	Scale	Paper envelope	Dry
Rockfish	20-40 cm	Otolith	Plastic vial	50% alcohol 50% water
Herring	15-35 cm	Scale/otolith	Paper envelope	Dry

1/ Gives length range of fish commonly found in random basket samples. Fish outside this range can be taken. All salmon scales in any range can be taken.



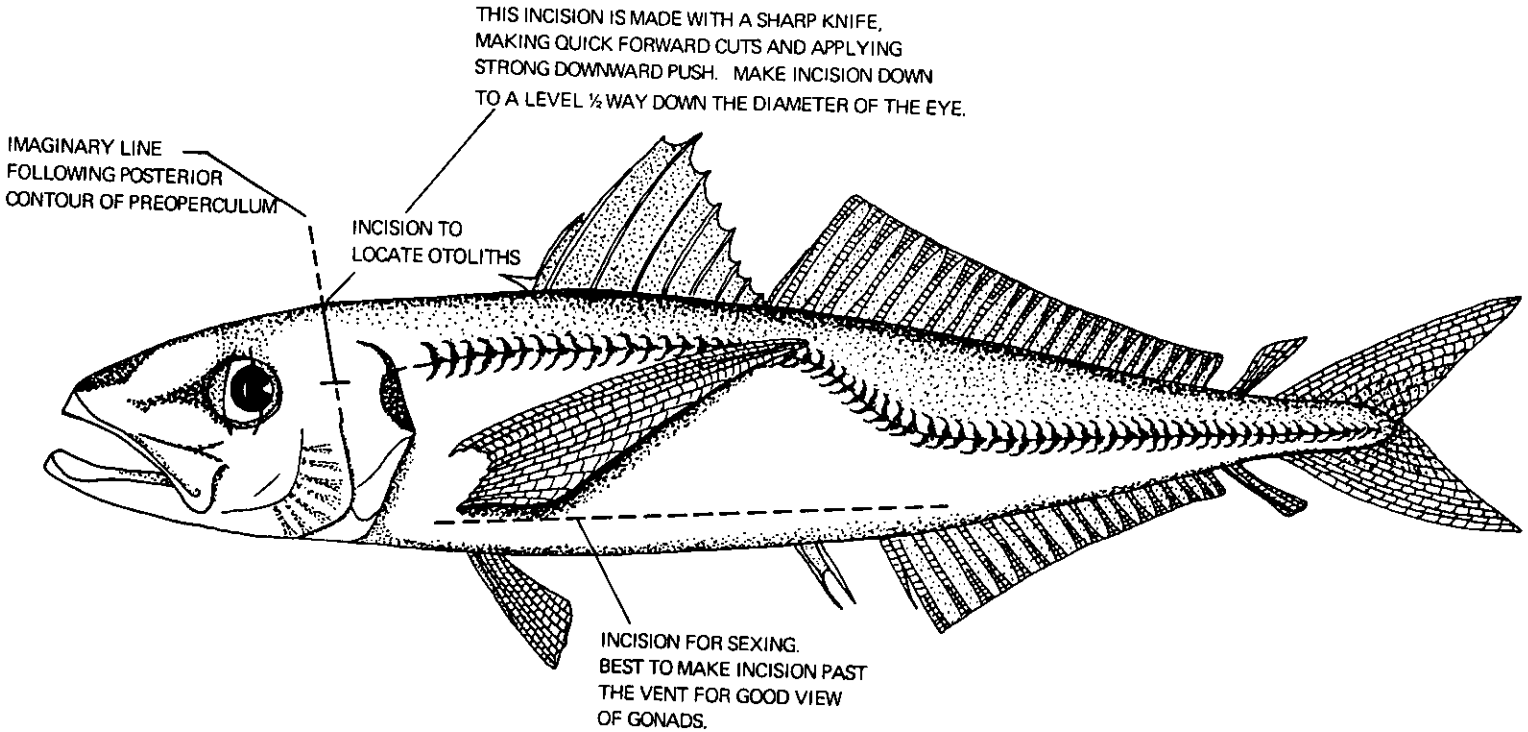
Arrowtooth Flounder
Atheresthes stomias

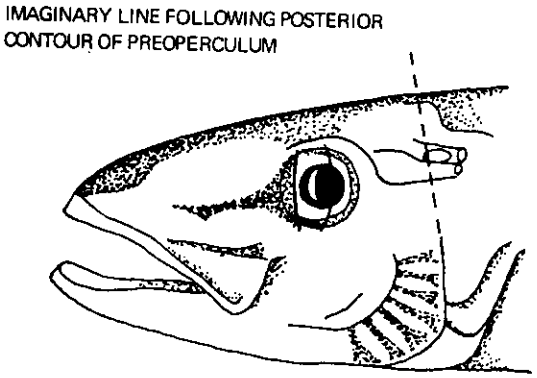


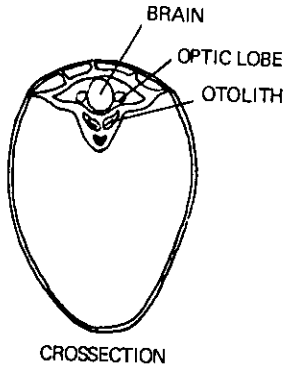
Walleye Pollock
Theragra chalcogramma

Approximate location of the otoliths (sagittal) and the cut for the removal of otoliths from flatfish and roundfish

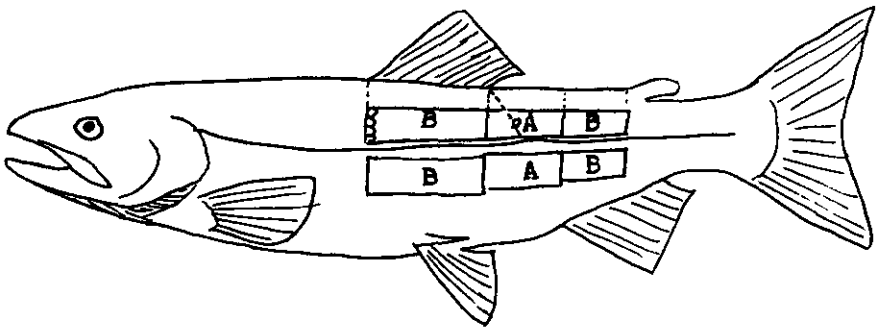
HOW TO DETERMINE SEX AND REMOVE OTOLITHS FROM JACK MACKEREL



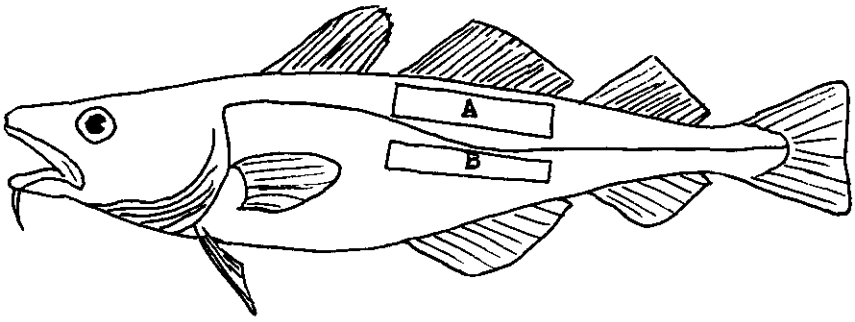




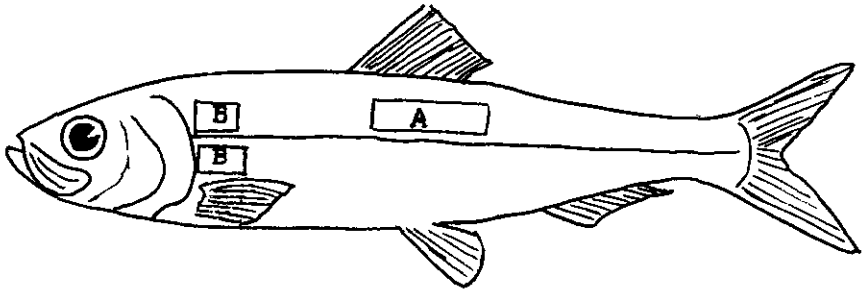
LOCATION OF PREFERRED SCALE SAMPLING ZONES
(Do not take lateral line scales)



SALMON - Follow the diagonal scale row from the posterior insertion of the dorsal fin to the lateral line of either side. Two scale rows up from the lateral line (on the diagonal) are the preferred scales.

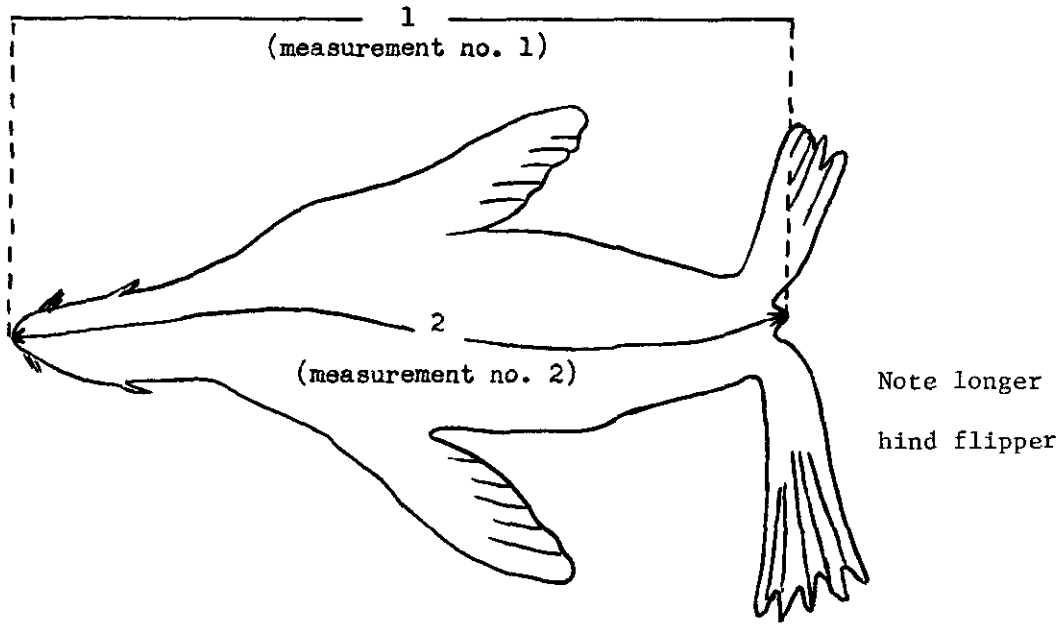


PACIFIC COD - Scrape along either side of the back directly below the second dorsal fin.



HERRING - Zones "A and B" are preferred over other body zones. If no scales are available then take otoliths and place them dry in envelopes.

LENGTH MEASUREMENTS OF SEALS AND SEA LIONS



Upper half of diagram is of Steller Sea Lion, lower half is Northern Fur Seal.

Standard Length (measurement no. 1) is the straight-line distance from snout to tip of tail flesh on the unskinned body, belly up, ideally with the head and vertebral column on a straight line. If rigor has set in, then this measurement probably cannot be taken and measurement no. 2 should be taken.

Curvilinear Length (measurement no. 2) is taken when the seal cannot be stretched belly up, as when rigor sets in, or is too heavy to be moved. It is the shortest surface distance from snout to tip of tail flesh along back, belly, or side. Record the type of measurement taken. Seals are usually measured with a flexible tape.

IDENTIFICATION OF NORTHERN SEA LIONS AND NORTHERN FUR SEALS

Northern sea lion

In fresh specimens they are light-colored dorsally and brown ventrally. The hair is coarse and short. In long-dead specimens the identification can be verified by checking the upper post canine teeth in the skull. There is an easily observed diastema (molar gap) between the fourth and fifth post canine teeth. This gap does not occur in any other seal or sea lion in the Northeast Pacific.

Adult males weigh from 700 to 1000 kg and reach 3 m in length.

Adult females weigh from 275 to 450 kg and reach 2.0 m in length.

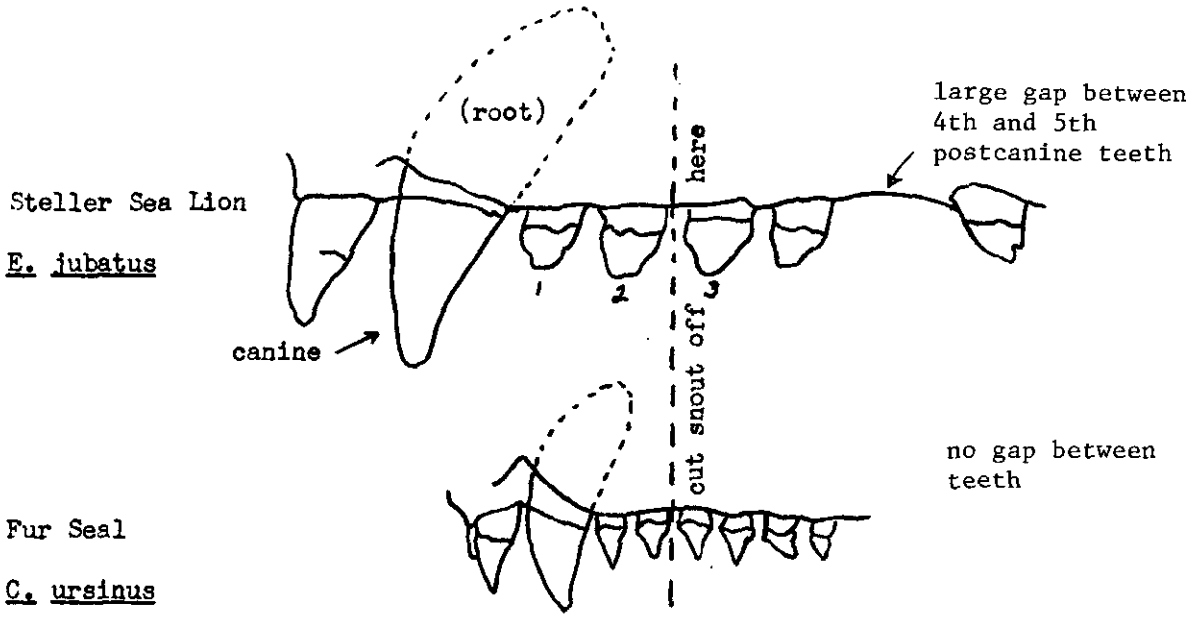
Northern fur seal

In fresh specimens, they are dark grey to black, lighter on the throat with silvery guard hairs and an underlying layer of dense brown fur. In long dead specimens, check the upper postcanine teeth in the skull; there is no molar gap in this species. Hind flippers of this species are about twice as long as in the sea lions.

Adult males weigh from 277 to 318 kg and reach 2 m in length.

Adult females weigh from 36 to 59 kg and may reach 1.2 m in length.

COLLECTION OF SEA LION AND FUR SEAL TEETH



Outline of sea lion and fur seal teeth

The procedure in collecting a tooth from a seal or a sea lion is as follows:

1. Skin and cut off snout, taking care not to damage the root of the canine tooth.

2. To insure that the entire canine root is collected, the snout should be cut off between the 2nd and 3rd post canine teeth (see figure).

3. Method of preservation: (use a. or b.)
   a. Boil snout until tooth can be easily pulled and removed. Do not forcibly twist the tooth when removing - twisting will break the tooth.
   b. Boil snout until no more flesh remains on jaws - jaws can then be stored dry.

4. Do not preserve snout in formaldehyde.

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

MODIFICATION NO. 2 TO PERMIT NO. 128

Pursuant to Sections 216.33(d) and (e) of the Regulations Governing the Taking and Importing of Marine Mammals and Section C-6i of Scientific Research Permit No. 128 issued to the Northwest and Alaska Fisheries Center, National Marine Fisheries Service, 2725 Montlake Boulevard East, Seattle, Washington 98112 on March 12, 1976 (41 F.R. 11593), as modified on September 7, 1976 (41 F.R. 41736), that permit is further modified as follows:

Section B-9 is modified by deleting "December 31, 1980" and substituting therefor the following: "December 31, 1985."

William H. Stevenson
for Terry L. Leitzell
Assistant Administrator for Fisheries
National Marine Fisheries Service

DEC 31 1980
Date

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

Permit for Taking and Importing Marine Mammals

Permit No. 128

Northwest Fisheries Center, National Marine Fisheries Service, Seattle, Washington 98112, is hereby authorized to take and import the marine mammals specified below for the purpose of scientific research, subject to the provisions of the Marine Mammal Protection Act of 1972 (16 U.S.C. 1361-1407); the Regulations Governing the Taking and Importing of Marine Mammals; and the Special and General Conditions hereinafter set out.

A. Number and kind of animals

1. An unspecified number of specimen materials may be taken from pinnipeds of any species, except the walrus, which are:

   a. directly taken in fisheries for such animals, in countries and situations where such taking is legal;

   b. killed incidental to fishing or other operations; or

   c. dead of natural causes.

B. Special Conditions

1. This research effort shall be conducted using the procedures and techniques described in the application.

2. Prior to engaging in any of the authorized activities with respect to those species listed as threatened or endangered, under the Endangered Species Act of 1973, the Holder shall have obtained the necessary authorization under the provisions of that statute.

3. In no case will agents of the Holder kill or cause to be killed, any marine mammals in connection with collecting the specimen materials.

4. Agents of the Holder shall not accept, as remuneration or gifts, the parts or products of any species of marine mammals nor defer the acceptance of such items to a later time.

5. The Holder shall provide, to the Director, a list of the names and locations of each agent participating in the scientific effort for the purposes authorized hereunder. This condition supercedes and is in lieu of the provisions of Section 1 of the General Conditions attached hereto.

6. Specimen materials from the pinnipeds authorized in this Permit may be imported for further analysis and disposition in scientific institutions. On receiving each of the importation shipments, the Holder shall provide a report to the Director, listing the number and kinds of specimens imported and the names of the individuals and institutions which have received them.

7. The Holder shall submit a report within 90 days upon the return of each agent into the U.S., describing the nature of the work conducted and information pertaining to specimen material collected.

8. Upon completion of the project, the Holder shall submit a final report which includes a summary of the results and a description of the activities actually carried out under the authority of this Permit.

9. This Permit is valid, with respect to the taking and importing authorized hereunder, until December 31, 1980.

C. General Conditions as attached hereto and made a part hereof.

Robert W. Schoning, Director
National Marine Fisheries Service

12 MAR 1976
Date

COMMONLY OBSERVED GEAR DIMENSIONS

Trawl Dimensions	Vertical opening	Horizontal opening	Headrope length	Footrope length
		(dimensions are in meters)		
Japanese				
Dependent stern trawlers	4-9	24-30	36-54	57-65
Pair trawlers	7.5	56	130	148
Danish seiners	7	35	115	128
Large independent stern trawlers	7-27	22-35	50-85	54-90
Small independent stern trawlers	3.5-7.5	12-30	55-65	50-70
Soviet				
Bottom trawl	4.5-8	16-28	31-50	35-60
Pelagic trawl	25-30	35-45	70-120	70-120
Korean	6-7.5	22-40	64-80	75-100
Polish	18-23	20-68	55-112	55-112

Japanese Longline Dimensions

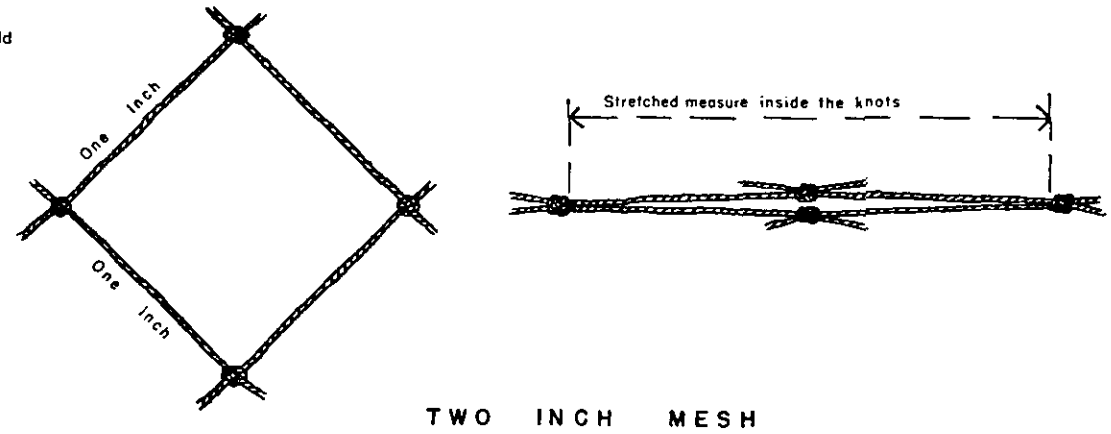
hachi length 70-100 m
average set length 24-40 km
breaking strength 20-40 kg
average number of hachi/set 390-420
average number of hooks/hachi 35-51

HOW TO MEASURE MESH SIZE

The mesh size measurement requested on the gear diagram is the stretched measure, that is, the distance between two diagonal knots when the mesh is tightly stretched (see second diagram below). In order to obtain this measurement, the net must be empty and the mesh pulled tightly enough so that two opposite knots of the mesh square meet and all four knots are in the same plane; measure the distance inside the two most distant knots in the mesh square.

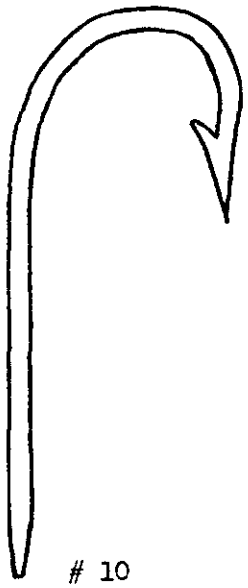
An easier way of obtaining the same measurement (the net does not have to be empty) is to measure the distance between two adjacent knots in a mesh square (the side of a square) and multiply by two. Check several meshes in each part of the net.

W. L. Scofield



A two-inch mesh, open (left) and stretched. This points up variables inherent in web measure and consequent difficulties. Common yardstick is "stretch measure."

HOOK SIZE CHART FOR LONGLINERS



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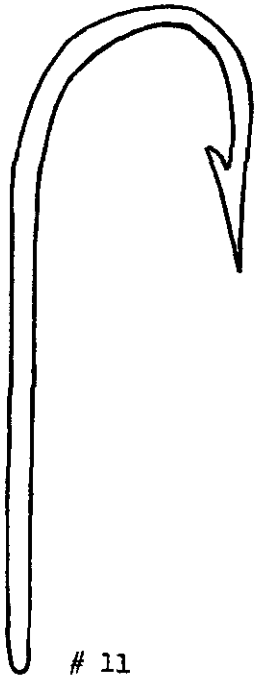

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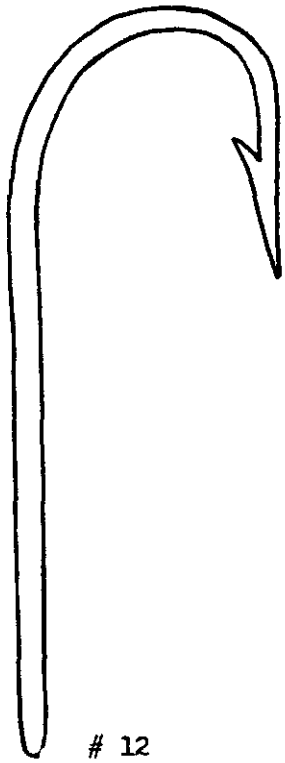

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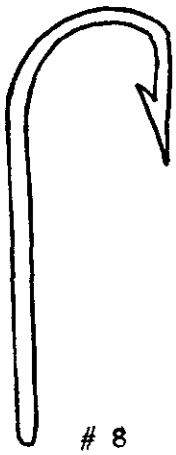

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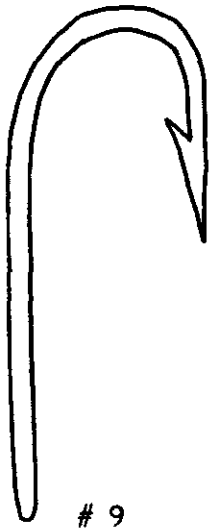


9

RADIO TELEPHONE PROCEDURE

1. Radios are different from telephones in that they cannot transmit and receive simultaneously. Therefore when you have temporarily finished talking and are ready to listen, say "over," and release the button on your microphone. When the other party is ready to listen they will say "over." At the end of your entire message, say "out" rather than "over." Keep in mind that people on other ships can overhear your conversation, so watch what you say.

2. Sounds are easily garbled on marine radios so the phonetic alphabet is used when sailors want to spell something. Here are the words that the Coast Guard will recognize as letters:

A - alpha	N - November
B - bravo	O - Oscar
C - Charlie	P - papa
D - delta	Q - Quebec
E - echo	R - Romeo
F - foxtrot	S - Sierra
G - gulf	T - tango
H - hotel	U - uniform
I - India	V - victor
J - Juliet	w - whiskey
K - kilo (keeloes)	x - x-ray
L - Lima (Leema)	y - Yankee
M - mike	z - Zulu

3. Every ship and all Coast Guard stations continually listen to the emergency frequencies. Therefore when you want to talk to someone, call on an emergency frequency. As soon as you contact them, arrange to switch to another channel. It is illegal, impolite, unfair, and dangerous to talk on emergency channels. Sometimes atmospheric conditions are such that the emergency frequencies are the only ones that work. At those times you simply cannot communicate via radio except to report emergencies.

   Emergency frequencies are:

   FM Channel 16, international distress
   FM Channel 13, for ships to use to avoid collisions. You can contact other ships on 13, but not Coast Guard shore stations.
   AM 2182, international distress

   Almost certainly as an observer you will only be using FM frequencies.

4. When you initially contact another station make sure you state what channel you are broadcasting on, since all ships and stations constantly listen to several.

5. Speak in normal tones, using normal conversational pauses and emphasis.

6. Ensure that your messages are brief and businesslike. No chatter.

7. When trying to establish communications repeat the other station's name, and your name, at least twice. A typical message may be as follows:

You - "Any Coast Guard Station, Any Coast Guard Station; this is Uniform Uniform Delta Gulf, the Soviet trawler Danko; this is Uniform Uniform Delta Gulf, the Soviet trawler Danko, on channel 16, over."

C.G.- "Uniform Uniform Delta Gulf, trawler Danko, this is Coast Guard Station Coos Bay, over."

You - "Coast Guard Station Coos Bay, this is trawler Danko, shift to channel 8, over."

C.G.- "Trawler Danko, this is Coast Guard Station Coos Bay, shifting to channel 8, out."

You - "This is the Danko, shifting to channel 8, out."

You - "Coast Guard Station Coos Bay, Coast Guard Station Coos Bay, this is the Soviet trawler Danko on channel 8, over."

C.G.-"Trawler Danko, this is Coast Guard Station Coos Bay, send your traffic, over."

You - "Coast Guard Station Coos Bay, this is the trawler Danko. I am an American observer talking for the captain. A Soviet sailor has broken his leg and needs hospitalization. Can you evacuate the sailor? Over."

C.G. - "Trawler Danko, this is Coos Bay. Affirmative. What is your current position? Over."

You - "Coos Bay this is Danko. Position 44 degrees zero 4 minutes north, 124 degrees, 24 minutes west, over."

etc.

8. When you call "Any Coast Guard Station, etc. his first response may be:

"Trawler Danko this is Coast Guard Station Coos Bay, shift and answer on channel 11, out."

This means he doesn't want any more talk on the emergency channel. So without broadcasting again on channel 16, switch to 11 and go through the entire routine on eleven.

9. When coming into port for disembarkation, ~~On your day to return to land~~, your ship will approach the designated port and wait offshore.* ~~The people ashore will wait for your radio call before they send the boat out to get you.~~ A typical message is as follows:

In many cases the transfer boat will not come out until the ship is readily visible or a message is sent indical

For ships approaching Dutch Harbor:

You - "Mrs. Griffin, Mrs. Griffin. This is Juliet Alpha Oscar Foxtrot. Anyo Maru No. 21, the Anyo Maru No. 21 on channel 16, over."

Her - "Anyo Maru number 21 this is Mrs. Griffin. Shift to channel 8, over."

You - "Mrs. Griffin, this is the Anyo Maru number 21 shifting to channel 8, out."

You - "Mrs. Griffin, this is the Anyo Maru number 21 on channel 8, over."

Her - "Anyo Maru this is Mrs. Griffin. You must be observer Jack Adams, and you must be eager to get off. Where are you, over?"

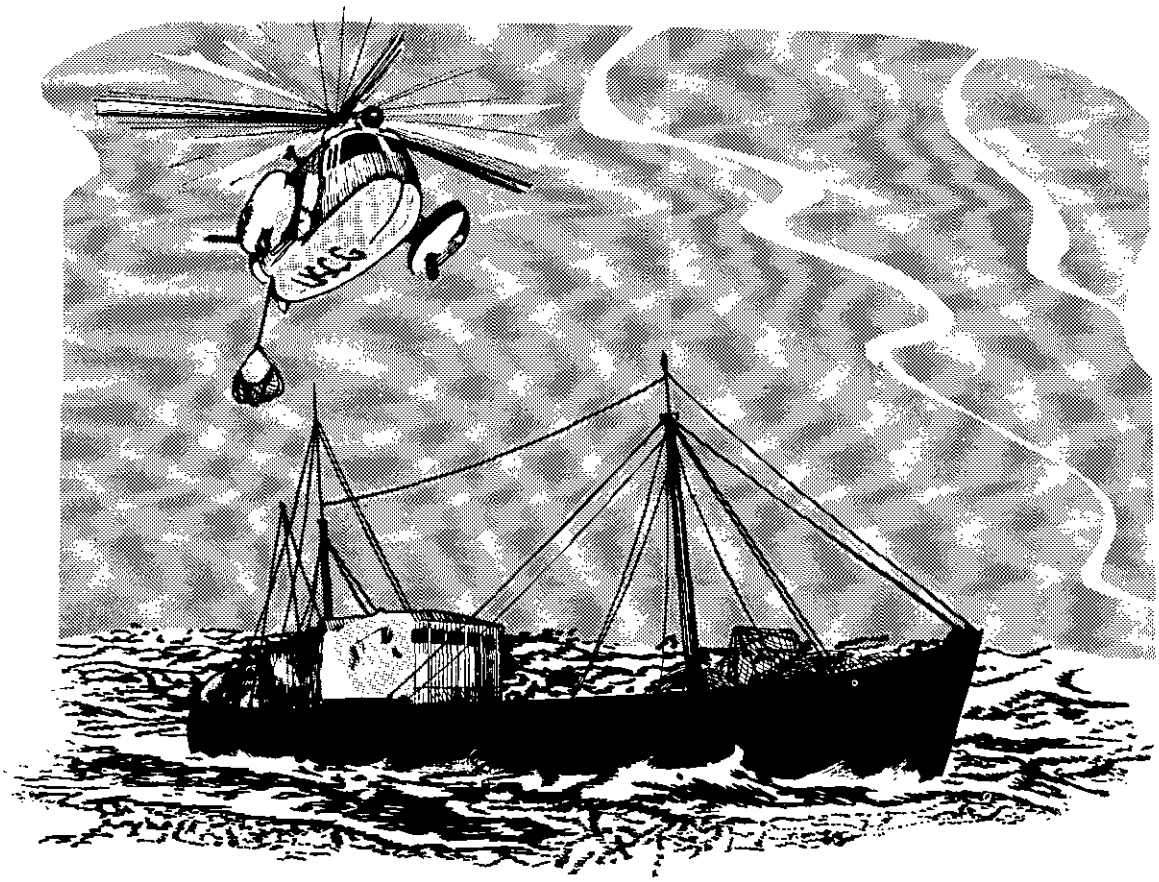
You - "Mrs. Griffin, we are underway approaching Dutch Harbor. We will be at the pilot point in one half hour, over."

Her - "This is Mrs. Griffin. O.K. I'll have the boat come out to get you. You may have to wait for awhile, over."

You - "This is the Anyo Maru. Roger, we will be waiting. Out."

Her - "This is Mrs. Griffin, out."

For ships approaching Coos Bay, the observer should call "Coast Guard Station Coos Bay" to arrange for a CG boat to meet the ship and bring the observer to shore.



HELICOPTER EVACUATION

Helicopter evacuation is a hazardous operation and should only be attempted in a life or death situation. The following information provides the capabilities and requirements of the Coast Guard for evacuation at sea.

RANGE:
Helicopters can operate only 100 to 150 miles offshore weather conditions permitting.

REQUEST FOR ASSISTANCE:
▲ Determine patients condition and call the nearest Coast Guard station listed on NMFS Medical Assistance Placard.
▲ Give position, course, speed, weather conditions, type and characteristics of vessel.
▲ Conserve time by heading towards rendezvous point.

PREPARE FOR ARRIVAL:
▲ Stand by on 2182 kHz or specified alternate if not available.
▲ Display distress signal.
▲ Clear hoist area, preferably aft, with maximum horizontal clearance. If area is mid-ships lower antenna and secure running gear.
▲ At night, light area, DO NOT shine lights on helicopter.

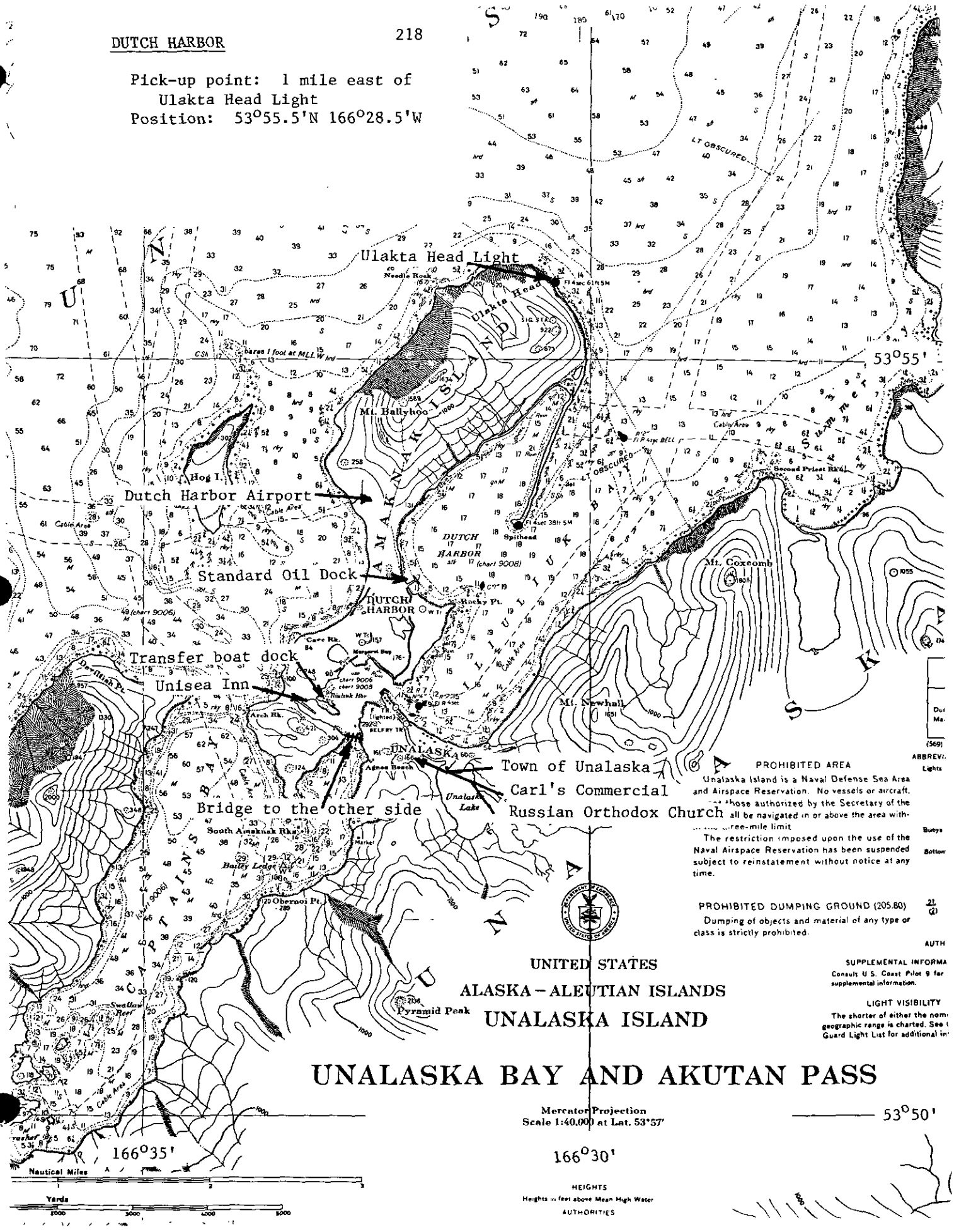
HOISTING:
▲ Tag patient, indicate medication given and conditions doctor should be aware.
Keep vessel into wind or with wind about 20° on port bow at 10 to 15 knots.
▲ Hoist instructions will be given by pilot. Allow stretcher or basket to touch deck to discharge static electricity. Wear dry cotton or rubber gloves.
▲ If stretcher is needed it will be equipped with a hoisting bridle.
▲ Conditions permitting, have patient in life jacket, strapped in, face up, and hands clear of sides.
▲ DO NOT secure hoist cable to vessel or attempt to move stretcher without first unhooking cable.
▲ With patient strapped in signal pilot to lower hoist. Steady stretcher.
▲ Use trail line to steady stretcher. Make sure line is clear of rigging and crew.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Fisheries Extention Service, Northeast Region, Gloucester, Massachusetts

DUTCH HARBOR

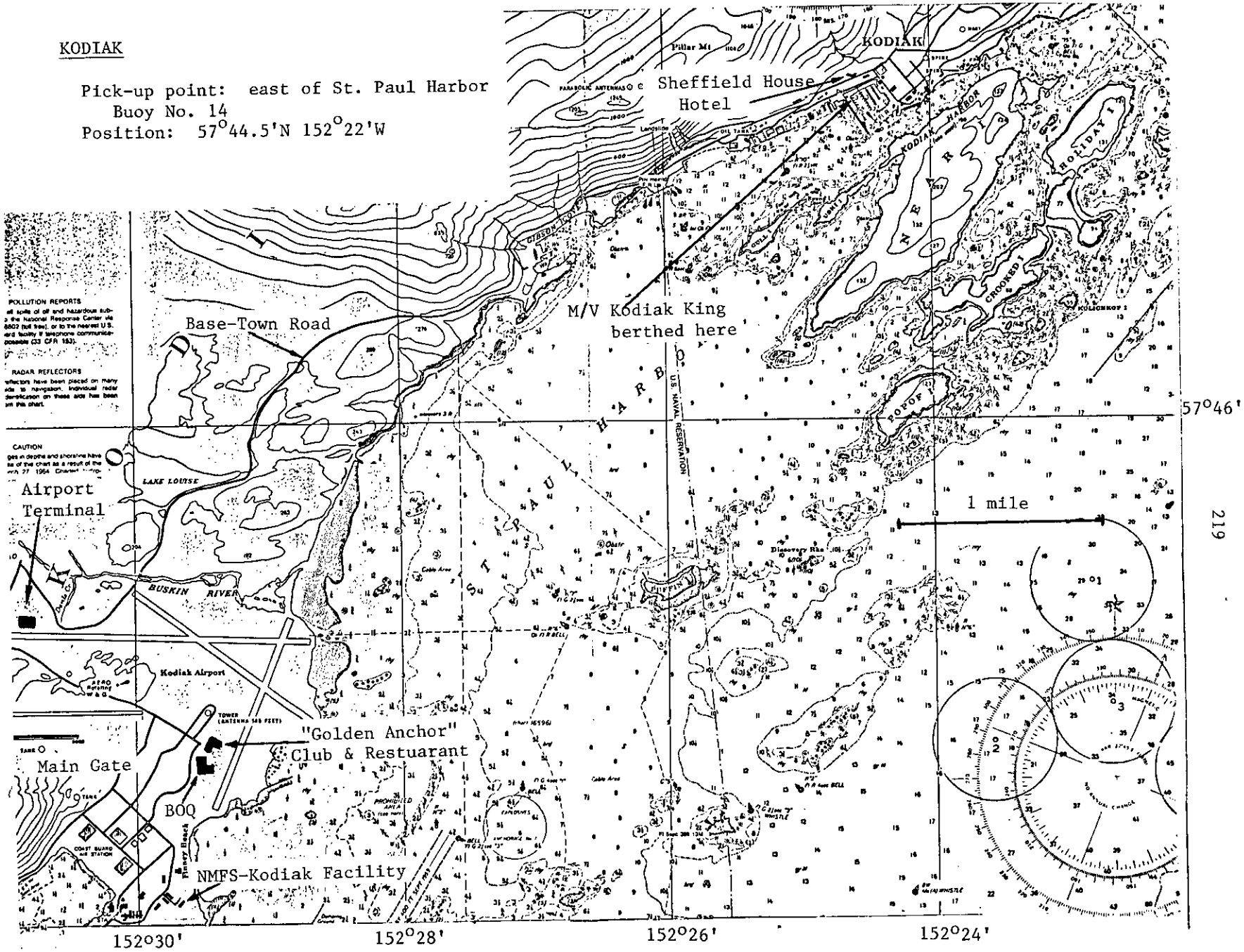
218

Pick-up point: 1 mile east of
Ulakta Head Light
Position: 53°55.5'N 166°28.5'W



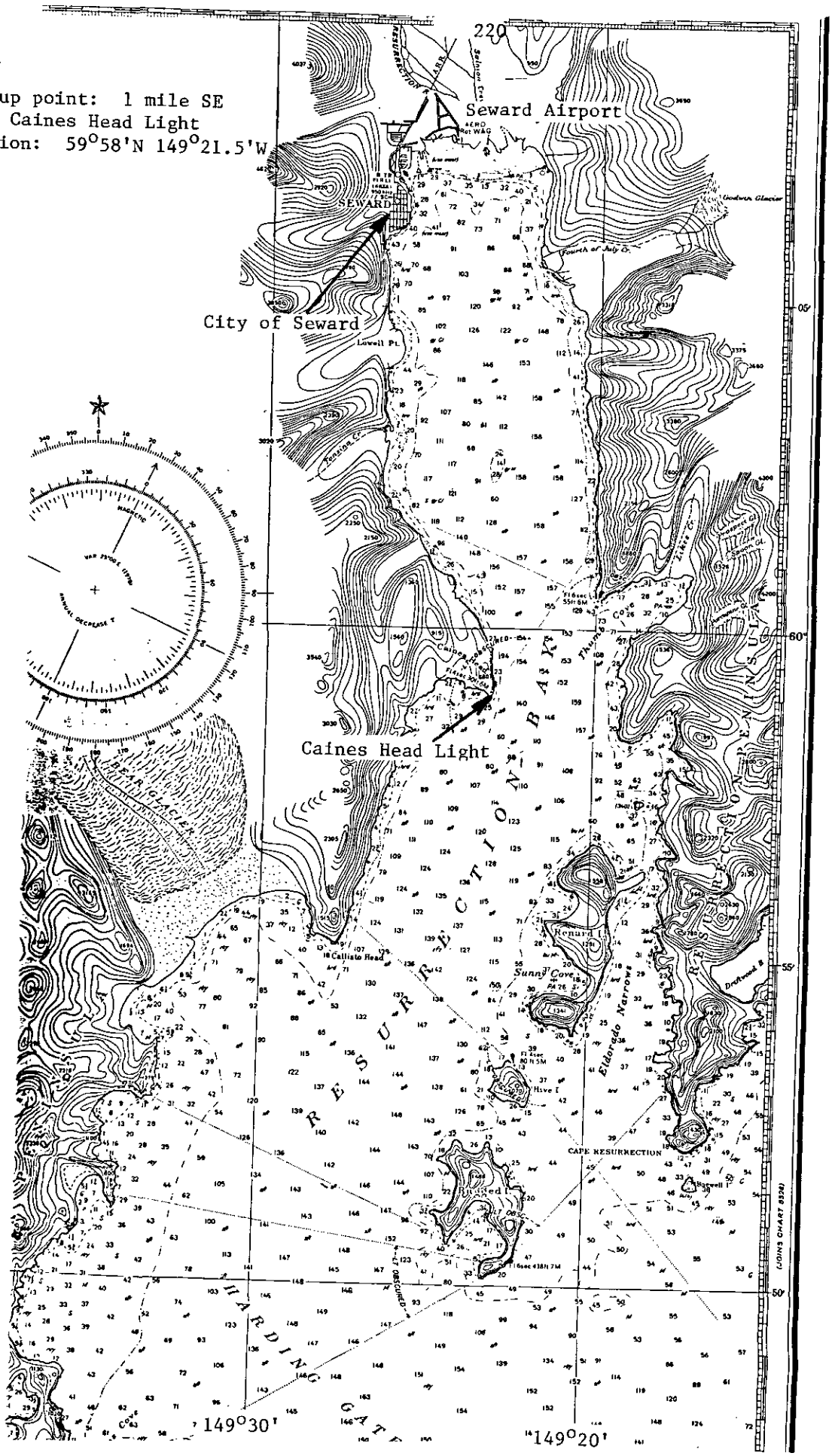
KODIAK

Pick-up point: east of St. Paul Harbor
Buoy No. 14
Position: 57°44.5'N 152°22'W



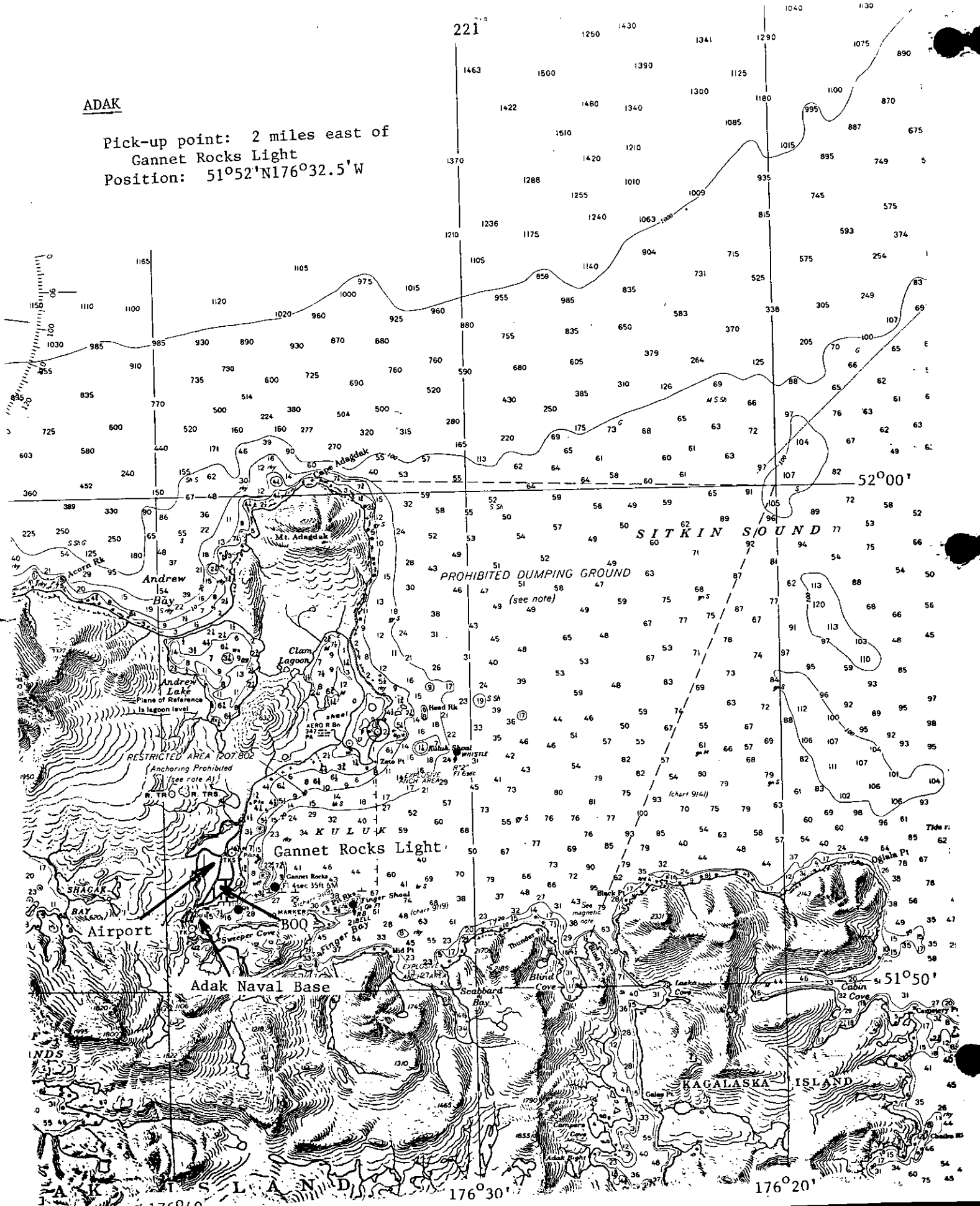
SEWARD

Pick-up point: 1 mile SE
of Caines Head Light
Position: 59°58'N 149°21.5'W



ADAK

Pick-up point: 2 miles east of
Gannet Rocks Light
Position: 51°52'N176°32.5'W



GENERAL DIRECTIONS FOR OBSERVERS ON JOINT VENTURES

A joint venture (J.V.) is a combined fishing and processing effort between a U.S. domestic fishing boat(s) and a foreign processing vessel(s). The U.S. fishing boat is often called a "catcher boat" and the foreign processor is sometimes referred to as a "mothership" or "processor". In a joint venture, the U.S. fishing boat catches the fish and delivers them to the foreign processor by transferring a fishing net codend. The financial and business arrangements between the foreign J.V. mothership and the U.S. catcher boats are usually handled by a third party which is called a "joint venture company". The J.V. company will usually place a "joint venture representative" (J.V. rep.) aboard the foreign processor to assist in communications with the catcher boat and in settling disagreements about codend delivery weights and species composition. The J.V. rep. will sometimes carry out similar duties as the observer, (i.e. catch rate estimates and species composition sampling) but this should not deter observers from doing their assigned work. The J.V. reps. can sometimes be of help in communicating with foreign ship personnel because of their possible language ability, or in communicating with the catcher boats for needed data on your form 2JV (see following section).

Ship Estimate of Catch Rates

On joint ventures an immediate estimate of the weight of a codend is sometimes required by the catcher boat that delivers the codend. This quick estimate or "hail weight" is usually settled upon by the captain and J.V. rep. and comes from a rough estimate of the volume and weight of fish in the net or fish bins. The hail weight may be written into the logbook and then changed later when factory production figures become available. (Other methods that may be used by the ship to estimate catch weights have been discussed earlier in this manual under the "Independent Stern Trawler" section.) The total catch estimate that you should record and use in your data is the final and most accurate estimate of a codend that is available from the captain.

Observer Estimate of Catch Rates

The methods described in your manual for determining catch estimates on stern trawlers (i.e. bin volume and codend volume methods, etc.) will also apply to joint ventures, therefore refer to those sections in your manual for a complete description.

Species Composition and Incidence of Prohibited Species Sampling

Sampling for species composition and the incidence of prohibited species in the catches delivered to a joint venture will be accomplished in the same manner as for an independent stern trawler. Therefore please refer to the appropriate sections in your manual to review those sampling methods if needed.

DATA FORMS FOR JOINT VENTURES

Form 2JV - Haul Form For Joint Venture

This form has several pieces of information that must be obtained from the catcher boats (i.e. location, fishing time, duration, depth, and speed). Since U.S. fishermen are not required by law to furnish this information, observers have not always been able to obtain it. The U.S. fishermen may have a voluntary "Joint Venture Trawl Log" however, which may have much of the needed information in it. This J.V. trawl log is provided to the catcher boats by the Pacific Marine Fisheries commission and is filled out on a voluntary basis only. Many times the U.S. fishermen are concerned that the information that they are giving to you can be retrieved by anyone who may be interested in finding out where a particular boat caught fish. If this is the case, reassure them that the information you are collecting is coded by catcher boat, and can not be released to non-NMFS users under provisions of the Federal law. The most important piece of information to try to get from the catcher boats is a measure of fishing effort, either through fishing time or duration. If you are unable to gather any information from a catcher boat, please explain the reason on a nonkeypunch part of the form or on the back of the form.

If you have any doubt about the accuracy of information from a catcher boat, do not record it on the form - record it in your logbook and point it out to the debriefers when you return.

Notes on filling out Form 2JV:

1. Collect Form 2JV data for the entire period you are aboard your vessel. Make certain that you have all of the hauls recorded for the days you begin and end sampling.

2. Each codend delivered to the processor must be numbered in sequential order and entered in columns 5-7. (Duplication of haul numbers is not allowed.) If possible, the haul number should correspond to the delivery number that is being used by the catcher boats and J.V. processor. If the processor is using a separate set of delivery numbers for each catcher boat, then these delivery numbers will not be of use because of the problem of duplicated haul(delivery) numbers.

3. The abbreviated catcher boat name is entered in columns 8-22. (Refer to the alphabetical listing of catcher boat names to find the proper abbreviation.) The abbreviated name must be spelled exactly as it appears in the catcher boat list because the computer will recognize only one abbreviated name code for each catcher boat. (Do not use periods, and put spaces only where shown.) The full catcher boat name and its abbreviated version should also be printed in the upper right-hand corner of the form in the space provided. This "list of catcher boats" need only be filled in once, and if required, may extend to page 2 or 3.

4. Every haul should have the delivery position entered under "location" (columns 24-32). In addition to this location, the trawl set and retrieval positions should be recorded if this information was obtained from the catcher boat. A "C" meaning "continuation", must be entered under "haul no." every time a trawl set or retrieval position is used. The location identifier (column 23) must be filled in for every location and the noon position of the processor is only used on a non-fishing day. The location identifiers are as follows: D = Delivery position; S = Trawl set postion; R = Trawl retrieval position; N = Noon position of processor. If you hear of any hauls being dumped by the catcher boats before delivery to the processor, please note the occurrence in your logbook.

5. If fishing times are received from the catcher boats, they must be recorded in GMT only. If fishing times are recorded, (columns 33-40) then the fishing duration (columns 41-44) should not be recorded. (Frequently catcher boats will record fishing duration without nets on/off bottom times.) Make a real effort to either get fishing time or duration.

6. Delivery times (columns 45-48) will be available from the processor and can be filled in by vessel personnel if needed. Remember that delivery times are to be recorded in GMT only. The delivery time should be used to assign a particular haul to a GMT day.

7. The average fishing depth (columns 49-52) will have to be collected from the catcher boats and can be recorded in either meters (m) or fathoms (f) (column 53) depending on what the catcher boat gives you. The same is true for average bottom depth (columns 54-57). Make sure you indicate the units for every depth you record.

8. The average speed (columns 59-60) is the speed at which the trawl net was towed. This information will have to be collected from the catcher boats or J.V. rep. and recorded in Knots.

9. The ships estimate of total catch should represent the weight of all of the fish and invertebrates delivered to the processor. This includes any catch that is discarded after it is delivered to the processing vessel. The ships estimate should represent the final estimate that has been agreed upon by the processors captain and the J.V. rep. (it is the "catch of record" that is recorded in the ships permanent logs.)

Remember that trailing zeros are required in total catch, observers estimate and original ships estimate (columns 61-75).

10. Weather and sea codes (columns 76-77) should be filled in at the delivery time and at GMT noon on a non-fishing day only.

11. On days with no hauls, enter the date, put a zero under haul number, enter the GMT noon position of the processor, enter "N" in column 23, give the reason for no fishing and enter the weather and sea codes for GMT noon.

12. Leading zeros are required in columns 1,3,and 33-40 only. Please do not put them anywhere else.

13. Skip a line after each day.

Other Data Forms For Joint Venture

In most cases, observers on joint ventures have been able to sample individual codends and record the species composition (form 3(2)) and incidence of prohibited species data (form 3(1)) in the same manner as for an independent stern trawler. If the catches are relatively pure (consisting mainly of one or two species), you may be able to use the whole-haul method of sampling or one of its variations. If the catches of two codends are mixed in the bins, handle the situation as you would on a trawler--sample the combined catches but divide the sampling data proportionally by codend size and enter the data as two separate samples (note this on the form).

Forms 4,6,7,8,9,10 and 11 are to be filled out in the same manner as for an independent stern trawler.

If the processing vessel also fishes on its own:

If two different types of catches are being landed aboard the processing vessel -- codends from catcher boats fishing on the U.S. quota, and hauls made by the processing vessel itself on a foreign allocation -- the data from these two types of hauls must be kept separate. The two sets of data should be like two separate cruises. If the processing vessel did not fish for itself on a given day because it was waiting to receive or process fish from the joint venture, enter this reason in columns 36-54 of Form 2 (for stern trawlers) to distinguish that situation from a non-fishing day due to bad weather or cargo transfer.

If the processing vessel made any catches on its own during the week, it is important to sample at least some of it so that you will have species composition data to apply to the foreign catch tonnage. Calculate and report in your radio message non-joint venture catches separately from joint venture trawls. (See "Specific Directions for Longline and Joint Venture Radio Messages" in the "Instructions for Weekly Radio Messages" section of your sampling manual.)

In addition to the above mentioned changes for a joint venture, there is an additional third paragraph in the radio message which is made up of three parts. The first part is a list of catcher boats that delivered codends to the foreign processor that week. (Use the abbreviated name of each catcher boat.) The second part is a listing of the total number of codends delivered to the processor that week, and the third part of paragraph three is the marine mammal report.

Marine Mammal Report for Joint Venture:

Observers on joint venture ships should always submit a marine mammal report if there is U.S. catch. Only freshly killed or fatally injured mammals that are delivered to the foreign processor are to be reported. If no marine mammals are killed or injured, report "MAMM 0". Sea lions caught in Alaska will be Northern sea lions. It is sometimes difficult to distinguish between Northern sea lions and Northern fur seals. Refer to the descriptions of each in the appendix of the sampling manual to

help in their identification. Observers in Pacific Coast fisheries (Washington, Oregon, and California) should check the "Species Identification Manual" to distinguish between Northern sea lions and California sea lions, as both may be found in that region. Be careful to identify marine mammals correctly, since allocations for each species differ greatly.

Unlike species composition and prohibited species catch reports, marine mammal reports should be reported by region (BSA, GOA, WOC), not individual statistical reporting area (51, 52, 54, etc.) If a ship fishes in areas 51 and 52 during the week, for example, send a single marine mammal report for the week for the Bering Sea (BSA).

Region Abbreviations:

BSA = Bering Sea GOA = Gulf of Alaska WOC = Wa., Or., Ca.

Species Abbreviations:

MAMM = Marine mammal (This should be recorded whether or not any are delivered to the processor. If there were no marine mammals for a week then the MAMM number would be zero.)
NLION = Northern sea lion (Eumetopias jubatus)
CLION = California sea lion (Zalophus californianus)
FURS = Northern fur sea (Callorhinus ursinus)
HARB = Harbor seal (Phoca vitulina)
WHALE = Whales, porpoises, dolphins (all cetaceans)
ELEPH = Northern elephant seal (Mirounga anjustirostris)
WALRS = Walrus (Odobenus rosmarus)

The following is an example of the first radio message sent from a non-Japanese processor participating in a joint venture in the Gulf of Alaska. (Since this is a non-Japanese ship the message was sent on Tuesday and the last available noon position was 57-50N and 154-03W.)

NOJ DE (vessel call sign) MSG CATCHREP K
TO: RUSS NELSON, NWAFC, SEATTLE WA
INFO: NMFS, AK REGION, JUNEAU AK
FROM: (your name, vessel name, vessel permit number,) 57-50N 154-03W MAR 13

PARA 1 /(vessel permit number)/ MAR 10 / ALL US CATCH / MAR 6-10 / A62 / DG5D0P5 / SQU 0D51P6 / FLAT 0D09P9 / POLL 1502D01P9 / COD 5D21P8 / OROCK 0D02P2 / NON 0D06P6 / TOTAL 1507D90P22 ///

PARA 2 / ALL US CATCH / MAR 6-10 / A62 / DG5D0P5 / HW 658D3P22 / KNG 0D0P0 / TAN 0D0P0 / HBT NOS 2D0P2 WT 1D83P12 / SAL NOS 223D0P7 WT 323D35P16 / IDS MAR 6 ///

PARA 3 / CATCHER BOATS: GREAT PACIFIC / US DOMINATOR / PACIFIC FURY / TOTAL CODENDS DELIVERED 44P8 / GOA MAMM 6P6 / NLION 5P5 / FURS 1P1 / STOP.

FORM 2JV

HAUL FORM FOR JOINT VENTURE

1. LEADING ZEROS IN COLUMNS 1, 3, 33–40 ONLY.
2. SKIP A LINE AFTER EACH DAY.
3. RECORD A C UNDER HAUL NO. IF MORE THAN ONE LOCATION IS RECORDED FOR A HAUL.
4. ON DAYS WITH NO HAULS, ENTER DATE, HAUL NUMBER = 0, AND NOTE REASON.
5. TRAILING ZEROS ARE REQUIRED IN COLUMNS 61–75.

	CRUISE NO.				VESSEL CODE				YEAR	
	1	3	4	5	6	7	8	9	10	11	12
*											

LOCATION IDENTIFIER (COLUMN 23)

D = DELIVERY POSITION
S = TRAWL SET POSITION
R = TRAWL RETRIEVAL POSITION
N = NOON POSITION OF PROCESSOR

DEPTH (COLUMNS 53 AND 58)

M = METERS
F = FATHOMS

PAGE ___ OF ___

LIST OF CATCHER BOATS

FULL CATCHER BOAT NAME	ABBREVIATED NAME
Aleutian Harvester	Aleut Harvester
Vanguard	Vanguard
Lady of Good Voyage	Lady Good Voy
Great Pacific	Great Pacific

DATE MO. (1–2)	DATE DAY (3–4)	HAUL (DELIVERY) NO. (5–7)	ABBREVIATED CATCHER BOAT NAME (8–22)	LOCATION I.D. (23)	LOCATION (N) LATITUDE (24–27)	E/W (28)	(I) LONGITUDE (29–32)	FISHING TIME (GMT) NETS ON BOTTOM (33–36)	NETS OFF BOTTOM (37–40)	FISHING DURATION (MIN.) (41–44)	DELIVERY TIME (GMT) (45–48)	AVG. FISHING DEPTH (49–52)	M/F (53)	AVG. BOTTOM DEPTH (54–57)	M/F (58)	AVG. SPEED (KNOT) (59–60)	TOTAL CATCH (SHIPS EST.) (MT.) (61–65)	OBSERVERS ESTIMATE (MT.) (66–70)	ORIGINAL SHIPS EST. (MT.) (71–75)	WEATHER CODE (76)	SEA CODE (77)
07	03	56	ALEUT HARVESTER	D	4347	W	2439			255	0830	183	M			3.4	15.30	.	.	2	4
		57	ALEUT HARVESTER	D	4350		2440			100	1123	122	M			3.4	16.00	15.40	.	2	4
		58	VANGUARD	D	4349		2440	1240	1430		1500	125	F	380	F	3.0	12.70	12.50	.	2	4
		C		S	4337		2439									.	.	.	.		
		C		R	4340		2439									.	.	.	.		
		59	VANGUARD	D	4353		2441	1600	2000		2015	180	F	400	F	3.0	17.20	17.00	.	2	5
		C		S	4340		2439									.	.	.	.		
07	03	C		R	4350	W	2440									.	.	.	.		
																.	.	.	.		
07	04	0		N	4350	W	2440	NO FISHING — BAD WEATHER								.	.	.	.	2	6
																.	.	.	.		
07	05	60	LADY GOOD VOY	D	4350	W	2426	0330	0630		0700	175	F	350	F	3.2	8.40	8.60	.	2	4
		61	GREAT PACIFIC	D	4353		2429			70	0939	200	M	410	M	3.4	5.90	.	.	1	3
		C		S	4341		2440									.	.	.	.		
		C		R	4343		2440									.	.	.	.		
		62	ALEUT HARVESTER	D	4354		2430			80	1515	195	M			3.4	6.80	7.10	.	1	3
07	05	63	LADY GOOD VOY	D	4352	W	2428	1900	1950		2000	220	F	430	F	3.2	9.30	9.50	.	2	3

LIST OF CATCHER BOATS

OFFICIAL NO.	ABBREVIATED NAME	FULL NAME	VESSEL LENGTH (FEET)	NET TONS
664363	ALDEBARAN	ALDEBARAN	132	135
590992	ALERT	ALERT--(sank in Feb. 1985)	91	107
603820	ALEU CHALLENGER	ALEUTIAN CHALLENGER	86	126
623570	ALEUT HARVESTER	ALEUTIAN HARVESTER	94	144
560237	ALYESKA	ALYESKA	125	131
529425	AMBER DAWN	AMBER DAWN	97	116
618713	AMBITION	AMBITION	95	136
526899	AMBITION*	AMBITION (*)		
558605	AMERICAN EAGLE	AMERICAN EAGLE	120	129
	AMERICAN SCOTER	AMERICAN SCOTER		
609117	ANNIHILATOR	ANNIHILATOR	82	93
655328	ARCTURUS	ARCTURUS	132	135
623210	BARBARA LEE	BARBARA LEE	108	181
514665	BLUE FOX	BLUE FOX		
	BOTTOM LINE	BOTTOM LINE --(sank in Nov. 1984)		
590758	CALIF HORIZON	CALIFORNIA HORIZON	90	181
618158	CAPE KIWANDA	CAPE KIWANDA		
513228	CAPTAIN JULIAN	CAPTAIN JULIAN	72	58
622773	COHO	COHO		
505269	COLENTINO ROSE	COLENTINO ROSE		
610150	COLENTINO R II	COLENTINO ROSE II		
532081	DAWN	DAWN	86	115
619236	DEFIANT	DEFIANT	59	63
628595	DONA GENOVEVA	DONA GENOVEVA	123	148
550418	DUSK	DUSK	86	99
526037	ELIZABETH F	ELIZABETH F	91	145
505311	EMERALD SEA	EMERALD SEA	86	71
	ENDURANCE	ENDURANCE		
576930	EXCALIBUR	EXCALIBUR	60	63
636602	EXCALIBUR II	EXCALIBUR II	78	81
598380	FLYING CLOUD	FLYING CLOUD	124	132
609951	GOLDEN FLEECE	GOLDEN FLEECE	104	128
599585	GOLDEN PISCES	GOLDEN PISCES	81	154
639329	GOLDEN PRIDE	GOLDEN PRIDE	65	99
554298	GOLDEN PROVIDER	GOLDEN PROVIDER	66	99
628789	GOLDEN VENTURE	GOLDEN VENTURE		
037660	GREAT PACIFIC	GREAT PACIFIC	110	136
640130	GUN-MAR	GUN-MAR	135	132
615796	HALF MOON BAY	HALF MOON BAY	108	133
592211	HAZEL LORRAINE	HAZEL LORRAINE	75	98
546558	HAZEL LORRAINE*	HAZEL LORRAINE (*)		
610984	HAZ LORRAINE I	HAZEL LORRAINE I	110	129
594154	HICKORY WIND	HICKORY WIND	75	100
594981	KARINA EXPLORER	KARINA EXPLORER	84	135
045419	LADY BLUE	LADY BLUE	93	127
597603	LADY GOOD VOY	LADY OF GOOD VOYAGE	78	126
584873	LESLIE LEE	LESLIE LEE		
578533	LINDA JEANNE	LINDA JEANNE	65	55
	LISA MELINDA	LISA MELINDA		

585059	LITTLE BEAR	LITTLE BEAR	90	98
523219	MAR DEL NORTE	MAR DEL NORTE	86	104
525608	MAR-GUN	MAR-GUN	110	130
615563	MARGARET LYN	MARGARET LYN	98	128
509552	MARK I	MARK I	88	138
610393	MORNING STAR	MORNING STAR	123	128
611524	MUIR MILACH	MUIR MILACH		
599534	NEAHKAHNIE	NEAHKAHNIE	98	133
602177	NEW JANET ANN	NEW JANET ANN		
609850	NORDFJORD	NORDFJORD	127	134
542651	NORDIC FURY	NORDIC FURY	110	137
214904	NORMA	NORMA	36	6
535026	NORMAR II	NORMAR II	83	115
609344	NORSELANDER	NORSELANDER	85	102
629262	NORSKA	NORSKA	70	75
	OCEAN BEAUT	OCEAN BEAUT		
615247	OCEAN DYNASTY	OCEAN DYNASTY	124	168
524908	OCEAN HARVEST	OCEAN HARVESTER	72	66
549892	OCEAN HARVEST*	OCEAN HARVESTER (*)	108	109
561518	OCEAN LEADER	OCEAN LEADER	103	131
517100	OCEAN SPRAY	OCEAN SPRAY	94	134
602279	OCEANIC	OCEANIC	122	134
612084	PAC ALLIANCE	PACIFIC ALLIANCE	89	131
518937	PAC CHALLENGER	PACIFIC CHALLENGER	86	111
561934	PACIFIC FURY	PACIFIC FURY	110	137
	PACIFIC RAM	PACIFIC RAM		
548750	PARAGON II	PARAGON II	110	133
507438	PAT SAN MARIE	PAT SAN MARIE		
621638	PATTY A J	PATTY A J	65	84
565120	PEGASUS	PEGASUS		
502779	PEGGY JO	PEGGY JO	99	134
611520	PELAGOS	PELAGOS	131	126
565349	PROGRESS	PROGRESS	100	137
547390	QUEEN VICTORIA	QUEEN VICTORIA		
249995	RAVEN	RAVEN		
555917	RONNIE C	RONNIE C		
509579	ROSELLA	ROSELLA	94	98
624371	ROYAL AMERICAN	ROYAL AMERICAN	105	151
559271	ROYAL ATLANTIC	ROYAL ATLANTIC	108	139
095757	SEA WOLF	SEA WOLF	123	135
040638	SHARON LORRAINE	SHARON LORRAINE	110	129
598904	SILVER CHALICE	SILVER CHALICE	83	139
610436	SILVER SEA	SILVER SEA	102	130
591482	SLEEP ROBBER	SLEEP ROBBER	78	111
561651	STARFISH	STARFISH	108	199
617807	STARWARD	STARWARD	123	199
620769	STORM PETREL	STORM PETREL	123	220
598484	SUNSET BAY	SUNSET BAY	108	147
531320	TAM-RAN	TAM-RAN	84	126
575428	TOPAZ	TOPAZ	80	98
602309	US DOMINATOR	US DOMINATOR	124	136
617802	VANGUARD	VANGUARD	94	144
516479	VEGA	VEGA	90	108
611642	VESTERAALEN	VESTERAALEN	125	198
565017	VIKING	VIKING	120	138

605228	VIKING EXPLORER	VIKING EXPLORER	123	131
616131	VOYAGER	VOYAGER	94	151
524423	WESTERN DAWN	WESTERN DAWN	97	130

(*) Indicates that there is more than one catcher boat with this name. Check official number and vessel statistics for correct identification.