

UNITED STATES DEPT. OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
ALASKA FISHERIES SCIENCE CENTER
SEATTLE, WASHINGTON

Only 1 message for
for shore side delivery
date of delivery use
do which ending date
which is ~~not~~ ~~not~~ ~~not~~

nan (nawn) - what
DARE (DAH-day) - who
NAZE (WAY-zeh) - why

Manual for Biologists
Aboard Domestic Groundfish Vessels

1990

[Revised May 1990]

PREFACE

This manual has been prepared to assist you in your duties as an observer aboard domestic 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 and consider ways in which it may be improved as a guide for future observers.

ROLE OF THE OBSERVER IN THE DOMESTIC FISHERIES OBSERVER PROGRAM

As American harvest of groundfish resources replaced the foreign and joint venture fisheries, domestic observer programs were implemented to provide biological data to take the place of the data base formerly provided by the Foreign Fisheries Observer Program. The re-authorization of the Marine Mammal Protection Act of 1972 mandates observer coverage of 20 - 35% of groundfish trawlers to monitor incidental take of marine mammals but this coverage requirement will be superseded by a domestic observer program created by amendments to the Bering Sea and Gulf Of Alaska Groundfish Fishery Management Plans. Under the new program, there is a 100% observer coverage requirement on all vessels 125 feet or greater in length and 30% coverage on vessels from 50 - 125 feet, 100% of shoreside processing plants receiving more than 10,000 metric tons (mt) of groundfish annually and 30% coverage of plants receiving from 1,000 to 10,000 mt annually. Though the stocks of fish are now harvested by U.S. vessels, the need for observers to make independent observations of the fishing operations has not changed.

The primary objectives of the observers are to: record fishing effort and obtain daily catch rates; determine species composition; monitor for the incidental take of marine mammals; gather data on species, size, and age compositions; determine incidence of Pacific halibut, salmon, king crab and Tanner crab in the landings; and report on possible violations of U.S. fishing regulations. The estimates of catch rates by species obtained through the observers, matched with data on the number of vessel days on the ground and production log data, enables the National Marine Fisheries Service (NMFS) to estimate total daily landings of the various fisheries and pace the progress of the groundfish fisheries towards the quotas.

Data collected by observers aboard U.S. fishing vessels will be used in much the same way as data collected by observers in foreign and joint venture fishery operations. The data will be used in: helping to assess the status of the stocks; estimating the bycatch rates of non-target and prohibited species; investigating population interrelationships; assessing the impacts of proposed fishery management plan amendments; assessing the impacts on fisheries of proposed actions by other federal agencies (e.g. oil leasing); assisting fishery development activities; and analyzing fishery-marine mammal interactions.

Data obtained by the observers on catch size and species composition will give fishery biologists some idea of the catch per unit effort of each species in a fishery, an important factor in determining the status of the stocks. Length frequencies and age structure collections of the target species obtained from the commercial catch are also vital in determining the condition of a fishery resource, and hence, of determining how much is available to be caught without causing fishery deterioration. Mathematical models used to assess certain fish populations (such as Shelikof Strait pollock, Bering Sea pollock, yellowfin sole, Greenland turbot, and others) are dependent upon a measure of the current age composition of the commercial catch. Without these data and models, the ability of fishery scientists to determine the condition of commercially important stocks of fish would be diminished. Resulting decisions on allowable catches will be based on a higher degree of uncertainty and thus may be more conservative.

Another important use of observer data is to obtain estimates of the percentage of

honestly any suspected violations that are observed. Falsification of observer data will be grounds for decertification.

3. Observers must keep all collected data and observations made on board the vessel or in the processing plant confidential according to the Federal guidelines on confidentiality.
4. Observers must refrain from engaging in any illegal actions or any other activities that would reflect negatively on their image as professional scientists, on other observers, or on the observer program as a whole. These actions or activities include, but are not limited to:
 - a) excessive drinking of alcoholic beverages (however, if the vessel or shoreside facility maintains a stricter alcoholic beverage policy for its employees, then the observers must comply with said policy);
 - b) use or distribution of illegal drugs; and
 - c) physical or emotional involvement with vessel or shoreside processing plant personnel.

Behavior which is contrary to these standards or the intent of these standards are grounds for the decertification of the offending observer.

CONFLICT OF INTEREST STANDARDS

A NMFS-certified observer:

1. must be employed by an independent contracting agent certified by NMFS to provide observer services to the industry;
2. may not have a financial interest in the observed fishery;
3. may not have a personal interest in the vessel or shoreside facility to which he or she is assigned;
4. may not solicit, accept, or receive, directly or indirectly, a gift, whether in the form of money, service, loan, travel, entertainment, hospitality, employment, promise, or in any other form, that is a benefit to the observer's personal or financial interests, under circumstances in which the gift is intended to influence the performance of official duties, actions or judgement.

SPECIAL CAUTION ON DEPARTMENT

As a fisheries observer:

1. You must abide by the standards of conduct developed by your hiring contractor.

2. When conflicts or sampling problems occur which affect your attempts to get unbiased samples of the catch (presorting of fish for example), you can usually work it out by talking with the crewmen, factory foreman or deck boss. If this doesn't help, you might talk to the captain and ask him to help you, don't demand. If talking fails, you might have to change your sampling system.
3. Maintain a friendly but professional demeanor to vessel personnel. Your behavior should be governed by remembering that, politically, you are highly visible. Before acting in any given situation, be mindful of the diplomatic nature and sensitivity of your position. Tactful, mature handling of problems is expected. Remember, you are on the job 24 hours per day.
4. Do not offer, even if asked, any authoritative advice on what a vessel can and cannot do under terms of the permit under which they are operating. If you know the answer to a question about fishing regulations, answer the question with a qualifying statement such as, "I think...". If you are not sure, admit it and refer the captain to the Code of Federal Regulations (CFR) book or to the NMFS Regional Office in Juneau.
5. Consumption of alcoholic beverages by observers at sea is prohibited. Remember that your conduct must be above reproach at all times. While in port, drinking a glass of wine or beer with a meal or having one or two drinks while relaxing during off hours is permissible. When you are in port, your alcohol consumption should be kept at a very low level. Observers are not allowed to be intoxicated, much less drunk, while deployed. Anything that damages your character in the eyes of the people you are working with -- now or later -- is detrimental to your effectiveness on the job.
6. Observers should never accept gifts, (even of fish to take home), as this may appear to compromise your impartiality.
7. An obvious point (but one of extreme importance) is the prohibition of any sexual activity while deployed as an observer.
8. As an 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 federal or state permit prohibits the vessel from fishing for or retaining, including especially salmon, halibut, crab, and marine mammals. (This includes eating them in the ship's mess, if served.) Do not accept or transport any item violating laws relating to endangered or protected species. There is a copy of a permit in the appendix of this manual which does allow you to bring back sea lion or fur seal canine teeth for age analysis by the National Marine Mammal Laboratory. However, no specimen materials may be taken from walrus.
9. 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 may let

them know that you are aboard, then stand by. Do not allow boarding officers to draw you into a discussion of your observations in front of vessel personnel. Tactfully suggest that if they wish to ask you any questions you'll be in your cabin (or go to some other place that's private).

10. Once you are aboard your sampling ship, avoid making visits to other vessels. Sometimes other ships, tenders, or catcher boats may tie up to our 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. Do not stay away from your vessel overnight. This is necessary to insure that planned levels of observer coverage are met.
11. Consider safety first in everything you do.

RESPONSIBILITIES OF VESSEL AND PLANT OPERATORS

An operator of a vessel must:

1. Provide, at no cost to the observer or the United States, accommodations on a participating vessel for the observer which are equivalent to those provided for crew members of the participating vessel;
2. Maintain safe conditions on the vessel for the protection of the observer during the time the observer is on board the vessel, by adhering to all U.S. Coast Guard and other applicable rules, regulations, or statutes pertaining to safe operation of the vessel and by keeping on board the vessel:
 - a) adequate fire fighting equipment;
 - b) one or more life rafts capable of holding all persons on board; and
 - c) other equipment required by regulations pertaining to safe operation of the vessel.
3. Allow the observer to use the vessel's communication equipment and personnel on request for the transmission and receipt of messages
4. Allow the observer access to and the use of the vessel's navigation equipment and personnel on request to determine the vessel's position;
5. Allow the observer free and unobstructed access to the vessel's bridge, trawl or working decks, holding bins, processing areas, freezer spaces, weight scales, cargo holds and any other space which may be used to hold, process weigh, or store fish or fish products at any time.
6. Notify the observer at least 15 minutes before fish are brought on board for fish and fish products are transferred from the vessel to allow sampling the catch or observing the transfer, unless the observer specifically requests not to be notified;
7. Allow the observer to inspect and copy the vessel's daily fishing logbook, daily

cumulative production logbook, transfer logbook, and any other logbook or document required by regulations, information from which will be kept confidential by the observer under Federal guidelines;

8. Provide all other reasonable assistance to enable the observer to carry out his or her duties;
9. Move the vessel to such places and such times as may be designated by the contractor, as instructed by the Regional Director, for purposes of embarking and debarking the observer;
10. Ensure that transfers of observers at sea via small boat or raft are carried out during daylight hours, under safe conditions, and with the agreement of the observer involved;
11. Notify the observer at least three hours before an observer is transferred so the observer can collect personal belongings, equipment, and scientific samples;
12. Provide a safe pilot ladder and conduct the transfer to ensure the safety of the observer during the transfer; and
13. Provide an experienced crew member to assist the observer in the small boat or raft in which the transfer is made.

A manager of a shoreside processing facility must:

1. Maintain safe conditions at the processing facility for the protection of the observer by adhering to all applicable rules, regulation, or statutes pertaining to safe operation and maintenance of the processing facility;
2. Accept and provide for an observer, at no cost to the observer or the United States, for the purposes of complying with the Observer Plan;
3. Notify the observer on a daily basis of the planned facility operations and expected receipt of groundfish.
4. Allow the observer to use the processing facility's communication equipment and personnel on request for the transmission and receipt of messages;
5. Allow the observer free and unobstructed access to the processing facility's holding bins, processing areas, freezer spaces, weight scales, warehouses and any other space which may be used to hold, process, weigh or store fish or fish products at any time;
6. Allow the observer to inspect and copy the shoreside processing facility's daily cumulative production logbook, transfer logbook, and any other logbook or document required by regulations, information which will be kept confidential by the observer under Federal guidelines; and

7. Provide all other reasonable assistance to enable the observer to carry out his or her duties.

PROHIBITED ACTIONS

No person may:

1. Forcibly assault resist, oppose impede, intimidate, or interfere with an observer;
2. Interfere with or bias the sampling procedure employed by an observer, including sorting or discarding any catch before sampling; or tamper with, destroy, or discard an observer's collected samples, equipment, records, photographic film, papers, or personal effects without the express consent of the observer;
3. Prohibit or bar by command, impediment, threat coercion, or by refusal of reasonable assistance, an observer from collecting samples, conducting product recovery rate determinations, making observations or otherwise performing the observer's duties; or
4. Harass an observer by conduct which has sexual connotations, has the purpose or effect of interfering with the observer's work performance, or otherwise creates an intimidating, hostile, or offensive environment. In determining whether conduct constitutes harassment, the totality of the circumstances, including the nature of the conduct and the context in which it occurred, will be considered. The determination of the legality of a particular action will be made from the facts on a case-by-case basis.

PREPARATION AND DEPARTURE

COMMUNICATIONS

While deployed as an observer, it is not uncommon to feel as if you are "way out on a limb". Trying to communicate with your contractor and/or NMFS can be frustrating at times. Patience, perspective and maturity will be needed. Please remember that you are employed as a professional and all your communications should reflect this. Know that all voice radio communications at sea are **public**, not private. Transmitted messages are often passed through company offices as well as to your contractor and to NMFS so **no idle comments, offhand remarks, or unauthorized personal business please**. Make all messages complete, but concise and to the point. Remember that no one will be in the NMFS Seattle office on Saturdays, Sundays or federal holidays.

Observers will not receive mail through NMFS or their contractor while at sea. To receive mail while in training or after your cruise, you must make your own arrangements either through your contractor or the place where you're staying. Observers have had personal mail forwarded to and from the vessel through the fishing company, but keep in mind that this is done only as a favor to the observer and **no demands** can be made by an observer for this service. Any mail you wish to send out via the company must be stamped and ready for mailing. Do not send or expect to receive any personal messages while at sea except in the event of emergencies. Before you depart, provide the contractor with phone numbers and addresses of whom to contact in case of emergencies or drastic changes in your scheduled return. Any person listed should be notified to contact anyone else who should know of the change in plans or emergency. If a family emergency should arise at home, relatives should contact your hiring contractor.

The following list of phone numbers is supplied for your reference. These individuals should only be contacted if you are unable to contact your contractor.

Observer Program Staff in Seattle:

Russ Nelson (supervisor) (206) 526-4194
Janet Wall (supervisory assistant)
Bob Maier (program manager) (206) 526-6195
Angela Dougherty (debriefing) (206) 526-4192
Karen Teig (training) (206) 526-4191
Mike Brown (training) (206) 526-4191
Gear Office (206) 526-

THE TRAINING PERIOD

The observer who requires certification training will spend approximately two and one half weeks in Seattle for orientation and training. Training will consist mainly of learning how to identify common species of fish and crabs found in the Bering Sea and Northeast Pacific,

explanations of the sampling procedures, and familiarization with groundfish fishing regulations. The following outline lists some of the activities covered during the training period. The outline is not necessarily complete and the items are not necessarily given in the order that they will be presented.

Domestic Observer Training Syllabus

Day 1

Orientation Day: Administrative information, introductions all around.

Introductory video about the Observer Program

MFCMA and management of the EEZ, (brief overview lecture).

Slides and lecture on the history of N.E. Pacific groundfish fishing, commercially important fish, vessel types and their operations.

Observer sampling duties - emphasis on terminology, visual orientation and safety on board.

Seasickness, medical advice, living accommodations, clothing and other items to bring.

Communications - with home, NMFS.

Day 2

Slide show on Alaskan ports, safety in boarding and disembarking vessels, life at sea, hazards, and observer work.

Hardships, deportment, and conduct lecture.

Statistical areas and vessel check-in reports.

Duties: objectives and priorities, workload.

Guest Lecture: Dr. Aron, Director of Alaska Fisheries Science Center.

Day 3

Species Identification: a general review of identification terminology and slides of various representatives of N.E. Pacific fish families: presented by a U.W. ichthyologist.

General instructions on data forms, use of GMT and the metric system.

Obtaining haul information: data forms 1 and 2US.

Estimation of catch size - by the observer.

Classroom practice of haul weight estimation.

Overnight homework assignment.

Day 4

Estimation of catch size - by the ship.

Correction of homework and quiz over haul data form.

Video on navigation and classroom practice on use of a navigational chart.

Identification of *Sebastes* and *Sebastolobus* (rockfish) and other species: lecture, slides and laboratory session presented by U.W. ichthyologist.

Day 5

Definitions of species report groups and prohibited species.

Catch Composition Sampling: determining a sample weight.

Methods for random, representative and unbiased sampling.

Slide presentation on sampling.

Data entry on species composition form 3US.
Classroom practice of sampling methods and data entry.
Homework practice assignment.

Day 6

Correction of homework.

Collecting biological information from Tanner crab, king crab, halibut and salmon in samples: weights and lengths, viability, sex, and salmon scale sampling.

Molting crab study.

Collecting data on tagged fish and crab.

Computations for weekly radio messages, (forms RM, RM-1, & RM-3) (lecture, classroom exercise and homework).

Day 7

Formatting weekly and daily radio messages for transmission.

Length frequency sampling, (form 7US).

Otolith and scale sampling, (form 9US).

Fish dissection and otolith removal: slides and lab practice.

Species identification of crab: slides and classroom practice.

Day 8

Vessel reporting requirements, production logbooks, ADF&G Fish Tickets.

Practice addressing the crew; interactions with vessel personnel.

Considerations and requirements for sampling shoreside delivery vessels.

Longline vessels: Gear and fishing methods, sampling longline catches.

Assignment of 2nd data exercise.

Day 9

Identification of flatfish and salmon species: lecture, slides and laboratory session presented by U.W. ichthyologist.

Background study: Review of previous cruise reports and reading files.

Receive special project instruction.

Day 10

Safety videos and discussion on hypothermia, medical emergencies at sea, fire control and sea and shore survival.

Medivacs, radiotelephone procedures and preparation of a medical diagnostic chart.

Checkout of survival suits.

Survival suit and life-raft water practice.

Day 11

Correction of homework

Observer's logbook entries, methods of documentation.

Obtaining vessel production information and product recovery sampling.

Guest Lecture: Scientist from the National Marine Mammal Laboratory showing slides on identification of marine mammals at sea.

Recording information on marine mammals: as incidental take, (form 10); sightings,

(form 11).

Day 12

Species identification exam.

Gear issue: familiarization and care of equipment, gear check-out and calibration of scales.

Day 13

Final Exam.

Problem solving using small discussion groups and in-class presentations.

Guest speaker: Debriefing supervisor discusses data review process and final reports.

Preparation for first day aboard.

Travel rules and parting information from contractors.

If a complete grasp of the duties is not demonstrated, the observer will not be certified. An observer will be de-certified or dismissed by their contractor if they violate rules of conduct, rules of data confidentiality, or lack the appropriate human relation skills necessary for the job.

Vessel and observer schedule arrangements are a difficult task. Though you may express a preference for a vessel type, an observer must be willing and able to accept any assignment. The observer-in-training should be prepared for changes in ship assignments and Seattle departure times. Some 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 by vessel schedules, so notify your contractor, before leaving, if you have any pressing dates soon after your expected return (such as the beginning of a school quarter).

After completing their trip at sea, the observers return to Seattle and are required to work with their contracting agency until their data forms have been properly completed and their cruise reports have been accepted by NMFS. Observers are normally paid for five full working days after their return to Seattle.

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 observer is responsible for the transport and return of the sampling gear issued. If the observer goes out on a number of short cruises during the same trip, it may be possible to arrange for the replacement of torn raingear or lost equipment between cruises.

Observers will provide their own personal clothing, warm work clothes for wearing under raingear, toilet articles including a towel, 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 and meals. It is expected that the vessel captain will allow the observer an adequate and safe space in which to carry out the sampling duties.

The following pages are lists covering the clothing and equipment necessary to perform 60 days sampling aboard a U.S. vessel.

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 - 2
Shirts, cotton sweat - 1
T-shirts - 3
Trousers, wool work - 1
Trousers, cotton - 2
Wool knit cap
Slippers or sandals
Handkerchiefs, large - 3
Underwear, long-thermal - 2 pairs
Underwear - 5 pairs
Socks, wool work - 2 pairs
Socks, cotton - 5 pairs
Jacket, medium wool or synthetic - 1

Other items or articles

Towel, medium cotton - 2
Pillowcase - 1
Toilet articles
Duffel bag - sturdy, medium size, old or inexpensive - 1
Small daypack or knapsack - 1
Traveler's checks purchased with the cash advanced
If corrective lenses are used for eyesight - a spare pair

Optional/Recommended Items

Felt/wool boot insoles (not liners) - 2 pair
Needle and thread, safety pins, and duct tape for repairs
Camera and film
Watch and travel alarm
Medication for seasickness
Vitamins
Hand cream
Paperback books
Small cassette player and tapes
Water bottle (1 qt.) - to keep drinking water in your cabin

Sampling Gear Provided by NMFS

To be packed loose in baskets:

Baskets (2 to 6) with at least one wooden lid
Set of castors or wheels for one or two baskets
Rope (one length, approximately 15 - 20 feet)
Clipboards (2)
Log book (1)
Scouring powder (1 can)
Lubrication oil (16 oz. bottle with applicator cap)
50 kg scale (1) - (observer should check accuracy with standard weights
on all scales before leaving)
5 kg scale (1)
2 kg scale (1)
Sponges (2)
Scale envelopes (50-200)
Plastic bags for salmon snouts (5)
Plastic bags (15)
Glove liners (3 pair)
Hardhat and chin-strap (1)
First aid kit (1) - (check contents for completeness)
Plastic measuring strips (3)
Plastic sheets:
Basket sample form (2)
Prohibited species form (2)
Otolith form (2)

To be packed in cardboard box in basket:

Pencils #2 (6)
Pencils #3B (2) - (soft lead - for use on plastic forms)
Pens (4)
Pencil erasers (2)
Plastic ruler (1)
Looseleaf rings for extra forms (3)
Scotch tape (1 roll)
Thumbtacks (1 container; about 25 tacks)
Forceps (1, or 2 if assigned to collect age structures)
Rubber bands (1 container; about 40 rubber bands)
Scalpel handles (2)
Hooked scalpel blades (10)
Tape measure (1 small, steel, 2 meter)
Tape measure (1 large, reel-type, 15 meter)
Thumb counters (1) - (mothership observers take 2; longline observers take 3)
Twine (1)

Knife (1)
Whet stone (1)
Flashlight and batteries

The following items will be checked out either before or during gear issue:

Sleeping bag (1)
Survival suit, signal light, whistle (1 each)
Life vest (with whistle)
Rain pants and jacket (1 set)
Boots (1 pair)
Rubber gloves (3 pair)
Manila folder containing:
 Carbon paper (10 sheets)
 Graph paper (2 - 5 sheets)
 Shipping Label for basket (1)
Data forms (important! - check for completeness!)
Calipers (1) - for those who are to measure crab
Otolith vials (200-600) - for those who are to collect age structures
Vial block (1) (if collecting otoliths or cod scales)
Liter bottle of alcohol for roundfish or glycerol for flatfish age structures (1)
Squirt bottle for alcohol (1) (if collecting otoliths or cod scales)
Stopwatch (an optional item for motherships or c/p vessels > 250 feet)
Extra calculator batteries (if appropriate)
Safety goggles (for observers on longliners, optional item for others)
Earplugs (2 pair) (optional, issued on request)

The following gear will be handed out during training class:

Observer Sampling Manual (1)
Mechanical Pencil (1) with extra lead
Calculator (1)
Book - Hart (1)
Book - Hitz (1)
Book - Eschmeyer (1)
Laminated photo guide (for new observers only, unless requested)
Species identification manual (check for completeness)
Marine mammal guide

Vessel Data Forms for 3 months:

Form 1US	20
Form 2US	20
Form 3US (for trawlers)	150
Form 3US (for longliners)	150
Shoreside Boat Sampler's Prohib. Talley	3
Species Description Forms (3 types)	20 ea.

Form 7US	45
Form 9US	5
Form 10US	10
Form 11	15
Radio rpt. worksheets RM	30
Radio rpt. worksheets RM-1	10
Radio rpt. worksheets RM-3	30
Catch Message Form	8
Plain white paper for misc. fax messages	6

Port Sampling Forms No. of Pages per Month:

Form A	10
Skipper Interview Form	10
Prohibited Species Summary Form	3
Form 8 Product Recovery Rates	3
Form 8 Worksheet	20

Vessel Reports:

Cruise Itinerary	1 per cruise
Form 12 Vessel Data Form	5
Map of Areas Fished	5
List of Catcher Boats for Processor	1
Gear Diagrams (BTR, PTR, LGL)	3 ea.
Report Questions	<i>X listed in this manual</i>
Agreement to Share Data With ADF&G	5

Preparation and Care of Sampling Equipment

The sampling gear provided for you may not be new, but should be 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 given to you will be examined upon return, to see that it is in good condition before it is checked in. There are facilities for cleaning gear at NMFS offices if this could not be done 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 if necessary) each day when used. (Be careful to keep oil away from plastic forms, since pencil marks tend to wipe off a slick surface).
6. 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.

Do not give away any gear or books. You will have to replace any government equipment that you give away. Replacement calculators cost about \$30.00 and must be of the type specified. The laminated photo guide cannot be replaced; they originally cost over \$50 each in materials alone.

Calibrate your scales during gear check-out. Then prepare a known weight by selecting items which may be easily assembled later. (i.e. a basket, the laminated photo guide, etc.) List the items weighed and their total weight. This known weight may then be used later to check your scale adjustment or to check the accuracy of shipboard scales.

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 contents 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 ceiling brace. 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.

All sampling gear and forms will be packed in sampling baskets for transport to and from the vessel. The baskets may be exposed to salt spray, therefore 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 basket to avoid their loss before checking in your baggage at the airport.

TRAVEL TO THE SHIP

Vessel assignments are arranged by your contractor with the vessel owner. Logistic arrangements are also made by your contractor. Observers must be aware that fishing schedules are often changed by weather, mishap, or fishing success and are often the cause for changes in observer schedules. If you find out that the ship you are on is planning to leave the fishing area unexpectedly, transmit a message explaining the matter. Do not make changes in your schedule yourself. Observer coverage of vessels is a large logistical "net". Movement in one part affects the whole and your contractor has logistical perspective that you cannot see.

Shipment of Gear

The observer carries the sampling 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 may be avoided by careful planning and keeping the number of personal and equipment items at a minimum. Your personal baggage should not weigh more than about seventy pounds. Distribute baggage weight between your pieces of luggage so that no piece exceeds the weight limit of the airline you are flying with. 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. (Excess baggage charges will typically run \$200-250 from Dutch Harbor to Seattle.) Do not ship your baggage unaccompanied. You cannot do your job without your gear. If you get separated from your luggage, initiate a luggage search from your end immediately. **Do not board a vessel without your luggage even if you are told it can be brought out to you later.**

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; manuals are not kept 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. Some observers have had their otolith alcohol confiscated by the airlines because we do not have a blanket permit for the transport of alcohol. If the airline personnel do not permit you

to take the alcohol, do not argue--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. Inform the debriefing staff upon your return and note on the top of the Form 9's that rubbing alcohol was used as the preservative.

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 observers are frequently delayed in both getting on their ships and in port between assignments. Some hotels and restaurants in Dutch Harbor, Ak. do not accept credit cards but you may be able to use them as identification for a personal check. If you have to pay cash for any excess baggage charges on your return flights, don't forget to allow enough money (and get a receipt). Remember, excess baggage charges from Dutch Harbor to Seattle can typically run from \$200-250. Retain any unused airline tickets and turn them in to your contractor upon your return.

Transport to the Ship

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. If you miss your flight, notify your contractor immediately, and make new arrangements, on another airline if necessary. Notify your contact person if your arrival date is affected. If you are going to miss your pick-up time at port, notify your contracting agency as soon as possible.

Upon arrival at the embarkation port, follow your contractor's logistics instructions and stay in contact. Let your contractor or agent know of your whereabouts so that they can contact you if there is a last-minute change of plans. Since Dutch Harbor and Kodiak are so heavily used by observers, there may be an NMFS employee to aid you and/or your contractor may have a permanent contact in port to help with logistics.

Embarking/Disembarking Through Dutch Harbor

Observers flying into the airport who have Carolyn Griffin as their Dutch Harbor contact person will be met by her or her assistant. Otherwise, ask your contractor about transportation in Dutch. Room reservations are usually made in advance, often at the Unisea Inn or Royal Dutch Inn. You will need to keep yourself informed of changes in vessel schedules, so make sure that you periodically check the hotel desk for messages and keep in touch with your contact person, especially on your day of embarkation. When returning to Dutch Harbor, call your contractor or contact person as soon as you can.

Useful Phone Numbers for Dutch Harbor:

Carolyn Griffin
P.O. Box 308
Dutch Harbor, Ak. 99692
(907) 581-1529 (home phone)
(907) 581-1239 (Ken Griffin)
Unisea Inn: (907) 581-1325
Royal Dutch Inn: (907) 581-1636

Marianna Langley
P.O. Box 322
Dutch Harbor, Ak. 99692
(907) 581-1453 (home phone)

ARRIVAL ABOARD THE SHIP

Living Conditions Aboard Vessels

Conditions vary widely depending on the ship type and size, company and skipper's policies, and the fishing success. "Conditions" include cleanliness and upkeep, safety, comfort of quarters, quality of food, general attitude, and good personnel management. Of these, only accommodations equivalent to crew members and compliance to safety requirements and regulations is addressed by the regulation for observers. Observers must be flexible as only a few generalities on what to expect can be made. Personal quarters are usually cramped. The most personal luggage one should ever carry on is a duffle bag. When going aboard a shoreside delivery vessel, experienced observers recommend taking only a day pack or knapsack of personal gear. Petty theft is likely to happen. It is a good idea to have a small or your bag or at least to keep your valuable items, such as tape players and cassettes, out of sight when not in use.

Crew's quarters range from twelve to two per room. Catcher/processors will usually arrange separate quarters by sex but on catcher boats and small longline vessels, women observers may need to be quartered with men for lack of alternatives. In these cases, however, the work aboard is often so intense that no one has the excess energy to be concerned about gender differences. For bedding, sleeping bags will be provided by the observer program. Showers and laundry facilities (or laundry service by a steward) will be available on larger vessels. Smaller vessels may or may not have showers and laundry is done by hand or waits until port. Catcher/processor vessels will have cooks and routine meals available. Shoreside delivery vessels may have a designated "cook" and a meal may be prepared on the way to the fishing grounds, but once fishing has begun, the galley will probably just be open for "help yourself" food. If the fishing pace is hectic, observers may find themselves caught up in a little-or-no-sleep and "survive on coffee, candy and pop" routine until the return trip to port. Cigarette smoking inside is the rule rather than the exception.

Guidelines developed from experience are: show respect to others and it will be returned to you. Be a good neighbor. One way to accomplish this is to make a conscious effort to remain clean and neat. Clean up after yourself and chip in to help where you can. Do your best to maintain your sense of humor... Adaptable observers with an easygoing attitude are apt to receive more consideration than those who criticize and make demands.

On catcher/processors there will be someone designated as medic who will treat minor

illnesses and injuries connected with life at sea. On shoreside delivery vessels there will probably be a first aid or EMT's (Emergency Medical Technician's) kit aboard and the most able person to deal with an emergency will surface or, by default, the skipper must take responsibility. When serious injuries or illnesses occur, it is up to the captain to decide when (or if) to return to port. Interim treatment and the decision to interrupt fishing can be aided by calling the Coast Guard and relaying symptoms to a medic or doctor.

Seasickness often hampers observers at the beginning of a cruise, but give it time - most of the effects of seasickness disappear after a few days. The symptoms are nausea, headache, drowsiness, depression. This is **normal**, it's just difficult to live with. Remember, no one ever dies of seasickness, but what can be a danger is weakness, so you must make yourself drink water or juice and try to eat some mild food (soda crackers are often recommended). **Take some seasickness medication along even if you don't plan on using it.** Scopolamine works very well for most people. Dramamine usually doesn't help. If you lay down if you feel really bad *and otherwise stand on the bridge or the deck where you can see the horizon while compensating with your body for the boat's motion you will adjust more quickly than if you remain inside sitting down.* Determine that you will persevere through any discomfort, do not dwell on fear. It is simply a matter of adjustment. If severe discomfort persists for more than five days let your contractor know. They can arrange for the vessel to drop the observer off onto a transport boat or at the nearest port, but this is done only for extreme cases.

In the event of a real emergency, such as an injury or illness requiring hospitalization, contact the Coast Guard via voice radio and they will attempt a rescue and/or advise you on how to proceed. The Coast Guard will also notify the Observer Program office and keep them advised.

Safety Aboard 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 galley, 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.
3. Observers are required to wear a hard hat, life vest or other flotation and steel-toed rubber boots when on the trawl deck for any reason. (If life vests are worn under your rain jacket, they will stay cleaner.)
4. Be cautious whenever wading through fish since fish spines (especially rockfish) can

penetrate rubber boots and cause painful wounds to the feet.

5. Apparel with loose strings or tabs should be avoided, as they might become caught in the equipment or belts.
6. Don't run aboard ships, particularly up stairwells. Slipping, tripping, and falling are the most common sources of observer injury. These accidents often happen when an observer is in a hurry. Specifically, watch out for slick spots where the deck is wet and oily or frozen, step carefully over the half-foot combing rising from the bottom of metal latch doors and passageways, and look out for low overheads in vessel stairwells and watertight doors.
7. The observer should 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/she should remain in full view of a second party at all times.
8. Cables that break under strain frequently kill sailors. Whenever a cable is subjected to tension, stand in a place where a backlash would 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.
9. When working near the exit chutes in the factory floor, where bycatch and factory offal wash out, the observer should be extremely cautious not to slip and fall in the wash of bilge water.
10. 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.
11. Factory processing areas are crowded with machinery, electrical lines, and conveyor belts. It is often difficult to get to the area where an observer needs to sample because of the maze of equipment. Climbing over, under and around heading, filleting, and skinning machines on oily and wet floors especially at sea in rough weather is extremely hazardous. Observers must watch carefully where they step and where they grab for handholds.
12. The observer should notify or have the skipper notify the U.S. Coast Guard should an injury or illness occur to him/her which requires immediate hospitalization.
13. Treat all minor cuts, especially those on hands, with antiseptic to avoid infection from fish slime. Poisoning from fish slime is called cellulitis and is a form of staph infection. Should a staph infection be left untreated and allowed to develop, your lymphatic system becomes involved and the threat to your health becomes much more far-reaching than simply a pair of inoperative hands. Wash hands thoroughly

after sampling in a solution of very hot water and an antiseptic such as betadine or providone iodine (1-2 oz. per qt. of water). Disinfectants such as Clorox, Lysol or Purex tend to sap your skin's natural chemicals and prolonged use may make you even more vulnerable to fish poisoning.

14. Take extra precautions against infection, such as new gloves, when collecting specimens from marine mammals. As these animals have similar biological systems to our own, organisms which infect them can infect us. "Seal finger" is a fungal infection of the hands which can easily be contracted.
15. Ask ship personnel which water sources are safe to drink. Some ships have lines containing water for washing and not drinking.

Safety in At-Sea Transfers

Observers will normally board and disembark their vessel at dock, but a transfer at sea may be necessary in certain circumstances. Transfers between vessels are potentially hazardous, especially in rough weather. The observer must assume responsibility for deciding whether or not transfer based upon their own evaluation of the transfer conditions.

There are no hard and fast rules for allowable safety limits during transfers. Conditions such as vessel size, swells versus waves, current and impending weather, good lighting, and mode of transfer affect the decision as to whether or not to transfer. Observers must use their best judgement. Be cautious--not foolhardy. Do not be forced into transferring against your better judgement by an anxious or impatient captain. Whenever possible be preceded or accompanied by a crewman. Always go with an experienced crewman if you are transferring in a small boat or raft. If boarding a small skiff or inflatable boat, see that the engine has been started and warmed up, and that there are oars stowed as a backup. As general guidelines, do not transfer at dusk, in darkness, or in any other low visibility conditions. Transfers involving a small boat or raft should never be carried out at night. Observers should not transfer when the sea state is two meters or more.

Other points to remember when transferring:

1. Observers will wear life jackets at all times on skiffs or other small-sized vessels and while transferring.
2. Observers will not encumber themselves with baggage when transferring vessels; *balance is important. Both hands must be free during transfers.*
3. All baggage will be secured with lines and transferred via rope lines or cargo nets. Observer baskets have been lost overboard because they were thrown between ships without lines attached.
4. Given a choice between using a Jacob's rope ladder or a gangway (accommodation walkway), to board a ship, in most cases use the Jacob's ladder since the use of a rigid gangway in rough seas can be extremely hazardous to the observer and to the transfer boat.

5. If a cargo net, transfer basket, or cage is used to transfer observer or baggage, make sure that a line is attached to the conveyance from both vessels for greater control and to reduce swinging. The observer should maintain a crouched (knees bent) position as opposed to sitting or standing with straightened legs, to avoid back injury. Be sure to wear your hardhat in addition to your lifevest when using this mode of transfer. Keep your arms, particularly elbows and fingers, inside the conveyance when transferring

First Days On Board

As quickly as possible, the observer should adapt to the new surroundings, meet people, and make preparations for work. Soon after boarding you should have a meeting with the captain. Cooperation from the captain, mates and crew is essential in many instances in order to obtain the unbiased samples the observer needs for his work. It is important at this meeting to set the tone for a friendly but business-like working relationship. Give the captain a copy of your letter of introduction and use it to briefly explain what you'll be doing and your needs. Observers on vessels making short trips should try to take care of the introductory details before leaving dock or on the way to the fishing grounds. If the captain is receptive, take this opportunity to mention the following points:

1. Tell the captain that you want to routinely see the ship's fishing logs.
2. Inquire as to how to send the weekly catch messages.
3. Ask to be informed, in advance, of changes in the fishing schedule so that you may adjust your schedule accordingly.
4. Ask to be notified if any marine mammals are found in the catches. If possible, sightings of marine mammals would also warrant notifying the observer.
5. Again, depending upon the captain's receptiveness and available time, you may opt to give him any forms that will need to be filled out such as the "Agreement to Share Data with ADF&G".
6. Ask the captain any questions you may have about emergency procedures after having done your own survey of equipment and instructions.

During the first few days aboard a catching and processing trawler, as you familiarize yourself with life on board, initiate your work by noting the following:

1. When the deck is inactive, perhaps on the way to the fishing grounds, make measurements which will aid you in estimating codend dimensions. Then watch the net retrieval and handling. Decide when and where you will need to take additional measurements and who to enlist for help.

2. Watch how and where the codends are opened and how thick and fast the fish are dumped. Look to see if the crew does any sorting on deck and whether different hauls are mixed in the tanks.
3. Notice where the catch is sorted by species and size and what is the destination of fish on each line of conveyor belts. What products are being made?
4. Consider the location of your sampling station. Remember, you have to be present at or ahead of any sorting area. If at all possible, avoid having to haul baskets of fish long distances or up or down stairs. Basically, you need a place where you can gather your samples, have a few baskets of fish around you and a place to hang your scale. Adequate lighting will be necessary and you'll need to locate the nearest hose for cleaning yourself and your area.
5. Try collecting one or more baskets of fish. Familiarize yourself with the species being caught, start writing species descriptions and practice using the keys. Practice sexing the target species and/or other species that will have to be sexed for your work.
6. Work out routines for sorting, weighing, and counting fish.
7. Get started with the most obvious methods for making catch weight estimations and determining sample weights. Then after your work is underway, consider variations or other methods which may improve your sampling or be contingency plans should the catch composition change.

On board a catcher-only trawler, the operation is much simpler and an observer has less opportunity to get oriented as only a few tows are made each trip. Do your best to find or rig a place to weigh fish. Ask how the last observer (if any) weighed fish. Ask what they'll be fishing for and get an idea how diverse the catch will be. If they sort on deck, ask which fish go where. Let the skipper and crew know you'll need to take a few quick measurements of the net. Get any deck measurements you can before fishing begins.

As retrieval begins, get yourself and your sampling tools ready. When fish are dumped, watch what's happening all around you as you go to grab a couple baskets of catch. Learn quickly where you can be and where not to be! Watch how they handle the catch. Then you can get some i.d. and sexing work done while figuring out, (maybe practicing) your sampling methodology for the next tow.

OBSERVER OBJECTIVES AND GENERAL INSTRUCTIONS

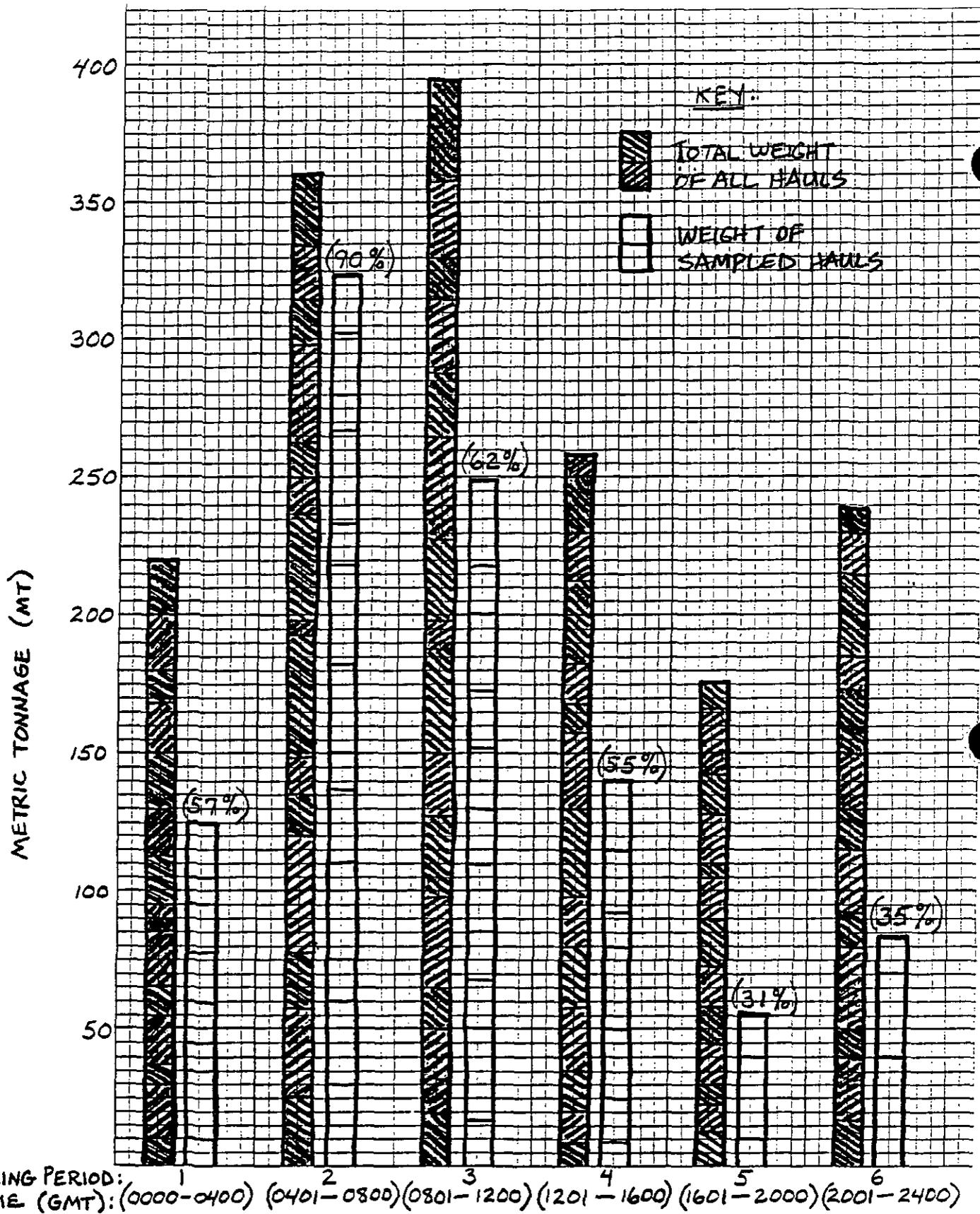
The main work objectives of observers are to record any incidental take of marine mammals, make independent estimates of catch size, determine the catch composition, figure out the incidence of specified prohibited species in the catch, collect biological data on the prohibited, target and other species and monitor for compliance to fishery regulations. Secondary objectives include marine mammal observations, gathering factory production information, recording gear design and vessel layout, 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 or more 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: the physical sampling, recording the data on plastic sheets, transposing the data on the plastic sheets to the final paper copy, and correctly calculating totals and extrapolations for the weekly catch reports. The need for representative, unbiased sampling and accuracy cannot be over stressed.

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 sampling periods so that the catch sampled is representative of the daily and weekly catch. Fish will usually lie or school close to the bottom during daylight hours. Consequently, during the day they are more easily located with sonar and catches will be greater than at night when the fish rise up in the water column and scatter to feed. Since many vessels will fish and process catch around the clock, the observer should rotate his/her schedule to allow for sampling at different times of the day within each week aboard. Changes in gear, fishing methods, depths and areas of fishing can result in very different catches. Therefore, care should be exercised so that all or most of the observation and sampling is not done during the same time period. The majority of an observer's efforts should correlate with the time periods or tows that land the majority of catch. For example, 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. Many observers sample enough (greater than 60% of the tonnage landed), that these concerns are met as a matter of course. Those that are sampling 50% or less of the tonnage landed will have to monitor their work more closely.



SAMPLING PERIOD:
 TIME (GMT): (0000-0400) (0401-0800) (0801-1200) (1201-1600) (1601-2000) (2001-2400)

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

The bar graph 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. This is a cumulative graph showing tonnage landed on a large vessel over a two week period. 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 indicate the tonnage landed during that period and the open bars stand for the tonnage of the sampled hauls (not the tonnage sampled). The percentage of the sampled hauls (by weight), 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 hauls are sampled from periods 5 and 6 and somewhat less from period 2. The graph is only a suggestion--you may find a running tally for each time period more convenient.

Once a given tow has been selected for sampling, 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, etc.

The frequency of sampling will vary according to the type of vessel, the number of hauls per day, catch size and composition. The following workloads are meant to be guidelines for minimum sampling. On some days however, an observer may sample only one haul because the ship moved to another area and did not fish any more that day or because the observer was ill or it was their first sampling day and they were still orienting themselves to their job. Specific directions on taking different kinds of samples are given in the appropriate section.

SAMPLING DUTIES FOR DOMESTIC FISHERIES OBSERVERS

Every Haul, Delivery, or Set:

Obtain haul, delivery or set data (Form 1US, 2US, or 2MUS)

Sampled Hauls, Deliveries or Sets: (numbered items presented in order of priority)

1. Record any incidental take of marine mammals (form 10US).
2. Sample for species composition of catch (Form 3US), 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. In your sampling, do not leave out any species or species group, such as sampling only for prohibited species. Try to sample the whole catch for king crab, Tanner crab, halibut and salmon if possible. You may have different sample weights for different species, therefore you may also sample the whole haul for obvious species like shark and large skate or species of interest like sablefish.
3. Estimate haul weight (Form 1US, 2US and 2MUS) from as many hauls as possible, but aim for at least 3 per day--estimates should be made of some hauls that were not sampled as well as of sampled hauls. If you use your catch estimate as the "Official

Total Catch," you will have to estimate every haul.

Biological data from prohibited species:

4. Sex and identify to species, all the salmon, king and Tanner crab in your sample if possible, or take a random subsample for sexing (form 3US).
5. Take length measurements of all halibut, salmon, king and Tanner crab in your sample (form 7US). Subsample, if necessary, when incidence rates are high. A subsample should be of at least 20 fish or crab.
6. Determine the viability of all halibut, king and Tanner crab in your sample if possible; or take a random subsample; or sample specifically for viability at another time (form 3US). (The choices for viability sampling are presented in order of preference.)
7. Collect scales from salmon in your samples for species confirmation and ageing (form 9US).
8. Check salmon for missing adipose fins, and other fish and crab for tags. If you collect a tag be sure to record all pertinent data as requested in the "Tagged Fish and Crab" section of this manual.

Every Day:

9. Take length measurements of 150 randomly selected fish per day (form 7US). Lengths should be taken of the target species unless you are also collecting otoliths of a sampling species other than the target species. Remember that the otolith collection must be a subset of the length frequency collection. If it is not possible to measure 150 fish per day, try to do at least 70 per day. You may have to forego sexing the fish.
10. Otolith/scale collection - If given this assignment, choose a sampling species according to the directions given later in this manual (form 9US).

Other special projects - if assigned any other special project, such as stomach sampling, conduct work according to directions given.

Per Vessel: (not in order of priority)

Evaluate the accuracy of the vessel's catch weight estimations and report on their method of estimating. List what species are discarded. (see vessel report questions.) Describe the fish processing products. Record the product recovery rates they use, if any.

Make pertinent diagrams: fishing gear, fish tanks, factory, or weather deck.

Calculate catch report messages and either phone them in at end of trip (short trips), or transmit them weekly via telex, rapidfax, or phone (trips over one week in length).

A vessel report includes: cruise itinerary summary, Form 12 - Vessel Data, map of areas fished, list of mothership's catcher boats (if appropriate) gear diagram(s), and complete answers to information asked for in report questions, plus anything else you feel would be helpful to staff members or future observers.

GENERAL INSTRUCTIONS FOR DATA FORMS

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 must cease. Data from hundreds of 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 (refer to example forms) can be used to indicate that the numbers in a column are to be repeated. Ditto marks should not be used to repeat a number.

Much of forms 1US, 2US and 2MUS should be filled out from the ship's fishing logs. Observers should take care to record the correct information and avoid making copying errors. All sampling data require the vessel position data on these forms, so if these are missing, other data cannot be used.

A captain may request copies of your catch composition or length frequency forms. Carbon paper is provided so that the forms can be made out in duplicate. Copies are to be made at the observer's convenience, but before leaving the ship. Vessel captains have no right to demand that any form be completed at a given time. However, if the captain is waiting for your species composition data, so that he can fill in a calculated estimate of the weight of discards or bycatch, then it may be to your advantage to provide the captain with copies of your form 3's so that you can get a final ship's estimate of catch size and complete your species composition extrapolations. (Note: It is permissible for the captain to use your sampling data to help him fill out the ships' fishing logs.)

CRUISE NUMBERS AND VESSEL CODES

The cruise number and vessel code identifies each set of data from the observer on each vessel. A cruise number is assigned for each observer deployed and the observer program also assigns a vessel code to each boat. This code is for our program use only and does not have anything in common with the ADF&G boat number, the permit number, or the radio call sign. Each of these identifiers is for a specific use and observers must be careful to record the specific identifier asked for! Cruise numbers and vessel codes will be assigned during your trip, and you can find out what they are when you debrief. In the meantime, start and maintain separate sets of data for each boat and mark your name and the ship's name on the first page of each set of forms for each boat.

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, for each cruise, should have pages numbered separately and 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 a cruise, 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 for king salmon scales, a page 1 of 3 for coho salmon scales and a page 1 of 32 for pollock otoliths.

CALCULATION GUIDELINES: THE ROUNDING RULE

For in-class work only:

The calculated result should be carried out to one more decimal place than your least accurate measurement; and, round as you go.

$$\text{Example: } 380.6 \times 1.22 = 464.33 \text{ and } 464.33 \times 0.16 = 74.293$$

(In the first equation, 380.6 is the least accurate figure. It is recorded to the tenth's or one place to the right of the decimal. Therefore the product or 464.33 is recorded to "one more place than the least accurate measurement", or to the hundredth's--two places to the right of the decimal. In the second step, the answer from the first part of the problem is used in a subsequent equation, and the rounding rule applies again, except in this case both numbers in the equation are recorded to the hundredth's, so the answer is carried out to the thousandth's or three places to the right of the decimal.)

In all your data:

≥ 5 is rounded up, < 5 is rounded down.

$$\text{Example: rounded to two decimal places: } .52499 = .52$$

(When rounding, look only at the first digit to the right of the place you are rounding off at. In the example above, since we are rounding off at the hundredth's, we would only look at the "4" and thus leave the "2" as it is. We would not look at the "9" and change the "4" to a "5" and continue to round the "2" to a "3" thus getting an answer of ".53".)

CONFIDENTIALITY OF OBSERVER DATA

The fishermen are concerned that the information you are collecting can be obtained by anyone who may be interested in finding out where a particular boat caught fish. If this is brought up to you, reassure them that the information you are collecting is handled under strict

rules of confidentiality and that you (the observer) are bound by the confidentiality rules as well. If you are asked by vessel personnel about another vessel you were on, explain that just as you can't talk about this vessel after you get off it, so you can't tell them about a previously observed vessel.

Observers must know that all 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. NMFS 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.

FORM 2US-HAUL FORM FOR U.S. TRAWLER

1. Leading zeros in columns 12, 14, 34-41 only.
2. Skip line after each day.
3. On days with no hauls, enter date, noon position in 25-33 and haul no. = 0. Note reason.
4. Trailing zeros are required in columns 56-72.

Date	Mo.	Day	Haul no.	Vessel code	Year	Gear type	Gear	Merge	Gear performance	Processing mode	Location code	Location		Fishing time (GMT)		Fishing duration (min)	Avg. fishing depth	M/F	Avg. bottom depth	M/F	Avg. speed (knot)	Retained catch (round wt.)	Official total catch (mt.)	Observers total catch (mt.)	ADF&G stat. area																																								
												(N) latitude	(E) longitude	Nets on bottom	Nets off bottom																																																		
12	3	4	5	6	7	8	9	10	11			25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
✓	09	10	101			1	1		1		R	5838	W	7624	2345	0525	280	130	F	130	F	3.5	15.80	16.00	18.50	765830																																							
✓	✓	10	102			1	1		1		5837	1	7630	0610	0920	190	135	(	135	(	3.5	7.94	8.25	765830																																							
✓	✓	10	103			1	2		1		5837	1	7607	1015	1435	260	140	(	150	(	3.2	19.90	20.00	18.00																																							
✓	✓	10	104			1	1		1		5838	1	7647	1530	1850	200	140	V	145	V	3.2	10.50	12.00	13.50																																									
✓	✓	10	105			1	1		1		5838	1	7654	1935	2330	235	138	F	138	F	3.5	17.92	18.62	765830																																									
	11	0	0								N	5832		No Fishing	-									765830																																									
✓	12	106				1	1		1		R	5826	1	7553	2000	0000	240	240	F	260	F	3.4	8.50	11.75	755800																																								
✓	✓	107				1	1		1		5824	1	7525	0145	0745	360	240	(	260	(	3.6	5.62	7.28	8.50																																							
✓	✓	108				2	1		1		5826	1	7511	0830	1100	150	235	(	250	(	3.6	6.30	8.22	8.50																																							
✓	✓	109				1	2		1		5826	1	7546	1200	1300	60	220	(	245	(	3.0	10.20	13.21	15.00																																							
✓	12	110				1	4		1		5814	1	7710	1800	2350	350	250	(	265	(	3.2	5.34	6.12	7.00																																							
✓	13	111				1	1		1		5812	1	7706			180	240	(	240	(	3.6	15.08	17.35	18.00																																							
✓	✓	112				1	1		1		5812	1	7709			120	210	(	210	(	3.5	16.00	19.20	19.00																																							
✓	✓	113				1	1		1		5810	1	7704	1215	1340	85	216	(	250	(	3.5	5.25	7.80	6.00																																							
✓	13	114				1	1		1		5735	1	7550	1730	2240	310	205	(	265	(	3.5	4.62	5.64	755730																																							
✓	14	115				1	1		1		5732	1	7548	0055	0855	480	180	(	190	(	3.4	8.50	11.20	15.00																																							
✓	✓	116				1	1		1		5731	1	7547	0735	1442	427	185	(	195	(	3.5	6.90	7.86	8.00																																							
✓	✓	117				1	1		1		5731	1	7542	1735	1930	115	162	V	172	V	3.2	20.13	22.16	20.00																																									
✓	09	14	118			2	1		1		5728	1	7546	2105	2355	170	168	F	178	F	3.2	16.72	18.30	20.00																																									

Tails sampled

FORM 2US--HAUL FORM FOR U.S. TRAWLER

This form summarizes stern trawler fishing effort and total catch by haul. If you are working aboard a mothership or a catcher/processor which takes deliveries of codends from other catchers as well, fill out the form 2MUS-Haul Form for U.S. Mothership instead of the form 2US (instructions follow those for 2US). Obtain the data for these forms from the ship's logs (if logbook data is recorded according to instructions below), from vessel personnel, and from direct observation. Check carefully to see that no errors are made in copying the data to the forms and that the data are reasonable. Points to note:

1. Collect Form 2US 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. (Port Moller cod fishery observers--if possible, collect these data for the entire period, but if this is not possible, make sure that you have the data for all hauls taken in area 512, or for any other period that you are able to sample.)
2. The identifying cruise number and vessel code will be assigned after you return and will be different for each vessel you are on. Keep the data for each cruise separate.
3. Place a check mark in the far left column to indicate which hauls you sampled.
4. A given haul number should be used only once - no duplicates. The haul numbers must be in numerical sequence. Make sure that the haul numbers do not exceed 3 digits. (If the haul number recorded in the fishing log is 1657, for instance, then drop the first digit and call the haul 657. This will enable you to more easily compare your data with the ship's.) All hauls must be recorded unless there was a gear malfunction resulting in a zero catch. A haul number must be assigned to every haul. If you reach number 999, the next haul should be "1", not "0." Haul number "0" means a nonfishing day.
5. Leave the "merge" column blank (col. 19).
6. Enter the gear type: (based on the configuration of the gear, not where it's fished)
 - 1 - bottom trawl - Common otter trawl corresponding closely to the bottom trawl diagram provided to you. This type of net is designed to drag on or close to the bottom, and may be equipped with chafing gear, rollers, or bobbins.)
 - 2 - pelagic trawl - (Trawl designed to fish off-bottom. Wings may be of very large mesh or composed of lines. The net seldom has chafing gear, rollers, or bobbins, and is designed to minimize drag.)

Leave this column blank temporarily if the gear doesn't fit either category.

7. Enter the gear performance code:
- 1 - no problem
 - 2 - problem--crab pot was in the haul
 - 3 - problem--net hung up on some bottom obstacle (vessel had to back down)
 - 4 - problem--net ripped
 - 5 - problem--other problem, put a note of explanation on a non-keypunched part of the form 2US
8. Enter the processing mode: (Indicates where the utilized fish from that haul are processed)
- 1 - Most of the processing is done on board the catcher vessel (a catcher/processor). The products are placed in a freezer hold and the trip usually lasts more than a few days.
 - 2 - The catch is delivered to a mothership at sea for processing.
 - 3 - Utilized catch is delivered to a shorebased processing plant. The trip usually lasts no more than 3 to 4 days and in the meantime the catch is kept on ice.
 - 4 - The vessel is a floating processor which is processing catch delivered from catcher boats.
9. For the location code, enter R if the location in columns 25-33 is a retrieval position, and N if it is a noon position on a nonfishing day.
10. If there were no hauls on a given day (due to bad weather, mechanical breakdowns, traveling etc.) enter the Alaska Local Time (ALT) noon position in columns 25-33 and enter 0 in the haul number column. In columns 34-72, comment on the reason there was no fishing. Enter the ADF&G statistical area corresponding to the noon position in columns 73 - 78. All days at sea must be accounted for in this manner.
11. The location entered should be the haul retrieval position - the location of the ship when a particular haul is begun to be retrieved, i.e. when the winches begin bringing in the cable. (For a mothership the location entered is a delivery position, on form 2MUS.) Check the latitude and longitude for all trawl retrieval positions and noon positions to make sure that they are reasonable - i.e., 58°63' does not exist; double check positions that indicate large movements if you have not been aware of any. The first digit of longitude (1) is understood, so record only the following digits. Each haul must have a position. On nonfishing days, record ALT noon position in these columns.
12. The time system used (on this and all other forms) should be Alaska Local Time and dates. From the last Sunday in April through the summer to the last Sunday in October, entries should be made according to daylight savings time. Time recorded should be in the 24-hour system.

13. 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.
14. 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.) "Nets on bottom" refers to the time that the net first reaches the fishing level and the winches stop paying out cable.
15. 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.
16. Double check haul times to see if they are reasonable times for your vessel. An overlap in haul times for two hauls is an obvious error.
17. Record both the "nets on/off bottom" times (cols. 34-41) and the fishing duration in minutes (cols. 42-45). You will use the sum of the duration entries to report fishing effort in your weekly catch messages. On/off bottom times provide us with more detailed information however, so when the form 2US data is compiled on the database the duration will be calculated from the difference in the on/off bottom times. [Note: If the actual fishing duration is substantially different than what would be obtained by calculation from the on/off bottom times, record only the duration and off bottom time. This may occur if the net is raised and lowered several times during the haul. If this is the case, minutes duration would be more accurate than on/off bottom times. Note the reason for the unusual entry at the top of the form.]
18. The average fishing depth (cols 46-49) and average bottom depth (cols 51-54) can be recorded in either fathoms (more likely) or meters, depending on the depth recording instruments that the vessel has. Try to obtain both fishing and bottom depths as that will indicate whether the net was fishing on or off the bottom. Make sure you indicate the units (fathoms or meters) for every depth that you record (cols 50 + 55).
19. Record the average trawl speed in columns 56-57.
20. Retained catch: this is the amount of catch (in metric tons, not pounds or short tons--see Table of Equivalents) that is retained aboard the ship. This figure should always be filled in for unsampled as well as sampled hauls, and must be recorded to two decimal places. On catcher processors, generally the retained catch is just the round weight of the fish that are actually utilized for products. The retained catch may thus be the ship's estimates of the products (converted to round weight using product recovery figures, and converted from pounds to metric tons). Daily production totals may have to be divided based on deck estimate proportions or observer extrapolations from sample data could be used if production figures are not available. Use your judgement as to how to obtain the most accurate data. Give a complete description in your report of how these figures were obtained.

On vessels that deliver catch to shoreside processing plants, there may be some discard of prohibited species, small fish, and nonutilized species at sea, but the main discard of fish may occur at the processing plant. Your job will be to estimate the amount that is actually discarded by the catcher boat and hence, by subtraction, the amount that is delivered to the processing plant, not what is eventually retained by the processing plant. If discard is occurring at sea, the best way to determine how much, may be to estimate the amount of utilizable species in the haul using the observer sampling data for the haul or the day, and a rough estimate of amount of the undersized target species that were discarded.

21. Official total catch: this will be the official catch weight for the haul, and should be used in all calculations involving haul weight on Forms 3US and radio message worksheets. This should be the best estimate of total catch (all species included), and in most cases it should be based on the ship's estimate of retained catch (round weight), adjusted for the nonutilized species (using the observer's sample data). Instructions for adjusting for non-utilized species are in the following section.
22. Observer's estimate: record your estimate of the hauls that you observe. This will usually be a codend or bin-depth estimate (instructions and information on making estimates of catch weight follow). Record the weight estimate to two decimal places.
23. Enter the 6-digit ADF&G statistical area that the haul retrieval position places each haul in. Refer to the special supplement on the ADF&G statistical areas for your determination of the correct area.
24. Leading zeros should be in the dates (cols 12 & 14) and the times (cols 34-41) only, as needed.
25. Skip a line after each day.
26. Any notes, or comments (other than notes for nonfishing days) should be placed in a part of the form that is not keypunched.

FORM 2MUS--HAUL FORM FOR U.S. MOTHERSHIP

Form 2MUS is used by observers on processing-only vessels and catcher/processors which take "outside" tows. If you are working aboard a catcher/processor and have started filling out 2US forms when your ship takes a catcher boat delivery, leave your 2US forms as they are and simply switch to the 2MUS forms **from that point on**. Do not fill out both forms alternately. The remainder of your haul forms should be the form 2MUS. Note especially item 5 below. This form is essentially the same as the 2US with the addition of columns for the name of the catcher boat making each delivery. Only the differences from form 2US are described here.

1. The location code in column 24 should be either "D", indicating a delivery position, "R"

for a retrieval position if a catcher/processor is fishing for itself (in addition to taking outside tows), or "N" for noon position on a day when there is no fishing and/or no deliveries.

2. The location entered should correspond to the location code type. For example, at the time of delivery, i.e. when the codend being transferred is landed on the processor vessel, the position of the processor is recorded and coded with a "D". The ADF&G statistical area should also correspond with the latitude and longitude entered in the location columns.
3. Information on fishing times and/or fishing duration, fishing and bottom depth, average towing speed, and gear type and performance has to be obtained from the catcher boat skipper. This may be accomplished by talking to the skipper on the VHF radio after the delivery is complete, that is, when they are no longer busy coordinating the delivery maneuvers. If the skipper is not cooperative in providing the above information, try at least to get his estimate of fishing duration.
4. The catcher boat name will have to be abbreviated if the name exceeds 15 characters. There is or will be a specific abbreviation for each boat name. Request the correct abbreviation information at the end of a catch report if you need it. If the name is less than 15 characters, simply enter the full name.
5. If a catcher/processor also fishes for itself, enter the word "self" in columns 79 - 93 for those hauls.

Cruise no.	Vessel code					Year				
1	2	3	4	5	6	7	8	9	10	11

Date	Haul no.		Gear	Gear performance	Processing mode	Location code																						
	Mo.	Day																										
12	13	14	15	16	17	18	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41

FORM 2 MUS-HAUL FORM FOR U.S. MOTHERSHIP

1. Leading zeros in columns 12, 14, 34-41 only.
2. Skip line after each day.
3. On days with no hauls, enter date, noon position in 25-33 and haul no. = 0. Note reason.
4. Trailing zeros are required in columns 56-72.

Depth (columns 50 and 55)

M = meters

F = fathoms

Page _____ of _____

List of catcher boats

full catcher boat name	abbreviated name

Date	Mo.	Day	Haul no.	Gear	Gear	Fishing time (GMT)		Fishing duration (min)	Avg. fishing depth (M/F)	Avg. bottom depth (M/F)	Avg. speed (knot)	Retained catch (round wt.) (mt.)	Official total catch (mt.)	Observers total catch (mt.)	ADF&G stat. area	Abbreviated catcher boat name																																																																							
						Nets on bottom	Nets off bottom																																																																																
12	13	14	15	16	17	18	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00

CATCH RATES

FISHING LOGS AND ESTIMATION OF CATCH RATES

A skipper will keep several types of records or logs. A skipper may keep a fishing log for himself or his company and there are logs required by NMFS and ADF&G for fishery management. Your normal procedure is to obtain information on the fishing effort from these ship's logs, from vessel personnel, and by direct observation and accurately record it on your Haul Form 2US. All of the tows made while you are aboard must be recorded on your haul form whether you sampled them or not.

The observer must cross-check all data for accuracy. The correct haul/date correlation, retrieval position, duration, and total catch weight are especially important items--without this information the observer's sampling data cannot be used. After a week's worth of data, or for each page, check the "Nets off bottom" time of the last tow of each day. The tow cannot span midnight and be the last tow. Check any change in degrees of latitude and longitude. Unless the minutes indicate the position is close to the next degree, changes of degree would mean long distances traveled or a recording error. Use the ADF&G statistical area numbering system to check the ADF&G area number against the latitude and longitude. Look at each whole page of form 2US for "holes" where data may be missing.

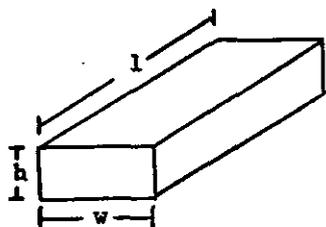
The skipper will make a deck or "hail weight" estimate of each catch by direct observation of the volume of fish in the net or in the fish bins. This is entered in the far right column of their Daily Cumulative Production Logbook for NMFS and may be utilized by an observer for "Official Total Catch" on form 2US **only if it is the best estimate of catch weight.** As an observer, you will also make deck estimates using similar methods. Some ships may maintain accurate records of production information by haul which can be used for the "Retained Catch" figure and combined with information on discarded fish for "Official Total Catch". The observer must evaluate these sources of information and choose or derive the **best estimates of catch weight to enter on form 2US as "Official Total Catch."** Remember, total catch on Form 2US should be the weight of everything that is caught--whether it is utilized or not.

Skipper's Deck Estimates: The skipper or mate on watch will make a deck estimate by looking at the codend and count the number of bands full of fish. The codend of the net has reinforcing and hauling bands around it at regular intervals. The amount of fish between each band can be added as a consistent unit of weight. The person making an eyeball estimate will take into account the number of full bands plus the adjustments for the last band which often contains a bit more fish and the first band(s) which is deflated as the fish are not compressed and slide forward. Also, like any mesh bag, when the net is very full the mesh will expand and bulge and there will be more tonnage per band. The appearance of the net coupled with the net maker's specifications and past experience with delivery weights or the number of cases put up per haul can make "estimates by eye" very accurate. On the other hand, skipper's deck estimates can be wildly optimistic and/or pessimistic if he is casual about it.

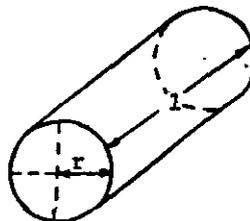
Observer estimation of the total catch is important, so you should do your best to get good data. When observer estimates are made, record them in columns 68 - 72 on form 2US

even if this estimate is also utilized as the "Official Total Catch". Observers should estimate the weight of several hauls per day, those that are sampled and some that are not sampled. If the observer's catch estimates are being used as the official total catch because they are the most accurate, the observer should try to estimate all of the catches brought in while the observer is aboard. Some techniques for estimating haul weights are as follows.

Observer Estimates of Codends: As scientists, observers must have data to verify their estimations. Codend measurements are taken to determine volume (m^3) and volume is multiplied by weight per volume t/m^3 (density) to derive an estimate of the catch weight. The first step in the estimation of the volume of fish in the codend is to decide which geometric shape a particular codend most closely resembles: a rectangular solid, a cylinder, an ellipsoidal solid, a semi-ellipsoidal solid, or perhaps a combination of two of these shapes. Determine the needed dimensions for volume calculation of the chosen solid. Then measure the codend of fish or use known dimensions to gauge the net size using, for instance, pre-measured deck lengths; height to your shoulder, nose or whatever; or other standards of reference. When a net of fish has more of a long cone shape, it will be necessary to measure the volume of fish in several banded sections and add them together instead of treating the whole codend as a single unit. Calculate the volume in cubic meters using the appropriate formula, then multiply the volume times the density, obtained as explained below, to obtain the metric tonnage of the catches.

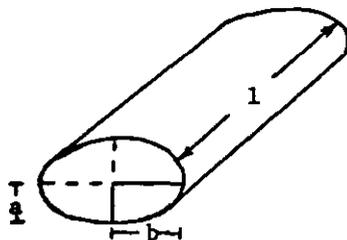


Rectangular solid
Volume = height x width x length
 $V = hwl$

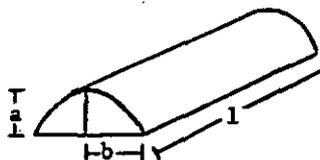


Cylinder
Volume = $\pi \times \text{radius}^2 \times \text{length}$
 $V = \pi r^2 l$

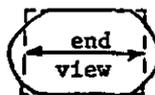
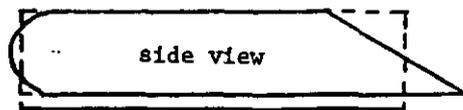
($\pi = 3.1415$)



Ellipsoidal solid
Volume = $\pi \times \text{short radius} \times \text{long radius} \times \text{length}$
 $V = \pi abl$



Semi-ellipsoidal solid
Volume = $\frac{1}{2} \pi abl$
 $V = \frac{1}{2} \pi abl$



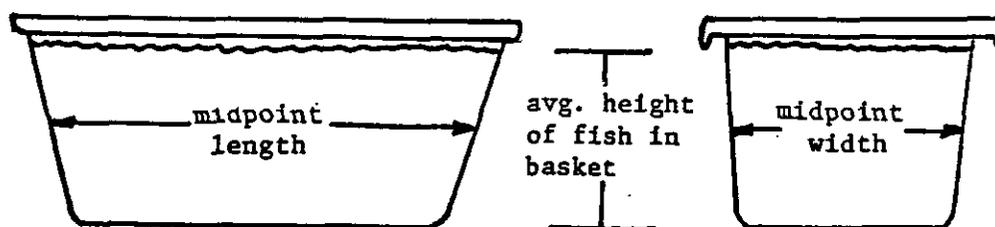
(Allowances can be made for irregular shapes or partially filled portions of the net by the way in which the measurements are taken.)

The deck crew will often have orders or for their own reasons will want to empty the net as quickly as possible. They may be reluctant to allow an observer time to make the needed measurements. Prepare for this possibility by making sure the skipper is aware of your needs and by being ready to get your measurements as quickly as possible. Be ready to step on deck as soon as the winch cables are relaxed and know which measurements you need to take. Having one of the deck crew help you regularly will help everyone. The two of you will soon learn to work quickly as a team; measuring will be easier for you and you will finish faster so they can get on with their work. On a big net of fifty tons or more, single handed measurements might take ten minutes. With help you should be able to shave several minutes off that time. If the deck crew are reluctant to follow your reasoning, explain your plan to the skipper and ask his cooperation.

Codend volume (in cubic meters) is multiplied by a weight per cubic meter ratio, (termed "density") to obtain a catch weight estimate for that haul. Density is the ratio of mass, or weight, to volume. One cubic meter of fresh water by definition weighs one metric ton. It's density then is $1 \div 1$, or 1.00. The density of seawater is 1.026. The density of fish in a fish bin, (their weight per cubic meter of volume) should be close to 1.00, (they commonly range from .87 - .98). The fish in a codend are often very tightly compacted and thus their density would be greater than the density of fish dumped loosely into a bin or basket. It has been theorized that densities of fish in tightly compacted codends approach 1.00 and may even be greater than 1.00 but no studies have been done to substantiate this. Therefore, we ask that observers sample for density as explained below and do not make unsubstantiated assumptions.

Density is variable and should be derived from random basket samples for each sampled haul. Average density values for the day or area should be calculated and used for catch weight estimates of unsampled hauls. A minimum of four baskets should be used to calculate density. First obtain the volume of fish in the sampling baskets, (or some other small container which is larger than a basket but not larger than a cubic meter), such that fish weight and volume can be accurately determined. The basket sides are sloped slightly, so use the midpoint width and length measurements. Remember that the midpoint is half the distance from the bottom to the level of fish in the basket (or other container) not necessarily to the top of the basket. It is important to fill all the baskets to the same level. It is also important to examine the way that the fish are packed in your basket or small container and make sure that it approximately duplicates the way that the fish are packed in the fish bin or codend. For instance, if you have very large fish in your basket, such as Pacific cod or turbot, they may not be laying flat on top of each other as they would in a large fish bin. The density of the fish in the basket will be less than the density of fish in the bin because there are more spaces or air pockets between the fish in the basket. It may be appropriate to lay or settle the fish into the container but do not compact or smash the fish in an attempt to duplicate the force in the codend. Your resulting density value would be too subjective. To calculate the volume of the basket, use the following equation:

Midpoint length x height of fish x midpoint width = total volume

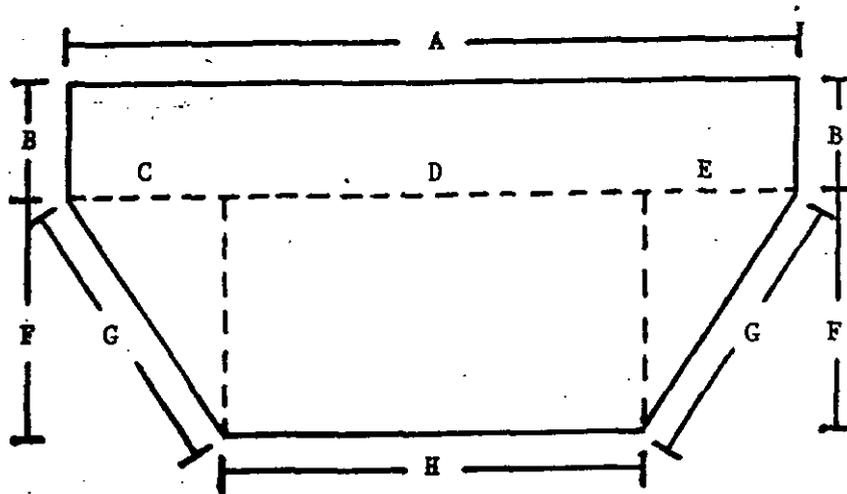


After the volume of an average basket is calculated, you need to obtain the average weight of four or more baskets. Be careful to take a random sample of the catch and to fill all your baskets consistently to the same level. Then simply divide the average weight of a basket by the average volume of a basket to calculate the density value for that haul. Using the volume of the fish in the codend or live tank and the density of those fish, you can calculate a total catch weight estimate. Remember:

$$\text{Volume of fish (m}^3\text{) } \times \text{ density (mt/m}^3\text{) } = \text{weight of fish (mt)}$$

On some ships, it may be possible to estimate the catch size by the volume of fish in a live tank or fish holding bin. Tank or bin volume is preferred over codend volume because of the consistency of the shape but often cannot be used. The tanks may be enclosed such that the depth of fish cannot be determined; the tank may hold fish and an indeterminate amount of water; the tank may be too difficult a shape to measure; or tows may be mixed by dumping them in together.

Observer Estimates by Bin Volume: Measure the fish bin into which the fish will be emptied to obtain the volume in cubic meters. If the fish bin is shaped like a rectangle or square, it would be relatively easy to calculate the volume. Simply multiply the floor area (length x width) by the height of fish. However, many fish bins are irregularly shaped, in which case the floor 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.



Useful Formulas You May Need

Area of a circle = πr^2 Circumference = $2\pi r$ ($\pi = 3.1415$)

Area of a square or rectangle = length x width (In diagram above: $A \times B$)

Area of a triangle = $\frac{1}{2}$ base x height (In diagram above: $\frac{1}{2} E \times F$)

For bin floors with a conical shaped depression: Volume of a right angle cone = $\frac{1}{3}\pi r^2 h$

50 47 37

The height of fish in the bin is the third dimension needed to determine volume. 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 if you can use some paint to make a height scale at a couple of places on the sides. To determine an average height of fish, it is best to measure the height of fish at four or more points around the inside of a bin. Be aware of overhead structures which may reduce the volume capacity of a bin when it is filled above a certain point. When working with enclosed tanks, some observers have successfully used a "dip stick" which they had made, to measure fish depth through the hatches from the trawl deck. Height of fish scales painted on the sides of the tank might also be read from the trawl deck. The area of the fish bin (a constant) multiplied by the height of fish from that catch equals the volume. Volume times density equals the catch weight.

There is no need to be surreptitious about your estimates of catch weight or composition. In some cases, captains have improved their record keeping by learning from the observer. On the other hand, do not argue with the captain about catch estimations. His logbook haul (deck) weights do not have to equal or even approximate yours and we do not expect them to. Catch weight estimation is a difficult task and the accuracy is often dependent on the circumstances.

RETAINED AND TOTAL CATCH DATA FROM PRODUCTION FIGURES

Catcher/processor vessels are required to report retained product information and the amounts of discarded species in addition to the haul data and deck estimates in the Daily Cumulative Production Logbook for NMFS. A count of the number of units of each product produced by the factory for each haul or each day will be reported to the bridge. A unit of product would be a tray of fish packed for freezing or a bag of fish meal.

$$\text{Number of Product Units} \times \text{Average Unit Weight} = \text{Total Weight of Product}$$

A product recovery rate (pr) or a conversion factor can then be applied to the product tonnage to estimate the round weight of catch going into that product line. A recovery rate represents the proportion of the organism that is used in any given product. Recovery rates are expressed as a percent or as a ratio. Headed and gutted cod may have a recovery ratio of .62 to 1, or 62% recovery, while fish frozen whole would have a recovery ratio of 1.00 to 1, or 100% recovery. The product weight divided by the product recovery ratio equals the fresh weight of the fish used to make the product. [Note: A conversion factor is the reciprocal of the recovery ratio and is multiplied by the product weight to obtain the round or fresh weight of the fish). A conversion factor is always greater than 1. To convert a conversion factor to a recovery rate, or vice versa, divide the number 1 by one of them to obtain the other.]

$$\text{Product Weight} \div \text{Recovery Rate} = \text{Whole Weight of fish used to make the product}$$

$$\text{Product Weight} \times \text{Conversion Factor} = \text{Whole or Fresh Weight of fish used to make the product}$$

The retained product information in the ship's logbook could be useful to observers except that the information is entered by production day. Observers will need product

.63

.086

information by haul to estimate the round weight (also termed: whole or fresh weight) of the retained catch for each haul. Except in the case of surimi or fish meal production, the observer may be able to obtain production data by haul by requesting it. If catches are not mixed together when dumped into the live tank, production tallies by haul may be made. Observe the handling of fish through the processing line(s). If fish from different tows are kept separate, watch the clean-up of one catch and the starting of the next. If product counts by haul are feasible, discuss your information request with the factory manager. Alternatively, the observer could find out which hauls are attributed to each "production day" and divide the day's production data by the proportion of each haul based on deck estimates. Example:

Hauls 14 - 17 (roughly) went into production on a day when 30 tons (t) of surimi was put up. Surimi has an average product recovery ratio of .22.

$30 \div .22 = 136.4$ t round wt. of pollock went into production.

Haul No.	Deck Est.	% of Day's Catch	Retained Catch/Haul
14	45 t	30%	40.92 t
15	30	20%	27.28
16	55	37%	50.47
17	<u>20</u>	<u>13%</u>	<u>17.73</u>
	150 t	100%	136.4 t

$136.4 \times .30$

Retained catch weight can now be entered on form 2US. Remember, retained catch, converted to round weight, must be entered on form 2US for every haul. On shoreside delivery vessels, observers use delivery weight instead of the day's production round weight to estimate the retained catch by haul.

An accurate total catch weight may be calculated using the retained catch weight and adjusting for the non-utilized, discarded fish using the observer's sample data. Discards normally consist of prohibited species, bycatch species and undersized and damaged target fish. If you count and/or weigh all of a discarded species in a haul, as is often the case with prohibited species, simply add the total weight of the non-utilized species to the round weight of retained catch for that haul.

$$\text{round weight of retained fish} + \text{weight of discarded fish} = \text{total catch}$$

When the observer cannot weigh all of the discarded fish in the whole haul, the proportion of the retained fish in the unsorted catch sample to the weight of retained fish in the haul can be used to extrapolate the weight of the total catch:

$$\frac{\text{Sample wt. of retained and discarded fish} \times \text{Round wt. of retained fish in total catch}}{\text{Weight of retained fish in sample}} = \text{Total Catch}$$

To obtain total catch for hauls which you did not sample, calculate an adjustment factor for the day (see example below) and multiply the retained catch for the unsampled haul times the adjustment factor for that day. If you observed the haul but did not sample it, and feel that the adjustment factor for that day would not give an accurate estimate of the total catch,

then use your judgement as to how to obtain the best estimate of total catch.

$$\frac{\text{sum of calculated total catch weights for the sampled hauls for the day}}{\text{sum of the retained catch estimates for the sampled hauls for the day}} = \text{adjustment factor for the day}$$

$$\text{adjustment factor for the day} \times \text{retained catch est. for a nonsampled haul} = \text{total catch est. for that haul}$$

(Example--see 9/10 on example form 2US:

$$\begin{array}{r} 16.00 + 20.00 + 12.00 \\ \hline 15.80 + 19.90 + 10.50 \end{array} = \frac{48.00}{46.20} = 1.0390$$

1.0390 x 7.94 = 8.25
and
1.0390 x 17.92 = 18.62

In summary remember, official total catch must also be filled in for every haul (record it to two decimal places). This is the weight that you will use in calculating catch report extrapolations. Basing total catch on back-calculations of retained catch plus the observer's estimates of the weight of discarded species may be the most accurate figure. Failing this, if the vessel officers can provide good estimates of total catch (all species included), then convert these estimates from pounds to metric tons and use them as the official catch weight or use your estimate of total catch if you feel it is most accurate. Note at the top of the form the origin of the official total catch estimate. (The first sheet is sufficient unless it changes.) Give a complete description in your report of how these figures were obtained.

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. NMFS is only interested in the catch of organisms so do not include the weight of the mud, logs, oil drums or other non-living component in your catch estimation, and avoid including it in your species composition data.

Retained wt will be from production figures

ADDED DECK ESTIMATES

<i>OK</i>	<i>TOTAL #</i>		
	<i>80</i>	<i>→ 44%</i>	<i>.45</i>
	<i>46</i>	<i>25%</i>	<i>.26</i>
	<i>53</i>	<i>29%</i>	<i>.30</i>
	<i>179</i>		<i>101%</i>

FORM 3US—SPECIES COMPOSITION

Leading zeros in columns 12 and 14 only. Skip line between sample sizes when space permits.

Worksheet

Example 3

Species:	<i>P. halibut</i>	King salmon				
No. weighed:	9 act 2 est	3 act 1 est				
Wt. of above:	60.7	13.17				
Avg. weight:	6.74	4.39				

Other calc.; comments: Whole-haul sampled for salmon, steelhead, and halibut.

Partial whole-haul sampled for Tanner + King crab (1/4 of haul, using bin depth).

Took ten baskets for other species. Applied avg. wts. to observed (but not weighed) halibut

ST = Sampling Type: Check Type: W P B and salmon.
 B = basket Halibut
 P = partial whole haul Salmon
 W = whole haul King crab
 O = other Tanner crab
 V = viability only

Cruise no.					Vessel code				Year	Mo.		Day		Haul no.			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1	1	4	A	1	2	1	8	7	0	9	1	0	1	0	4

Species name	x as	Species code			ST	Number					Weight (in kg. w/ decimal pt.)	Sample weight (in kg. w/ decimal pt.)	Viability											
		19	20	21		22	23	24	25	26			27	28	29	30-40	41-51	Number excellent			Number poor			Number dead
(Keypunch check)	X	9	9	9	X						7	2	3	567.63	12000.0	32	37	56						
Pacific halibut	U	1	0	1	W						1	1	74.19	12000.0	5	4								
King salmon, F	F	2	2	2								3	13.17											
steelhead, M	M	2	2	6								1	1.2											
Salmon, unident., U	U	2	2	0	W							1	4.39	12000.0										
Opilio Tanner, M	M		5		P						8	1.4	3000.0					3	5					
Opilio Tanner, F	F		5								8	1.65		4	2	2								
Bairdi Tanner, M	M		4								5	3	7.23		8	16								
Bairdi Tanner, F	F		4								4	7	10.6		15	12	20							
King crab unid., U	U		2		P						0	0.0	3000.0											
pollock		2	0	1	B						4	4	9	350.0	453.8									
red banded rockfish		3	0	1								4	0	20.5										
darkblotched rockfish		3	1	1								5	2.5											
sablefish		2	0	3								2	5.2											
squid		5	0								7	2	51.8											
Pacific cod		2	0	2	B						2	3	23.8	453.8										

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.
2. The weight of the groundfish catch which was sorted for the sample is the "sample weight". It is sometimes obtained by actually weighing the whole sample and is sometimes a calculated weight estimate.
3. The sample is sorted according to species or species groups, and the weight of each group is recorded.
4. The number of individuals of each species or species group is counted and recorded.
5. When sampling for species composition, you must also sample for the incidence of halibut, salmon, king crab and Tanner crab.

RECORDING SPECIES COMPOSITION (INCLUDING PROHIBITED SPECIES) ON FORM 3US

The Form 3US allows observers to whole-haul or partial-whole haul sample for some species, such as sablefish or a rockfish species, while basket sampling for other species. Entries on the form are grouped in order of descending sample weight. Prohibited species such as Tanner crab, king crab, or salmon are listed separately by species and sex. If large quantities of, for example, Tanner crab are seen, it is still possible to count a large number of the prohibited species group, apply an average weight, and record these as Tanner crab, unid., unknown sex. Refer to the detailed instructions below and the example forms.

1. Enter the date, and haul number. (The cruise number and vessel code will normally be given to you during debriefing.) Remember that the date of the sample should correspond to the information on Form 2US. The date should thus be the day the trawl began to be hauled in.
2. Group the species in your species composition samples by the sample size, starting with the largest sample size first. For example, if you whole-haul sampled for halibut and salmon, partial whole-haul sampled for king and Tanner crab, and basket sampled for the rest of the species, enter the halibut and salmon data first, the crab data next, and the basket sampled species last (as in Form 3 example 3).
3. List each species or species group by their common name and the corresponding code from the alphabetically arranged Species Code List in this manual. Look up a species

under its group name--rockfish, sculpin, sole, etc. Most fish, especially the commercially important species, should be identified to species, if possible. See the section on Species Identification which precedes the Code List. .

4. Each species may only be listed once for each haul. You cannot have two or more sample weights for any species.
5. All Tanner crab, king crab, or salmon should be listed separately by species and sex whenever possible. Pacific halibut should be listed with "U" for sex unknown. (Do not sex halibut, even the dead ones.) For these species only, record an "M", "F", or "U" in column 19. If large quantities of one of the crab or salmon species groups are seen, it is permissible to take a random subsample of the group and record all of the individuals in the subsample by species and sex. Either count or weigh all of the remaining members of the group and apply an average weight (from your subsample totals) to get the weight or number, and record these as (Tanner crab/king crab/salmon) unid. and unknown sex. Make sure that no individual is recorded twice on the forms (none of the subsample should be reported in the larger group of unidentified individuals). (See 3US example 1, Tanner crab for an illustration of how to record the data in this type of a subsample situation.)
6. In column 23, indicate the sampling type for each sample size. For species that you whole-haul sampled, use "W"; for species that you partial whole-haul sampled, use "P". If you have two types of partial haul samples in one haul, use "P" and "O". When the *sum on the species weights equals the sample weight*, designate the sample as "B".
7. Skip a line between species with different sample weights (see example 3).
8. The number of individuals and weight of each species group are then placed in the appropriate columns. Every number you enter must have a weight and every weight must have a number. All weights 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 3US). Enter a trailing zero after the decimal point if you do not carry the weights to a tenth or a hundredth of a kilogram. Do not enter any weight to more than two decimal places. If something weighs much less than .01 kg, ignore it.
9. Enter the weight sampled for each species in columns 41-51, using a well-defined decimal point. If you whole-haul sampled for the species, the sample weight should be the same as the official total catch estimate (cols. 63-67 on the Form 2US). If you partial-haul sampled, the sample weight is a fraction of the official total catch estimate or the sample weight you calculated using difference in bin depth or other means. If you basket sampled, the sample weight should be the sum of the weights of the individual species that were basket sampled (marked with a "B" in column 23). The sample weight can equal but must never be greater than the official total catch.

Please note: if an observer is whole-haul or partial whole-haul sampling for some species, the observer should not include the weight of any of these in the

basket sample weight if some are found in the basket samples. These of course should be entered with any others as a part of the whole or partial whole-haul sample.

10. A worksheet is included as part of the form. The observer should record there any raw data that might otherwise be lost because an extrapolated figure is entered on the keypunched portion of the form. The following are examples of the use of the worksheet:

- a) If the observer counted more individuals of a species than he/she was able to weigh, he should enter the actual weight of the individuals he was able to weigh, use this space to calculate the average weight, and enter the total extrapolated weight for all observed on the keypunch form (see how the halibut and salmon were handled on Form 3US example 3).

- b) Similar entries should be made for the reverse situation (to item a above) when you, for example, weigh large quantities of small Tanner crab, and must extrapolate a total number.

- c) Individuals whose weight is estimated can be entered on the worksheet as in example 3--enter the numbers and weights of the ones that were actually weighed and apply the average weight to the nonweighed individuals. If you feel the nonweighed individual is of a different size than those that were weighed, enter an estimate on the "wt of above" line just below the number estimated. Include the total number observed and the combined weight of the actual and estimated individuals on the keypunched form below.

Note in the comments section the number of basket samples that were taken, the type of sampling you used, density values, and anything unusual about the catch or sampling.

11. Check to see whether or not each of the prohibited species groups was represented on the form. It is necessary to have some indication of how much catch was monitored for each of the prohibited species groups--halibut, king crab, Tanner crab, salmon/steelhead. **If no individuals of that species group were observed, then the observer should enter that group name, species code (use codes 2, 3, 101, 220), sample type, sample weight, 0 for the number, and 0.0 for the weight. (See the 3US examples 1, 2, and 3.)**
12. Under the heading "Viability", record the number of halibut and crab 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 or crab examined for viability but it doesn't have to match the numbers weighed (on the same line to the left of the viability).

* Note: If the observer wishes to record viability of prohibited species from a haul that was not sampled, the observer should use a separate sheet and record the identifying information including haul number, the species name, sex, species code, and viability data. A "V" (for viability only) should be recorded as the sample type in column 23.

13. To complete the keypunch check (line 999 at the top of each form), add all of the figures in the number column and enter the sum on line 999, columns 24-29. Add the weights and enter on line 999, columns 30-40. Enter the official haul weight in columns 41-51 of line 999. (Previous observers have found it useful to have this information present on this form for ease in filling out the 3US and radio report worksheet forms.) **Add the numbers in each viability category and enter in columns 52-60 of line 999.**
14. In the boxes just above the column heading labelled "Viability", check the sampling method for each of the prohibited species groups. This will enable the debriefers/data editors to see quickly what your sampling methods were and will serve as a check if you forget to enter 0 data for non-observed prohibited species groups.

METHODS OF SPECIES COMPOSITION SAMPLING

There are a number of different ways the above information can be obtained. The sampling methods you choose are dependent on the diversity and size of the catch, the shipboard setup and your time and energy. Basket sampling is the most common means of sampling when the catch is reasonably diverse. When one or two species predominate in the catch and there are very few other species, it may be possible to use a whole haul sampling scheme or a combination of whole and partial haul samples to determine composition. Observers have devised other, equally valid sampling methods for use in certain situations. The above mentioned methods will be discussed in detail; it is up to you to decide which methods provide the most accurate information in your particular situation, or to devise or adapt a sampling scheme which will work.

Basket Sampling

The sampling aim is to obtain baskets of fish from a particular haul's catch so that the relative amounts of species in the sample will reflect their proportion in the haul. In the course of your work you will be collecting baskets of fish for various purposes. However, when employing "basket sampling" for species composition, this means that your sample weight is limited to only the organisms gathered in baskets of fish taken at random from different parts of the haul. Basket sampling yields the smallest sample size, or weight, of any recommended method. 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 codend. 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.

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 getting assistance from a crewman on the deck to hold a basket into the flow of fish as they fall from the net into a hatch opening in the deck. Another good method is to hold the basket where unsorted fish are falling from the live tank to a conveyor belt, or from one conveyor belt to another. Yet another technique is to find or design a diverter board for the conveyor belt. This is a board hinged into 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, but be careful, this could be a size selective method.

It commonly takes an hour or several hours for all of the fish to be emptied from the bins to the factory and sometimes you do not have many baskets available and/or the sampling space is limited. Therefore it is recommended that you collect only two or three baskets at a time and do this at intervals during the haul processing. This allows you to gather your samples effectively from different parts of the catch. The observer may choose to collect all of the fish in a section or several different small sections of the bin (make sure that all fish in the chosen areas are taken and that the fish are representative of the composition of the haul). As a guideline, when basket sampling for species composition, try to collect a minimum of 8 - 10 baskets of fish or at least 300 kg. At times, on domestic vessels, some of your basket samples may be smaller. Be sure to record in your logbook any difficulties you encounter.

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, 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 sample 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 subtracting the total weight of the various species groups from the total basket weight.

Whole-Haul Sampling

In some cases hauls are composed almost entirely of the target species and basket sampling would not provide a large enough sample size to get an accurate representation of the percentages of the other incidentally-caught (bycatch) species. This happens very frequently on vessels fishing for pollock. Whole haul sampling means that the entire unsorted catch passed by you at one point and you were able to see, and pull out, all bycatch organisms for counting and weighing later. Partial haul sampling is a variation of this where the observer samples a large portion of the catch and sorts it for bycatch. In a pure pollock fishery, catches will normally be whole or partial haul sampled which allows for a large, more representative sample but the danger is that accuracy may suffer. (Refer to "Partial Whole-Haul Sampling" on the following pages.)

When whole-haul sampling, the sample weight will be the official total catch weight from form 2US. When converting from pounds to metric tons, be sure to use the catch weight after it has been rounded to two decimals or the sample weight with more decimal places may exceed the total catch weight by a small amount. The analysis program will flag this as an error.

The observer must be present at all times to sort or supervise the sorting of bycatch when whole haul sampling. Ideally, the fish flow passing by the observer at one point would be slow and shallow to allow for the complete sorting of bycatch by the observer alone, but these circumstances do not always exist. You are expected to work within the constraints of each sampling situation and produce high quality sampling data. If processing is very slow, the observer may choose to sort during the dumping of a catch on deck or sample less than the whole haul, thus changing to a partial whole-haul sampling method.

Bycatch species (which include any prohibited species) that have been sorted out of the entire catch, must then be counted and weighed. Their numbers and weights are entered on the form 3US first with a sample type designation of "W". The observer should then randomly obtain a couple of baskets of the predominant species (or a minimum of thirty to fifty fish if they are large like cod), and count and weigh them. This will be entered as a basket sample type on the 3US form. This is a very common sampling method, and the recording of the data from this type of sampling is illustrated in the first example form 3US.

When two species (for example--pollock and Pacific cod) dominate the catch, sort out all of the bycatch, (in this example, everything that isn't pollock or Pacific cod) from the whole haul--identify, count, and weigh these. Take basket samples for pollock and Pacific cod (maybe 4-6 baskets full) and count and weigh them. Enter the bycatch data and the pollock/cod data under their respective sample types as before, largest sample type first, skipping a line between the two. The predominant species are not necessarily species the vessel was fishing for or "targeting" on. For example, when fishing for pollock, vessels will occasionally tow through clouds of jellyfish and when fishing on the ocean bottom for turbot, they will sometimes pick up lots of basket starfish. Refer to the second haul of the form 3US examples.

Partial Whole-Haul Sampling Methods

When your normal sampling procedure is to whole-haul sample, and you are faced with a haul containing large numbers of non-target species (bycatch), you may be forced to sample only a portion of the haul. The sampling procedure is the same as when whole-haul sampling but the observer must determine what the sample weight is. The sample weight is usually computed as a fraction or percentage of the whole-haul weight. For example, if the catch fills one and a half of two equal sized bins and you sample the half bin, your sample weight is one-third of the total catch weight.

Sample weight could be determined by measuring the difference in the height of fish in the bin at the beginning and end of the sampling period. Multiply the difference in the height measurements times the area and then multiply that volume by the density, to determine the sample weight.

Timing methods can be useful when all else fails. Take special precautions in using

them to verify all assumptions and do not use broad generalities such as, "the factory processed fish at about eight tons per hour." Check the rate of the machinery you are using as a gauge every time you sample. Do not attempt timing methods when you must tally the rates of several machines or when the machinery does not run at a constant rate. The following example is from an observer aboard a foreign processing vessel.

"Since the conveyor belt moved slowly and erratically, I had to devise a new method for estimation of my sample weight: 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 ½ hours to 3 ½ hours to monitor for incidence of prohibited species 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 which equals 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).

Incline conveyor belts may carry a fairly uniform amount of fish per step (like the steps of an escalator) as long as the supply is constant and large or unusually shaped fish such as cod or skates are not prevalent. If an incline conveyor runs at a constant rate to or from your sampling area, it may be utilized for a timing method using steps per minute and weight per step while you record the minutes sampled.

Tallying fish is the primary method for sampling aboard a longline vessel and may be employed in a trawler factory too. Tallying works best with large fish such as cod, halibut or turbot, or you can tally pollock if there are not too many of them passing you at any one time. When tally sampling, you are counting one or possibly two species passing you on a conveyor belt and collecting all other bycatch to be sorted, counted and weighed later. Just before, after or between tally periods, a random sample of the tallied species is gathered to determine average weight. The numbers and weight of the sample of tallied fish is recorded on the worksheet portion of the form and the average weight (**Be Careful:** average weight = weight ÷ number, **not** the other way around!) calculated and multiplied by the total number tallied. The number tallied and their calculated weight is entered on the keypunch portion of the form. The entries for the tallied species and the bycatch species are all recorded under the same sample type, "B" because the sum of the species weight would equal the sample weight.

DETERMINING INCIDENCE OF KING CRAB, TANNER CRAB, HALIBUT, AND SALMON

Catch landed other than the target species is called incidental catch or bycatch. Among the species caught incidentally are those that have long been the target species of other U.S. fishermen. Therefore, these and species whose allowable catch is zero for protection are designated as "prohibited species" for groundfish vessels. Groundfish regulations state, " Each vessel must sort its catch as soon as possible after retrieval of the catch and, after allowing sampling by an observer (if any), shall return any catch of prohibited species or parts thereof to the sea immediately with a minimum of injury regardless of its condition."

<u>Common Name:</u>	<u>Scientific Name:</u>
Salmonids (includes steelhead)	<u>Oncorhynchus</u> spp.
Halibut	<u>Hippoglossus stenolepis</u>
King crab	<u>Paralithodes</u> spp. and <u>Lithodes</u> spp.
Tanner crab	<u>Chionoecetes</u> spp.
Herring	<u>Clupea harengus pallasii</u>

Also: Any groundfish species in any area where the total allowable catch of that species is zero or any groundfish species declared prohibited by a notice of closure.

The prohibited species listed above that are of particular importance for observer sampling are Pacific halibut, salmon, king crab, and Tanner or snow crab. As these are the target species of other fisheries, there is a great deal of interest concerning their number per ton of catch on domestic groundfish vessels. Determining the incidence of crab, halibut, and salmon is thus a high priority duty for observers. Since these species are normally relatively rare in the catch, a large sample weight, (whole or partial haul sampling) must usually be observed in order to obtain effective data. A small sample size, such as results from basket sampling, is not normally adequate except in those instances when the incidental catch of Tanner crab is high.

Sampling for the incidence of prohibited species (crab, halibut and salmon) is just a specialized subset of species composition sampling even though it may be referred to as a separate operation. Remember that when sampling a haul, do not leave out any species or species group such as sampling only for prohibited species. As you may have different sample weights for different species, you may sample the whole haul for obvious species, (like shark and large skate) or species of interest, (like sablefish) as well as for the prohibited species while having a smaller sample for the rest of the species. Also, the four prohibited species groups do not have to have the same sample weight.

Observers have experienced other types of problems in attempting to determine the incidence of prohibited species:

- 1) Presorting of the prohibited species by crew members on the trawl deck as the catch is emptied into the live tank may cause a problem for you if you were counting on sampling them in the factory. You may make the best of this situation by whole-haul sampling for prohibited species on deck and take advantage of the crews sorting effort. However, you must work with them on deck to oversee the operation as their sorting efforts are likely to be haphazard. The skipper is likely to object to the delay caused by sorting on deck and this

would be your opportunity to explain that it is all or nothing and thereby get the captain to order his deck crew not to presort.

If you whole-haul sample for prohibited species on deck, you will probably still gather your species composition sample from the factory level below. To do this you may feel the need to be in two places at once. You may find it necessary to subsample for the biological information on crab and halibut and bring any salmon you collect to the factory and complete your sampling of them later. You will have to partial haul or basket sample for species composition.

2) Occasionally a haul comes in with a high incidence of prohibited species. (i.e. >20 halibut, salmon or king crab and/or >70 Tanner crab.) You must decide whether it is possible to sort all of the prohibited species from the whole haul. If more than one prohibited species group is abundant, you could reduce your sample size to a partial whole-haul sample. If there is a high incidental catch of only one prohibited species group, you could partial whole-haul sample for one of the prohibited species groups and whole-haul sample for the others. Even then you may need to simply tally the numbers of the abundant prohibited species group and subsample for average weight and biological information.

Sometimes it is possible to sort a prohibited species out of a large sample with the help of the crew. However, if after sorting them out, it becomes apparent that the species may be *too abundant to count*; (i.e. many small crab) or *weigh*; (i.e. many large halibut), then either count or weigh all of the abundant prohibited species which has been set aside. Take a random subsample of them and count and weigh all of the individuals in the subsample. The subsample is then used to determine an average weight that will be used to estimate the number or weight of the remaining individuals. Remember that you must at least have an actual weight or actual count of all of the prohibited species that occur within your sample weight.

If you sort from the catch an enormous amount (>300) of say, Tanner crab, and cannot separate them all into species groups, you should take a **random** subsample of the unidentified Tanner crab and identify those in the subsample to species and sex groups. After doing this, figure out the percentage by number of C. bairdi Tanner crab and other Tanner crab in the subsample. This percentage can then be applied to the remainder of the unidentified Tanner crab to divide them into C. bairdi and other Tanner crab groups for your RM-3 catch message worksheets. The subsample should also be worked up for other biological information required.

3) Sometimes halibut are too large or too numerous to weigh. In that case, measure the fish, look up the weight in the length/weight table for halibut and record the sum of the weights on form 3US. If there are too many to weigh **or** measure, reduce your sample size or be sure to measure those from a **random** subsample (every third one or something), look up the weights, calculate an average and apply it to the number that were only counted.

4) Sometimes a vessel will accidentally pick up a crab pot that has been snagged by the trawling gear. This incident would be recorded as a gear performance code two on form 2US (see instructions for the form). Also, note that you **do not count any crab that may be in the pot as part of your sampling for the incidence of King and Tanner crab**. You should note the incident in your logbook and include a description of the pot and identifying numbers, if any.

Cod Tally Method: In a flatfish or cod fishery, basket sampling is normally used to determine species composition because of the diversity of catch. Due to the bottom trawling, there are usually comparatively high numbers of crab and halibut caught also. This makes whole haul sampling impossible and yet basket sampling is usually too small a sample weight to yield representative data. When the other methods of partial haul sampling discussed above are not possible and cod are prevalent, cod may be tallied as an indicator species of the amount of catch being sorted for prohibited species.

The assumptions are that there are lots of cod in your random basket samples for species composition, and that the distribution of cod in the catch is not "patchy", i.e. they are mixed in throughout the catch. If so, then count the cod passing by as you sort out prohibited species to be worked up when you're done. Then:

$$(\text{Number of cod tallied}) \times (\text{Avg. wt. of cod}) = \text{Total wt. of cod in prohib. sample}$$

Average weight should be obtained from 30 - 50 cod, randomly gathered, from species composition sample plus extras if needed.

$$\frac{\text{wt. of sp. comp. sample}}{\text{wt. of cod in sp. comp. sample}} = \frac{\text{wt. of prohib. sp. sample}}{\text{wt. of cod in prohib. sample}}$$

and therefore:

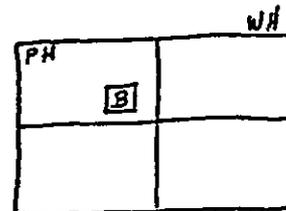
$$\frac{(\text{wt. of sp. comp. sample})(\text{wt. of cod in prohib. sample})}{\text{wt. of cod in sp. comp. sample}} = \text{wt. of prohib. sample}$$

Note: If prohibited species were presorted from the species composition sample, the weight of any prohibited species found during prohibited species sampling must be added to their sample weight.

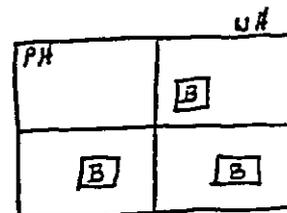
INTER-RELATIONSHIP OF DIFFERENT SAMPLE SIZES

During the following scenarios assume that you are partial haul sampling for some species and basket sampling for others. The baskets samples are not just being used for numbers and weight of the major species in the partial haul sample.

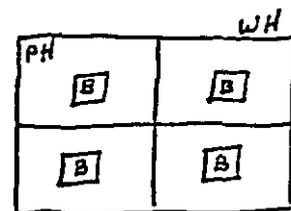
1. The baskets were taken during partial haul sampling. The baskets are a subset of the partial haul sample and any partial haul species found in the basket sample should be added to those collected during the partial haul sampling.



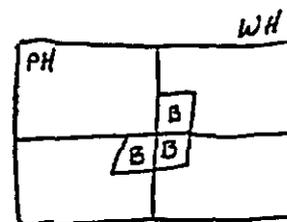
2. The baskets are taken from outside the partial haul sample. The basket sample weight and the partial haul species in the baskets could be added to the partial haul sample or ignored.



3. One of the four baskets was taken during the partial haul sample and the other three were taken outside. Any partial haul species found in the basket taken during the partial haul sample should be removed and added to the rest from the partial haul sample (but the weight of this basket is already included in the partial haul weight - right?) or the basket should somehow be identified. Later, the other three baskets can be added to partial haul sample or ignored. Another possibility would be to add 1/4 of the basket sample and 1/4 of the partial haul species found in the baskets to the partial haul sample.



4. The baskets were taken during the time you were partial haul sampling, but the baskets are not a subsample of the partial haul sample (example - bin volume weight was calculated in RSW tanks after baskets were taken); the basket weights and any partial haul sample species in the baskets could be added to the partial haul sample or ignored.



INCLUSION OF PRESORTED SPECIES IN LATER SAMPLING

Assume the following for a theoretical haul:

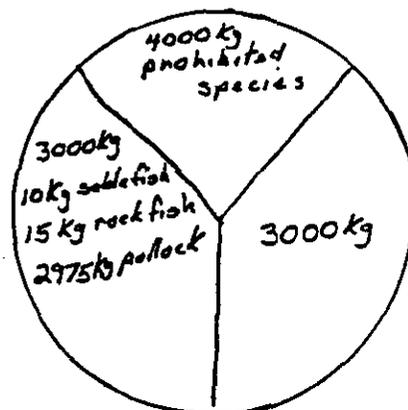
haul weight = 10 mt

4 mt of presorted prohibited species

20 kg of sablefish

30 kg of rockfish In the entire haul

5950 kg of pollock



The observer derives a partial haul sample size of 3000 kg after the prohibited species have been removed and takes a 400 kg basket sample for the numbers and weights of pollock. (What is the difference between derived and non-derived sample weights?) The observer's extrapolations for catch messages and the computers extrapolation for the data forms would be as follows:

Whole Haul	4000 kg x 1 mt / 1000 kg for prohibited species	=	4.000 mt
Partial Haul	10 kg / 3000 kg x 10 mt for sable fish	=	.033 mt
Partial Haul	15 kg / 3000 kg x 10 mt for rockfish	=	.050 mt
Basket Sample	400 kg / 400 kg x 5.917 mt for pollock	=	<u>5.917 mt</u>
	total	=	10.00 mt

NOTICE THE DIFFERENCE FROM WHAT THE DATA SHOULD BE!!!!!!

The solution is to adjust the derived partial haul sample weight. You must determine what portion of the those prohibited species would have been in the portion of the haul you sampled, if they had not been removed.

One possible method involves using the partial haul sample weight and the official total catch:

$$\frac{\text{adjusted partial haul sample wt}}{\text{haul wt}} = \frac{\text{partial haul sample weight}}{(\text{haul wt} - \text{whole hauled species wt})}$$

Rearranged:

$$\text{adjusted PH sample wt} = \text{haul wt} * \text{PH sample wt} / (\text{haul wt} - \text{WH species wt})$$

$$\text{adjusted PH sample wt} = 10,000 \text{ kg} * 3000 \text{ kg} / (10,000 \text{ kg} - 4000 \text{ kg})$$

$$\text{adjusted PH sample wt} = 5000 \text{ kg}$$

If you don't know the official total catch weight is, you may still be able to adjust your partial haul sample weight

First, what portion of the remaining species were sampled? (The following weights could be determined by any of our standard partial haul sampling methods - bin volume, codend volume, cod tally, or production figures.)

$$3000 \text{ kg} / 6000 \text{ kg} = .50 \text{ or } 50\%$$

Therefore, 50% of the presorted species would have theoretically been in your sample if they had not been removed.

$$50\% \times 4000 \text{ kg} = 2000 \text{ kg of prohibited would have been in the sample.}$$

Finally, sum the two parts of the partial haul sample (presorted and non-presorted).

$$3000 \text{ kg} + 2000 \text{ kg} = 5000 \text{ kg - adjusted sample weight}$$

Using our adjusted partial haul sample weights:

Whole Haul	4000 kg x 1 mt / 1000 kg for prohibited species	=	4.000 mt
Partial Haul	10 kg / 5000 kg x 10 mt for sable fish	=	.020 mt
Partial Haul	15 kg / 5000 kg x 10 mt for rockfish	=	.030 mt
Basket Sample	400 kg / 400 kg x 5.95 mt for pollock	=	<u>5.950 mt</u>
	total	=	10.00 mt

SPECIES COMPOSITION (AND PROHIBITED SPECIES) SAMPLING OBJECTIVES AND PRIORITIES

Species composition samples should be representative and unbiased. The larger the sample weight the better. To accomplish these objectives you can choose from various methods of sampling: whole-haul, partial whole-haul, basket sampling, bin volume, difference in bin volume, timing methods, tally (counting) method, sections of a belt or bin, a combination of these methods and others. It is up to you to choose, adapt or devise a sampling method which provides the most accurate information for your particular situation. If you deviate, adapt, or combine methods, document this fully. Remember, you must have good sampling data to back up any assumptions that form a basis for the rest of your data collection. Your choice of a sampling method must fall under the natural constraints of your available time, energy, and work space as well as consideration of the size of the catch and its diversity. To guide your judgement in choosing a sampling method, please comply with the following additional constraints to ensure proper and accountable data collection:

1) You must be present to sort, or directly supervise the sorting, through the entire collection of **all** of every sample.

2) If you see or suspect that the sorting of your sample is not completely thorough, reduce your sample size and/or change your sampling situation until you can be sure that you are getting all the bycatch--allowing for human error. This usually occurs because (a) the fish that are passing by you are too deep or moving too quickly or (b) you do not have enough supervisory control over those assisting you to sort.

3) It is best to count and weigh all of a species sorted from your sample weight, but if you cannot, you must at least count them all and weigh some of them or vice versa. You cannot estimate both the number and the weight of any species.

4) Allocate your time appropriately. Sampling a catch should usually take two to three hours. If you are spending more than three hours per sample you won't be able to sample three times per day. Sampling twice per day may be all right if there are only three hauls per day, but if your ship is hauling four to six catches per day, you should reduce your sample size and increase the number of samples per day. A deciding factor is whether there is stratification or patchiness in the distribution of species within a haul. As this makes representative sampling more difficult, in these cases it is appropriate to devote more time sampling each haul. On the other hand, when there are obvious differences between tows and uneven species distribution is not a problem then it would be best to reduce the sample size and sample more catches.

5) Believe in the scientific method of random sampling and in the "long run" accuracy of it. As a result of reducing your sample size, you may find that a species whose occurrence is "patchy" is over-represented in some of your samples and under-represented in others. Over time and many samples, the level of occurrence will closely approximate the true value (assuming random samples). Remember that in many analyses your data will be merged with all other observer's data in that area, year, month and vessel type classification. **In general: It is better to produce accurate data using a small sample size than to have a much larger sample size with dubious data on bycatch species.**

MIXING OF HAULS

A special sampling problem exists when hauls are being unavoidably mixed and you must sample after mixing occurs. If this happens, there are at least three possible courses of action:

1) Look at the arrangement and capacities of the fish bins and consider the frequency and tonnage of the fish being delivered. If it is possible to do so, ask the captain or fishing master to keep the hauls separate. If several bins empty onto the conveyor belt from which you are sampling at one time, ask the factory manager if he could arrange for only one bin to be emptied at a time while you are sampling.

2) If the fish are thoroughly mixed, sample the combined hauls but divide the sample data proportionally by haul weight and enter the data as two separate samples.

3) If you observe differences in the species composition of the mixed hauls as they are being dumped, use your judgement to attribute bycatch to the appropriate haul. This could only be done if the mixed hauls were very different in composition, such as a pelagic haul of pollock and a bottom haul of turbot.

4) If you observe layering of fish after the mixing of hauls, you possibly could see the difference in new fish versus old fish in freshness and in state of rigor. Noticing this difference can allow you to sample either or both hauls and obtain discrete data.

BIOLOGICAL DATA COLLECTED FROM PROHIBITED SPECIES

In addition to the numbers 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. The additional data collected will consist of:

1. sex - except for halibut
2. measurements - measure salmon, halibut and crab
3. viability - for halibut and crab only

In most cases, it will be possible to obtain the data outlined above from all of the individuals observed in the prohibited species sample. However, 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 per sample.** These are guideline numbers for minimum subsamples. Certainly, if you had only 85 Tanner crab, you *should collect information from all of them.*

COLLECTING DATA FROM SALMON AND STEELHEAD

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

- (a) Species identification--the six species which may be encountered are -- king, chum, sockeye, pink, coho, or steelhead.
- (b) Sex--determine the sex of each salmon; only live salmon that have minimal scale loss 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."
- (c) Numbers of salmon/steelhead--determine numbers by species and sex groups.
- (d) 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 species and sex group for those fish whose scales were not sampled.
- (e) Length--the fork length of each individual should be recorded in the same manner as for sampling species, (see "Length Frequencies" in a following section). Lengths are recorded to the nearest whole centimeter.
- (f) Scale samples--remove scale samples for ageing from all salmon in your sample. Follow the directions in "Scale Samples and Random Stratified Otolith Samples" in a following section. Do not collect scales from salmon that are not part of your prohibited species

sample.

- (g) 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 the section on "Tagged Fish."

The observer should seldom have to subsample salmon. If time does not allow the observer to gather all of the above information from each fish, get at least numbers and weights by species from your random sample, (failing this, reduce your sample size!) then take a random subsample for sexed lengths (and watch for tags) but take scale samples from a selected subsample of each species identified in the catch.

COLLECTING DATA FROM KING AND TANNER CRAB

The following information should be collected from the king crab and Tanner crab obtained in the prohibited species incidence samples:

- (a) Species identification--species which could be encountered are red, blue, brown, and Lithodes couesi king crab; Chionoecetes bairdi, C. opilio, C. hybrid, C. angulatus, and C. tanneri Tanner crabs.
- (b) Sex--determine the sex of each crab. When the observer is not sure of the sex of a crab or does not have enough time to sex it, the sex should also be listed as "U" for unknown."
- (c) Numbers of king/Tanner crab--determine numbers by species and sex groups.
- (d) Weight--record the total weight by species and sex group.
- (e) Viability--an estimate of the survival chance of each crab. This estimate is based upon an appraisal of the condition of the crab upon release to the sea. (Refer to following pages for a discussion on how to sample for the viability of crab.)
- (f) Check for Tags--follow the directions in the "Tagged Fish" section.
- (g) Length--measure the lengths of king crabs and widths of Tanner crab as described below. (King and Tanner crab are the only species of crab which should be measured.)

Observers will be provided with dividers to use in conjunction with a measurement scale on a plastic form. Measure the width of 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. Thus, check your work to see that all records of crab measurements end in the digits three or eight. The carapace length of king crab should be measured. 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 (refer to the illustration of "Length Measurements for Various Species" in the Appendix).

COLLECTING DATA FROM HALIBUT

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

- (a) Numbers--of halibut.
- (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 table weights as well as scale weights.) When possible, however, halibut should be weighed instead of using the length-weight table.
- (c) 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. Lengths are recorded to the nearest whole centimeter.
- (d) Viability--an appraisal of the condition of the halibut
[Note: Do not sex halibut, not even the dead ones. The data will not be used and so it would be a waste of your time.]

VIABILITY OF HALIBUT, KING CRAB AND TANNER CRAB

The observer's primary duty is to get accurate incidence data, lengths, and total weights, and these tasks may require that the halibut or crab be handled in a manner that would delay their release to the sea. If this is true, try to arrange your sampling scheme so that the data from the prohibited species is collected quickly. This is especially true of halibut and crab. (Most salmon do not have a favorable chance of survival after being caught in a trawl because of scale loss). The collection of viability data on halibut and crab can be done quickly and easily and should be carried out at the same time that you are collecting other biological data from these species. If you cannot work with the prohibited species immediately after they are sorted from the catch, then see if you can arrange for a salt water holding tank to put them in temporarily. (A blue basket lined with plastic and a saltwater hose running into it might work.)

If you are unable to get viability information as part of your ordinary sampling procedure, then try to sample specifically for viability of halibut and crab at least twice a week. Viability sampling should not take precedence over sampling for their incidence and obtaining the other biological information needed.

Using the tables on the following pages giving the definitions of "excellent," "poor," and "dead", note the number of halibut and crab in each category. Do not guess the condition of halibut or crab that you do not personally examine. If the sample of halibut or crab, that is checked for viability, is a subsample of the incidence of prohibited species sample, make certain that the subsample is a representative one.

SPECIES IDENTIFICATION

All commercially important fish and invertebrates should be identified to species. In the radio message section of this manual, under "Report Groups" for the Bering Sea and Gulf of Alaska, all the allocated categories, (those other than NON), can be considered commercially important and should be identified to species with four exceptions from the "Other Fish" category. From the Other Fish category, only sharks, eulachon and capelin need to be identified to species. All prohibited fish and crabs must also be identified to species. It is more important that observers spend their time working on proper identification of species of commercial interest, such as flatfish and rockfish, than to spend time on fish that no one targets on, such as eelpouts or sculpins.

To verify identifications, we ask each observer to fill out species description forms for the first sighting during a trip of any fish or invertebrate keyed out to species. There are separate forms for rockfish, flatfish and other or miscellaneous species.

On species composition forms, do not use categories such as "flatfish unidentified" or "rockfish unidentified" unless the fish has been mangled to the point that that is all that can be determined. 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" and carefully fill out a species description form in complete detail. If you are able to determine their identity later, (perhaps with a staff member's help during debriefing), then substitute the species name and code in place of "rockfish A" and "rockfish B" on your forms. If you do not get a positive ID on them later, then you must group them under "rockfish unidentified", (or "rockfish - unident.") on your forms, and combine their numbers and weights. Remember, a species code may only be listed once on any page (or day) of form 3(2).

Most of the species of the non-allocated report group (except for the prohibited species) have been listed simply by family in the Species Code List on the following pages. Example families are: eelpouts, poachers, greenlings, lumpsuckers, pricklebacks and rattails. (Note: sculpins have been grouped into four genera. If you are not sure which genus a sculpin belongs to or you do not have time to key it out, then use the "sculpin - unident." code.) If you have the interest or knowledge and the time, and you would like the information on these non-target fish listed by species in your data, fill out a species description form. When your identification is verified by a staff member, they will give you the appropriate species code.

ROCKFISH SPECIES DESCRIPTION FORM

Species Name: _____
Date of Capture: _____
Haul or Delivery Number: _____
Position of Capture (Lat. & Long.): _____
Depth of Capture: _____
Length: _____
Weight: _____

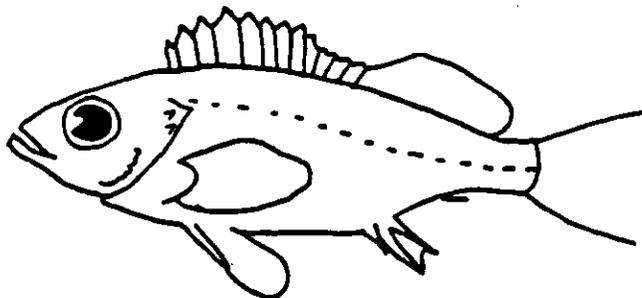
Was an example of this species brought back? Yes No

(Note: If this fish represents a range or depth extension or a record in size, bring it back for species verification.)

(Remember that Sebastolobus is not in Hitz "Field Identification of the Northeastern Pacific Rockfish (Sebastodes)". Check the rockfish section of the "Species Identification Manual" to make sure it is a Sebastes.)

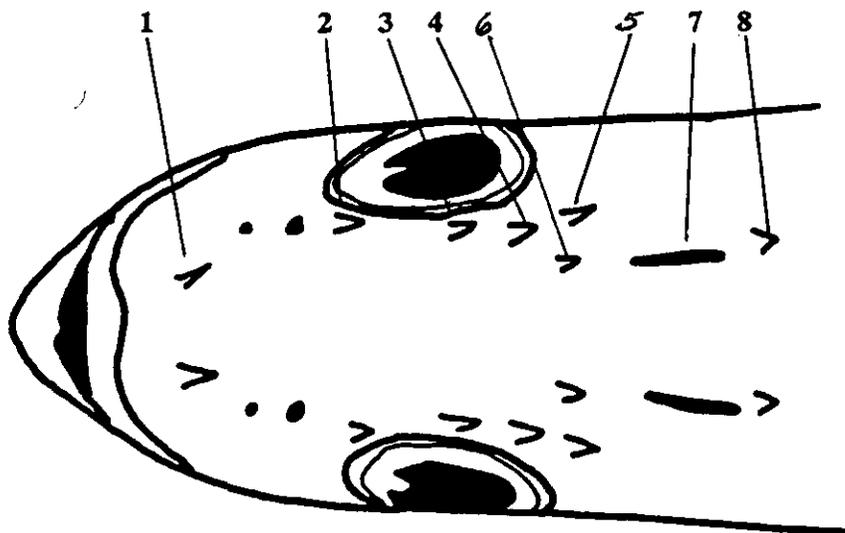
What color category of Hitz's would you place it in?

Please sketch any pattern, stripes, freckles, bars, light or dark areas etc. Be sure to note the color of each of these areas. Draw the shape of the anal fin and include any sympheseal knob. Study your specimen closely.



Please circle the numbers that indicate which pair of head spines is present on your specimen has the diagram below. Remember that all members of a species do not have exactly the same spine distribution that is depicted in Hitz. Also, remember that some spines are very difficult to find.

Strength of Head Spines: WEAK or STRONG



FLATFISH SPECIES DESCRIPTION FORM

Species Name: _____
Date of Capture: _____
Haul or Delivery Number: _____
Position of Capture (Lat. & Long.): _____
Depth of Capture: _____
Length: _____
Weight: _____

Was an example of this species brought back? Yes No

(Note: If this fish represents a range or depth extension, or a record in size, bring it back for species verification.)

First, please review the abbreviations at the bottom of the "Field Key to Flatfishes", p.31 in your Species Identification Manual. Often one of these abbreviations is misinterpreted and will create errors in identification. Terms such as ADB, and MAX have often caused confusion. Please also check the illustrations that precede the key to make sure you are taking measurements in the same way that the key asks you to.

Is the flatfish right eyed or left eyed? _____

Note: Right-eyed fish belong to the family Pleuronectidae and left-eyed fish belong the family Bothidae. However, remember that not all Pleuronectidae have their eyes on the right side, unusual individuals may have their eyes on the left.

Which fish of those listed in the illustrations on p.32-33 of the Species Identification Manual looks most like it?

Please answer the following questions:

What is the general tail shape?



Does the fish have an accessory dorsal branch (ADB) of the lateral line?

___ Yes (If so, remember to sketch it in.)

___ No

Does the eye protrude over the profile of the head such that its' edge can be seen from the blind side?

___ Yes ___ No

Relative to the lower eye, the maxillary ends:

___ forward of orbit

___ below anterior part of orbit

___ below pupil of eye

___ below posterior part of orbit

___ below posterior margin of orbit or beyond

In regard to mouth symmetry; the maxillary is:

- same length on eyed and blind sides
- slightly asymmetrical
- dramatically asymmetrical

What is the preoperculum shape?

- rounded
- angled

What is the shape of the lateral line over the pectoral fin?

- flat
- low arched
- curved
- highly arched

What is the shape of the posterior margin of the pectoral fin (on the eyed side)?

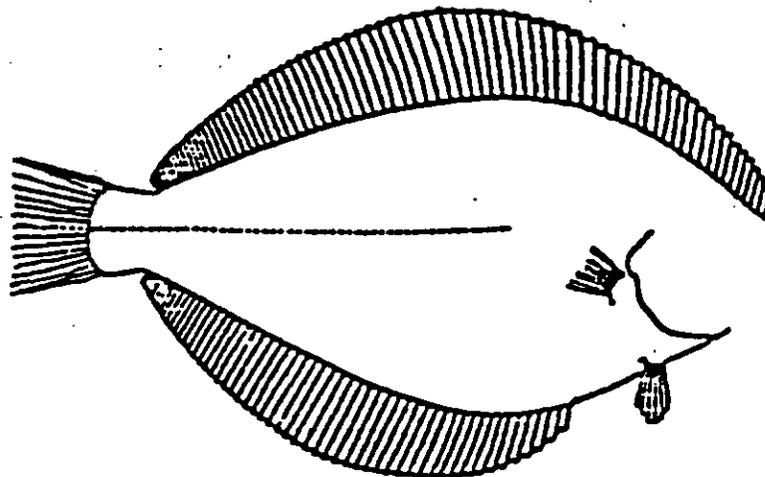
- rounded
- angular
- elongated (i.e. upper rays more than twice as long as lower rays)

Please make the following counts:

- | | |
|--------------------------|------------------------------|
| Dorsal fin rays: _____ | Gill rakers on the 1st arch: |
| Anal fin rays: _____ | upper arm: _____ |
| pectoral fin rays: _____ | lower arm: _____ |
| pelvic fin rays: _____ | total: _____ |
| | Gill rakers on the 2nd arch: |
| | upper arm: _____ |

Finish the sketch below as best you can. Make sure to draw in the important features of the flatfish. Include the following in your drawing:

- general head shape
- size and shape of mouth
- placement of eyes
- lateral line (include any arch and ADB)
- shape of preoperculum
- size and shape of pectoral fin
- shape of the end of the tail



MISC. SPECIES DESCRIPTION FORM

Species Name: _____
Date of Capture: _____
Haul or Delivery Number: _____
Position of Capture (Lat. & Long.): _____
Depth of Capture: _____
Length: _____
Weight: _____

Was an example of this species brought back? Yes No

(Note: If this animal represents a range or depth extension or a record in size, bring it back for species verification.)

This form is to be filled out for the first sighting of all species of fish (except rockfish and flatfish which have their own description forms) and invertebrates. Animals that are only keyed out to family groups, such as sculpin unidentified, poacher unidentified, or jellyfish unidentified need not be described. For fish, include counts of all fin rays, standard body measurements, (fork length, head length, snout length, and caudal peduncle length) and any other pertinent measurements.

List below, the features that led you to your genus or species conclusion. Be detailed in your description and make a sketch showing the main features. Be sure to include colors, patterns, body shape, fin shape, mouth size, and any other useful information or distinctive characteristics.

(Note: If you are not absolutely sure of your identification bring a specimen back or at least take a photograph of it.)

Please make the following counts: (each fin separately)

Dorsal fin spines	_____	_____	_____
Dorsal fin rays	_____	_____	_____
Anal fin spines	_____	_____	
Anal fin rays	_____	_____	
Pectoral fin spines	_____		
Pelvic fin spines	_____		
Gill rakers upper arm	_____		
Gill rakers lower arm	_____		
Gill rakers total	_____		

Other comments and pertinent information: _____

Draw Specimen on Reverse Side

SPECIES CODE LIST

CODE	COMMON NAME	SCIENTIFIC NAME
106	ALASKA PLAICE	PLEURONECTES QUADRITUBERCULATUS
450	ALLIGATORFISH, (POACHER) - UNIDENT.	AGONIDAE
610	ANCHOVY, NORTHERN	ENGRAULIS MORDAX
55	ANEMONE, SEA - UNIDENT.	ACTINIARIA
620	ARGENTINE - UNIDENT.	ARGENTINIDAE
43	ASCIDIANS, SEA SQUIRT, TUNICATE	UROCHORDATA
204	ATKA MACKEREL	PLEUROGRAMMUS MONOPTERYGIUS
48	BARNACLES	CIRRIPEDIA
795	BARRACUDA, PACIFIC (CALIFORNIA)	SPHYRAENA ARGENTEA
770	BARRACUDINA - UNIDENT.	PARALEPIDIDAE
622	BARRELEYE or SPOOKFISH - UNIDENT.	OPISTHOPROCTIDAE
289	BIGSCALE, (MELAMPID) - UNIDENT.	MELAMPHAEIDAE
998	BIRDS - UNIDENT.	AVES
618	BLACKSMELT - UNIDENT.	BATHYLAGIDAE
260	BLENNY - UNIDENT.	PHOLIDAE, STICHAEIDAE
302	BOCACCIO	SEBASTES PAUCISPINIS
27	BRACHIOPOD, LAMPSHELL	BRACHYOPODA
54	BRISTLEWORM, LEECH, POLYCHAETES	ANNELIDA
32	BRYOZOANS	
604	CAPELIN	MALLOTUS VILLOSUS
44	CHITON - UNIDENT.	AMPHINEURA
199	CHUB MACKEREL	SCOMBER JAPONICUS
29	CLAMS MUSSELS OYSTERS SCALLOPS	PELECYPODA
211	COD, ARCTIC (RACE)	BOREOGADUS SAIDA
203	COD, BLACK (SABLEFISH)	ANOPLOPOMA FIMBRIA
202	COD, PACIFIC	GADUS MACROCEPHALUS
208	COD, SAFFRON	ELEGINUS GRACILIS
214	CODLING - UNIDENT.	MORIDAE
32	CORALS	
1	CRAB - FAMILY, GENUS UNKNOWN	
6	CRAB, BLUE KING	PARALITHODES PLATYPUS
11	CRAB, BOX	LOPHOLITHODES FORAMINATUS
49	CRAB, CANCER	CANCER OREGONENSIS
16	CRAB, COUESI KING	LITHODES COUESI
39	CRAB, DECORATOR	OREGONIA GRACILIS
12	CRAB, DUNGENESS	CANCER MAGISTER
8	CRAB, GOLDEN KING	LITHODES AEQUISPINA
15	CRAB, HERMIT - UNIDENT.	PAGURIDAE
2	CRAB, KING CRAB - UNIDENT.	LITHODES & PARALITHODES
7	CRAB, KOREAN HORSEHAIR	ERIMACRUS ISENBECKII
37	CRAB, LYRE -- ROUNDED SPINED	HYAS COARCTATUS
9	CRAB, LYRE -- SHARP SPINED	HYAS LYRATUS
840	CRAB, LYRE - UNIDENT.	HYAS
17	CRAB, PARALOMIS MULTISPINA	PARALOMIS MULTISPINA
38	CRAB, PARALOMIS VERILLI	PARALOMIS VERILLI
74	CRAB, PEA	PINNIXA OCCIDENTALIS
13	CRAB, RED KING	PARALITHODES CAMTSCHATICA
31	CRAB, SCALED	PLACETRON WOSNESSENSKII

19 CRAB, TANNER, ANGULATUS
 4 CRAB, TANNER, BAIRDI
 5 CRAB, TANNER, OPILIO
 47 CRAB, TANNER, BAIRDI/OPILIO HYBRID
 18 CRAB, TANNER, TANNERI
 3 CRAB, TANNER - UNIDENT.
 23 CRAB, TELMESSUS
 53 CRINOIDS - UNIDENT.
 248 CUSK-EEL - UNIDENT.
 660 CUTLASSFISH - UNIDENT.
 144 DAB, LONGHEAD (SANDDAB)
 679 DAGGERTOOTH
 799 DRAGONFISH - UNIDENT.
 690 DREAMER - UNIDENT.
 250 EELPOUT - UNIDENT.
 91 EGG CASE, SKATE - UNIDENT.
 34 EGGS, SNAIL
 601 EULACHON, (CANDLEFISH)
 901 FISH - UNIDENT.
 100 FLATFISH - UNIDENT.
 210 FLATNOSE, PACIFIC (CODLING)
 146 FLOUNDER, ARCTIC
 141 FLOUNDER, ARROWTOOTH
 145 FLOUNDER, BERING
 147 FLOUNDER, KAMCHATKA
 142 FLOUNDER, STARRY
 660 FROSTFISH, (CUTLASSFISH)-UNIDENT.
 390 GREENLING - UNIDENT.
 80 GRENADIER, (RATTAIL) - UNIDENT.
 430 GUNNEL - UNIDENT.
 77 HAGFISH - UNIDENT.
 660 HAIRTAILS, (CUTLASSFISH)-UNIDENT.
 206 HAKE, PACIFIC
 102 HALIBUT, GREENLAND (TURBOT)
 101 HALIBUT, PACIFIC
 767 HATCHETFISH - UNIDENT.
 611 HERRING, PACIFIC
 902 INVERTEBRATE - UNIDENT.
 418 IRISH LORD - UNIDENT.
 33 ISOPOD
 207 JACK MACKEREL
 35 JELLYFISH - UNIDENT.
 2 KING CRAB - UNIDENT.
 608 KING-OF-THE-SALMON, (RIBBONFISH)
 700 LAMPFISH - UNIDENT.
 75 LAMPREY - UNIDENT.
 785 LANCETFISH, LONGNOSE
 700 LANTERNFISH - UNIDENT.
 54 LEECH, BRISTLEWORM, POLYCHAETES
 45 LIMPET - UNIDENT.
 603 LINGCOD
 14 LITHODID - UNIDENT. (RACE)

CHIONOECETES ANGULATUS
 CHIONOECETES BAIRDI
 CHIONOECETES OPILIO
 CHIONOECETES HYBRID
 CHIONOECETES TANNERI
 CHIONOECETES SP.
 TELMESSUS CHEIRGONUS
 CRINOIDEA
 OPHIDIIDAE
 TRICHIURIDAE
 LIMANDA PROBOSCIDEA
 ANOTOPTERUS PHARAO
 MELANOSTOMIIDAE
 ONEIRODIDAE
 ZOARCIDAE

GASTROPODA
 THALEICHTHYS PACIFICUS
 OSTEICHTHYES

ANTIMORA MICROLEPIS
 LIOPSETTA GLACIALIS
 ATHERESTHES STOMIAS
 HIPPOGLOSSOIDES ROBUSTUS
 ATHERESTHES EVERMANNI
 PLATICTHYS STELLATUS
 TRICHIURIDAE
 HEXAGRAMMIDAE
 MACROURIDAE
 PHOLIDAE
 MYXINIDAE
 TRICHIURIDAE
 MERLUCCIUS PRODUCTUS
 REINHARDTIUS HIPPOGLOSSOIDES
 HIPPOGLOSSUS STENOLEPIS
 STERNOPTYCHIDAE
 CLUPEA HARENGUS PALLASI

HEMILEPIDOTUS, SP.
 ISOPODA
 TRACHURUS SYMMETRICUS
 SCYPHOZOA
 LITHODES AND PARALITHODES SP.
 TRACHIPTERUS ALTIVELIS
 MYCTOPHIDAE
 PETROMYZONTIDAE
 ALEPISAURUS FEROX
 MYCTOPHIDAE
 ANNELIDA

OPHIODON ELONGATUS
 LITHODID CRAB UNIDENT.

809	LOOSEJAW, SHINING	ARISTOSTOMIAS SCINTILLANS
525	LUMPSUCKER - UNIDENT.	CYCLOPTERIDAE
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
710	MIDSHIPMAN, PLAINFIN	PORICHTHYS NOTATUS
900	MISC. - UNIDENT.	(ROCKS, MUD, GARBAGE, ETC)
29	MUSSELS, CLAMS, OYSTERS, SCALLOPS	PELECYPODA
25	NUDIBRANCH	NUDIBRANCHIATA
715	OARFISH	REGALECUS GLESNE
810	OCEAN SUNFISH	MOLA
60	OCTOPUS - UNIDENT.	OCTOPODA
61	OCTOPUS, PELAGIC	VAMPYROMORPHA
297	OPAH	LAMPRIS GUTTATUS (L. REGIOUS)
295	OREO, OXEYE	ALLOCYTTUS FOLLETTI
29	OYSTERS, CLAMS, MUSSELS, SCALLOPS	PELECYPODA
301	PACIFIC OCEAN PERCH	SEBASTES ALUTUS
762	PAPERBONES, SCALEY (WEARYFISH) - UNIDENT.	NOTOSUDIDAE
681	PEARLEYES - UNIDENT.	SCOPELARCHIDAE
450	POACHER - UNIDENT.	AGONIDAE
201	POLLOCK, WALLEYE	THERAGRA CHALCOGRAMMA
54	POLYCHAETE, BRISTLEWORM, LEECH	ANNELIDA
765	POMFRET - UNIDENT.	BRAMIDAE
790	POMPANO, PACIFIC	PEPRILUS SIMILLIMUS
750	PRICKLEBACK - UNIDENT.	STICHAEIDAE
205	PROWFISH	ZAPRORA SILENUS
280	RAGFISH	ICOSTEUS AENIGMATICUS
99	RATFISH, SPOTTED	HYDROLAGUS COLLIEI
80	RATTAIL, (GRENADIER) - UNIDENT.	MACROURIDAE
90	RAY, (SKATE) - UNIDENT.	RAJIFORMES
563	RIBBONFISH - UNIDENT.	TRACHIPTERIDAE
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, BOCACCIO	SEBASTES PAUCISPINIS
332	ROCKFISH, BROWN	SEBASTES AURICULATUS
314	ROCKFISH, CANARY	SEBASTES PINNIGER
325	ROCKFISH, CHILIPEPPER	SEBASTES GOODEI
327	ROCKFISH, COPPER	SEBASTES CAURINUS
311	ROCKFISH, DARK BLOTCHED	SEBASTES CRAMERI
330	ROCKFISH, DUSKY	SEBASTES CILIATUS
339	ROCKFISH, GREENSPOTTED	SEBASTES CHLOROSTICTUS
313	ROCKFISH, GREENSTRIPED	SEBASTES ELONGATUS
323	ROCKFISH, HARLEQUIN	SEBASTES VARIEGATUS
350	ROCKFISH, IDIOT FISH	SEBASTOLOBUS ALASCANUS
352	ROCKFISH, LONGSPINE THORNYHEAD	SEBASTOLOBUS ALTIVELIS

303	ROCKFISH, NORTHERN	SEBASTES POLYSPINIS
301	ROCKFISH, PACIFIC OCEAN PERCH	SEBASTES ALUTUS
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 PRORIGER
309	ROCKFISH, ROSETHORN	SEBASTES HELVOMACULATUS
312	ROCKFISH, ROSY	SEBASTES ROSACEUS
307	ROCKFISH, ROUGHEYE	SEBASTES ALEUTIANUS
304	ROCKFISH, SHARPCHIN	SEBASTES ZACENTRUS
318	ROCKFISH, SHORTBELLY	SEBASTES JORDANI
326	ROCKFISH, SHORTRAKER	SEBASTES BOREALIS
350	ROCKFISH, SHORTSPINE THORNYHEAD	SEBASTOLOBUS ALASCANUS
310	ROCKFISH, SILVERGRAY	SEBASTES BREVISPINIS
315	ROCKFISH, SPLITNOSE	SEBASTES DIPLOPROA
328	ROCKFISH, STRIPETAILED	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
240	RONQUIL - UNIDENT.	BATHYMASTERIDAE
200	ROUNDFISH - UNIDENT.	
203	SABLEFISH, (BLACK COD)	ANOPLPOMA 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
40	SAND DOLLARS	ECHINOIDEA
670	SAND LANCE, PACIFIC	AMMODYTES HEXAPTERUS
136	SANDDAB - UNIDENT.	BOTHIDAE
144	SANDDAB, LONGHEAD	LIMANDA PROBOSCIDEA
137	SANDDAB, PACIFIC	CITHARICHTHYS SORDIDUS
239	SANDFISH	TRICHODON
614	SARDINE, PACIFIC	SARDINOPS SAGAX CAERULENS
607	SAURY, PACIFIC	COLOLABIS SAIRA
660	SCABBARDFISH,(CUTLASSFISH)-UNIDENT.	TRICHIURIDAE
29	SCALLOPS, CLAMS, MUSSELS, OYSTERS	PELECYPODA
400	SCULPIN - UNIDENT.	COTTIDAE
431	SCULPIN, GYMNOCANTHUS - UNIDENT.	GYMNOCANTHUS, SP.
418	SCULPIN, IRISH LORD - UNIDENT.	HEMILEPIDOTUS, SP.
440	SCULPIN, MYOXOCEPHALUS SP.	MYOXOCEPHALUS SP.
433	SCULPIN, TRIGLOPS - UNIDENT.	TRIGLOPS SP.
Note:	Many other genera and species of sculpins are present. Group these others under sculpin unidentified.	
55	SEA ANEMONE - UNIDENT.	ACTINIARIA
41	SEA CUCUMBER - UNIDENT.	HOLOTHURIOIDEA
689	SEA DEVIL - UNIDENT.	CERATIIDAE
54	SEA MOUSE, BRISTLEWORM, LEECH	ANNELIDA

43	SEA ONIONS - UNIDENT.	UROCHORDATA
58	SEA PEN, SEA WHIP - UNIDENT.	PENNATULA
43	SEA POTATO - UNIDENT.	UROCHORDATA
25	SEA SLUG, - UNIDENT.	NUDIBRANCHIATA
56	SEA SPIDER - UNIDENT.	PYCNOGANIDA
43	SEA SQUIRTS, ONIONS, POTATOES, TUNICATES	UROCHORDATA
40	SEA URCHINS	ECHINOIDEA
58	SEA WHIP, SEA PEN - UNIDENT.	PENNATULA
54	SEA WORMS (POLYCHAETES)	ANNELIDA
550	SEABASS - UNIDENT.	SCIAENIDAE
240	SEARCHER, (RONQUIL) - UNIDENT.	BATHYMASTERIDAE
900	SEAWEED	MISC. ITEMS
606	SHAD, AMERICAN	ALOSA SAPIDISSIMA
750	SHANNY, (PRICKLEBACK) - UNIDENT.	STICHAEIDAE
65	SHARK - UNIDENT.	SQUALIFORMES
69	SHARK, BLUE	PRIONACE GLAUCA
68	SHARK, BROWN CAT	APRISTURUS BRUNNEUS
62	SHARK, PACIFIC SLEEPER	SOMNIOSUS PACIFICUS
67	SHARK, SALMON	LAMNA DITROPIS
78	SHARK, SIXGILL	HEXANCHUS GRISEUS
64	SHARK, SOUPFIN	GALEORHINUS ZYOPTERUS
66	SHARK, SPINY DOGFISH	SQUALUS ACANTHIAS
63	SHARK, THRESHER	ALOPIAS VULPINUS
70	SHRIMP - UNIDENT.	
90	SKATE - UNIDENT.	RAJIFORMES
212	SKILFISH	ERILEPIS ZONIFER
625	SLICKHEAD, THREADFIN	TALISMANIA BIFURCATA
602	SMELT - UNIDENT.	OSMERIDAE
604	SMELT, CAPELIN	MALLOTUS VILLOSUS
601	SMELT, EULACHON (CANDLEFISH)	THALEICHTHYS PACIFICUS
619	SMOOTH TONGUE, NORTHERN	LEUROGLOSSUS STILBIUS SCHMIDTI
30	SNAIL - UNIDENT.	GASTROPODA
34	SNAIL, EGGS	GASTROPODA
36	SNAIL, SHELL, EMPTY	
500	SNAILFISH - UNIDENT.	LIPARIDIDAE
559	SNIPE EEL - UNIDENT.	NEMICHTHYIDAE
109	SOLE, BUTTER	ISOPSETTA ISOLEPIS
118	SOLE, C-O	PLEURONICHTHYS COENOSUS
117	SOLE, CURLFIN	PLEURONICHTHYS DECURRENS
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.
 622 SPOOKFISH - UNIDENT.
 270 SQUARETAIL, SMALLEYE
 50 SQUID - UNIDENT.
 51 SQUID, GIANT
 20 STARFISH - UNIDENT.
 21 STARFISH, BASKET
 22 STARFISH, BRITTLE
 24 STARFISH, SUNSTAR
 226 STEELHEAD
 230 STURGEON - UNIDENT.
 3 TANNER CRAB - UNIDENT.
 209 TOMCOD, PACIFIC
 113 TONGUEFISH, CALIFORNIA
 227 TROUT, CUTTHROAT (SEA RUN)
 807 TUBESHoulder - UNIDENT.
 43 TUNICATES, ASCIDIANS, SEA SQUIRTS
 143 TURBOT - UNIDENT.
 102 TURBOT, GREENLAND (HALIBUT)
 805 VIPERFISH - UNIDENT.
 757 WARBONNET, DECORATED
 762 WEARYFISH, (PAPERBONES) - UNIDENT.
 779 WOLFFISH - UNIDENT.
 780 WOLF-EEL
 760 WRYMOUTH, GIANT
 783 WRYMOUTH, DWARF
 999 Z SUMMATION LINE

PORIFERA
 OPISTHOPROCTIDAE
 TETRAGONURUS CUVIERI
 DECAPODA
 MOROTEUTHIS ROBUSTA
 ASTEROIDEA
 GORGONOCEPHALUS
 OPHIUROIDEA
 SOLASTER SP.
 SALMO GAIRDNERI
 ACIPENSERIDAE
 CHIONOECETES SP.
 MICROGADUS PROXIMUS
 SYMPHURUS ATRICAUDA
 SALMO CLARKI
 SEARSIIDAE
 UROCHORDATA

 REINHARDTIUS HIPPOGLOSSOIDES
 CHAULIODONTIDAE
 CHIROLOPHIS DECORATUS
 NOTOSUDIDAE
 ANARHICHADIDAE
 ANARRHICHTHYS OCELLATUS
 DELOLEPIS GIGANTEA
 LYCONNECTES ALEUTENSIS
 CODE FOR FORM 3US ONLY

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
- (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
- (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

Definition of King Crab and Tanner Crab Condition

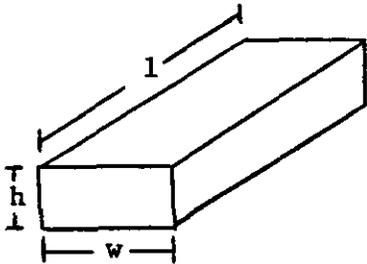
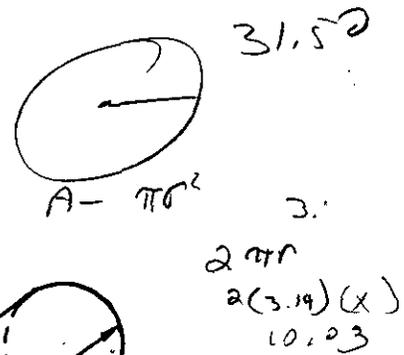
Trawl and Longline Catches

- (1) Excellent: No sign of stress or dismemberment
- (2) Poor: Alive but showing signs of stress--a few limbs may be missing; minor mouthpart movement may be the only sign of life
- (3) Dead: No sign of life, or if alive, likely to die from major carapace fracture or dismemberments

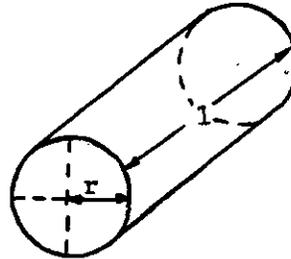
Useful Formulas You May Need

Number of Product Units x Average Unit Weight = Total Weight of Product
 Product Weight ÷ Recovery Rate = Whole Weight of fish used to make the product
 Product Weight x Conversion Factor = Whole or Fresh Weight of fish used for product

Area of a circle = πr^2 Circumference = $2\pi r$ ($\pi = 3.1415$)
 Area of a square or rectangle = length x width
 Area of a triangle = $\frac{1}{2}$ base x height
 Volume of a right angle cone = $\frac{1}{3}\pi r^2 h$

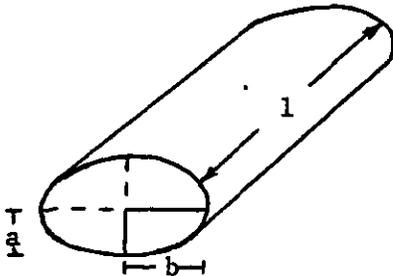


Rectangular solid
 Volume = height x width x length
 $V = hwl$

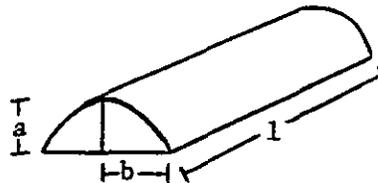


Cylinder
 Volume = π x radius² x length
 $V = \pi r^2 l$

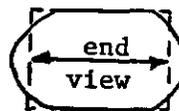
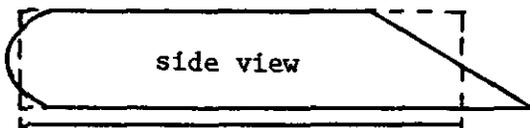
($\pi = 3.1415$)



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.)

TABLE OF EQUIVALENTS

1 inch = 2.540 centimeters	1 centimeter = .3937 inches
1 foot = .3048 meters	1 meter = 3.2808 feet
1 foot = .1667 fathoms	
1 fathom = 6 feet = 1.829 meters	1 meter = 100 cm = 0.5468 fathoms

1 statute mile = 5280 feet = 1.609 kilometers = 0.86899 nautical miles
= 880 fathoms

1 nautical mile = 1.15078 statute miles = 1 minute of latitude
= 1.852 kilometers = 1012.6859 fathoms = 1852 meters

1 fathom = 0.0009875 nautical miles = 0.0011364 statute miles

1 pound = 0.4536 kg 1 kg = 2.2046 lb.

total catch wt. in lbs ÷ 2.2046 = total catch wt. in kilograms

1 metric ton = 1000 kg = 2204.6 lbs = 0.9842 long tons = 1.1023 short tons

1 short ton = 907.1847 kg = 2000 lbs = 0.8929 long tons = 0.9072 metric tons

1 long ton (British) = 1016.0469 kg = 2240 lbs = 1.1060 metric tons
= 1.12 short tons

CONVERTING POUNDS TO METRIC TONS

LBS	MT	LBS	MT
1000	0.4536	14000	6.3504
2000	0.9072	15000	6.8040
3000	1.3608	16000	7.2576
4000	1.8144	17000	7.7111
5000	2.2680	18000	8.1647
6000	2.7216	19000	8.6183
7000	3.1752	20000	9.0719
8000	3.6288	21000	9.5255
9000	4.0824	22000	9.9791
10000	4.5360	23000	10.4327
11000	4.9896	24000	10.8863
12000	5.4432	25000	11.3399
13000	5.8968	26000	11.7935

Relationship of Pacific Halibut Lengths to Weight (Live Weight)

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

Relationship of Pacific Halibut Lengths to Weight (Live Weights)

Length (cm)	Kilograms	Length (cm)	Kilograms	Length (cm)	Kilograms
146	43.060	188	97.388	230	187.745
147	44.023	189	99.109	231	190.402
148	45.000	190	101.095	232	193.085
149	45.993	191	102.829	233	195.795
150	47.001	192	104.576	234	198.531
151	48.024	193	106.359	235	201.293
152	49.062	194	108.155	236	204.081
153	50.115	195	109.972	237	206.897
154	51.184	196	111.810	238	209.739
155	52.269	197	113.668	239	212.607
156	53.370	198	116.003	240	215.503
157	54.486	199	117.450	241	218.426
158	55.618	200	119.373	242	221.376
159	56.767	201	121.318	243	224.354
160	57.932	202	123.284	244	227.359
161	59.113	203	125.273	245	230.392
162	60.311	204	127.283	246	233.452
163	61.526	205	129.316	247	236.541
164	62.757	206	131.371	248	239.658
165	64.005	207	133.448	249	242.803
166	65.271	208	135.548	250	245.977
167	66.553	209	137.671		
168	67.830	210	139.817		
169	69.170	211	141.985		
170	70.505	212	144.177		
171	71.858	213	146.392		
172	73.229	214	148.631		
173	74.617	215	150.893		
174	76.024	216	153.179		
175	77.448	217	155.489		
176	78.891	218	157.822		
177	80.353	219	160.180		
178	81.833	220	162.562		
179	83.332	221	164.968		
180	84.850	222	167.399		
181	86.387	223	169.854		
182	87.943	224	172.334		
183	89.518	225	174.840		
184	91.113	226	177.370		
185	92.727	227	179.925		
186	94.360	228	182.506		
187	96.014	229	185.112		

Example

FORM 7 US - LENGTH FREQUENCY OF MEASURED SPECIES

(Includes halibut, salmon, and crab measurements)

- NOTE: 1. Leading zeros in columns /2 and /4 only—as needed.
 2. For motherhips—leave columns 17-19 blank. For longiners—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.

Cruise No.	Vessel Code	Date		
		Year	Mo.	Day
1 2 3 4 5	6 7 8 9	10 11	12 13	14 15
114	A 1 2 1	87	09	10

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.	X of S	Key/punch Check	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.	Size Groups	Freq.
	16-18	19 20 21 22		23-27	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	261	32	1	33	2	34	5	35	2	36	2	37	2	39	1
			M	129	40	1	42	1	44	1								
Pollock	201		F	300	33	4	34	9	35	12	37	4	38	1	43	2	45	3
			F	48	47	1												
Opilio Tanner	5		M	247	73	1	83	1	88	1								
Opilio Tanner	5		F	79	78	1												
Bairdi Tanner	4		M	466	48	1	53	1	58	3	63	4	68	6	73	6	78	4
			M	394	83	2	88	3	103	1	113	1						
			F	468	43	1	48	2	58	1	63	6	68	8	73	10	78	9
Bairdi Tanner	4		F	595	83	7	88	4	93	7	98	1	103	2	108	1		
Pacific halibut	101		U	130	54	1	74	1										
King salmon, M	222		M	39	38	1												
King salmon, F	222		F	44	43	1												
King salmon, U	222		U	41	40	1												
Pacific halibut	101	103	U	77	76	1												
Pacific halibut	101	104	U	544	48	1	56	2	58	1	78	2	80	1	88	1	127	1
King salmon	222	104	F	130	38	1	42	1	47	1								

FORM 7US--LENGTH FREQUENCY OF MEASURED SPECIES

Form 7US is used for recording the lengths of prohibited species from your samples and the lengths of your sampling species. **Caution: Only actually measured lengths, not estimated lengths, should be recorded on this form.**

1. Fill in the date; start each day's measurements on a new side of the two sided form. (Do use both sides of the page!).
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 trawlers, record the haul number in columns 19-21.
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 to the nearest whole centimeter 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. **List lengths from the smallest to the largest within a species/haul/sex designation.**
7. Start a new row each time there is a change in sex, haul number, or species, or when there are more than seven sizes in a group.
8. In the "keypunch check" columns 23 - 27, simply add all of the numbers in the row (size group and frequencies together) and enter the sum. Be sure to check your work by adding it again to verify your sum.
9. 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.**
10. 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 and use both sides of the form.
11. Leading zeros should appear in the month, and day only (columns 12 and 14 only, as needed). No leading zeros in species code, haul number, size, or frequency.
12. 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. Do not use ditto marks in keypunch columns.

LENGTH FREQUENCIES

LENGTH FREQUENCIES OF PROHIBITED SPECIES

All observers should take length frequencies of all salmon and halibut and crab found in the prohibited species incidence sample. Remember that when there are too many prohibited species to process in a reasonable length of time, take a random subsample of at least 20 halibut, 20 salmon, 20 king crab and 70 Tanner crab. A subsample of the salmon and crab groups should be a random sample of the species groups as found in the catch. Do not select a single salmon or crab species for subsampling. Taking length data from the prohibited species in your samples is a higher priority than length frequency measurements of a sampling species.

Length frequencies are recorded by species and, except for halibut, by sex. Do not use, for instance, the general code 2 for "king crab unidentified". **Do not sex halibut**, but do sex salmon unless they are vigorous **and** have minimal scale loss (see "Sexing Fish" in the Appendix).

In the previous section, "Biological Data Collected from Prohibited Species" are instructions for subsampling, a full listing of the data to gather for each group, and instructions on measuring king and Tanner crab. Detailed instructions on taking scale samples for salmon follow in the section on scale sampling and Form 9.

SELECTION OF SAMPLING SPECIES

The selection of your sampling species for length frequency measurements of about 150 fish per day depends on several considerations:

1. Your assigned special project.
2. The target species of your vessel.
3. The area you are fishing in.
4. The ships fishing schedule and other considerations.

If you are not assigned an age structure (usually otoliths) collection as a special project, your sampling species for length frequencies is the target species of the vessel. If you are assigned to take age structures, your sampling species for length frequencies will be the same species you take age structures from, before and/or after your special project collection is done, within a cruise. There are additional considerations when your sampling species is not plentiful. Refer to the next section.

Assignments of an age structure collection will be generally for "a roundfish species", which would usually be pollock or Pacific cod, or "a flatfish species", which would be yellowfin sole or one of the species listed in the following table. At times, a particular species such as a rockfish species, sablefish, or Greenland turbot may be assigned as a sampling species. Roundfish otoliths (and P. cod scales) are stored in a media of 95% pure ethyl alcohol and fresh water while flatfish otoliths are in a glycerol/thymol solution. For this reason it is difficult to switch from a roundfish to a flatfish species collection. Age structure assignments may be

for a certain month, i.e. "the first month" or "second month", of your time at sea. The purpose of this is to spread out the effort of observers over time so this request can be adjusted to conform with the dates of a cruise which is in the second month of your trip. Age structure collections are "by cruise" and so should be completed on one boat. Length frequency and all other data is also divided by cruise and so a new sampling species for length frequencies could be chosen when you begin a new cruise.

Table A is a list by area of the flatfish species other than yellowfin sole to choose from for a sampling species. Use this list when asked to collect data from a secondary flatfish.

Table A: Secondary Flatfish List

BERING SEA AND ALEUTIANS

Area 511

Rock Sole
Flathead Sole
Alaska Plaice

Area 513 & 517

Rock Sole
Alaska Plaice
Flathead Sole

Area 514

Rock Sole
Alaska Plaice
Flathead Sole

Area 515

Rock Sole
Flathead Sole
Arrowtooth Flounder
Greenland Turbot

Area 521

Greenland Turbot
Arrowtooth Flounder
Flathead Sole
Rock Sole

Area 522

Greenland Turbot
Arrowtooth Flounder
Flathead Sole
Rock Sole

Area 530

Greenland Turbot

Area 540

Greenland Turbot
Arrowtooth Flounder

GULF OF ALASKA

All Areas

Rock Sole
Arrowtooth Flounder
Flathead Sole

SPECIAL PROJECTS, SAMPLING SPECIES AND LENGTH FREQUENCIES

Many observers will be assigned a special project. Some observers will be asked to collect age structures from either a roundfish or a flatfish species. Others will be assigned to collect age structures from a particular species. While still others may be assigned a special project involving the collection of stomach samples, taking product recovery samples or other projects. Regardless of a special project assignment, all observers on catcher/processors should be able to collect 150 lengths from a selected sampling species each day. Observers on longline, pot, or shoreside delivery vessels may not be able to take as many lengths.

If your special project assignment involves the collection of age structures, then the species that you choose or are assigned for your collection will be the same species that you collect 150 lengths from daily for that cruise. If you do not have an age structure collection as your special project, then you would collect 150 lengths on a daily basis, from the target species of your vessel.

If you are assigned to collect age structures from an unspecified group of species such as flatfish or rockfish, then choose a species (one) from the group for that area which occurs most abundantly in the catch, (refer to the preceding Table A). This will make it easier for you to get 150 randomly collected lengths each day.

If an assigned species is not plentiful, there may not be enough in the sample for species composition for a good length frequency sample and you may have to use other methods to get additional fish of that species. In this case, the observer could collect all the individuals of that species from the conveyor belt over a period of time or use some other method to obtain randomly selected fish from a larger sample weight. Be sure to collect the additional fish required in an unbiased manner. If you cannot get 150 fish in a day of the sampling species, take lengths and age structures from those you did collect and, additionally, take approximately 150 lengths of the target species each day.

Try to keep the same sampling species throughout your cruise, regardless of the area you are fishing. If you should change fishing strategies, move to a vastly different fishing area or change ships, then you may choose a new sampling species. However, if you cannot continue the collection of age structures from a sampling species, don't keep a collection of fewer than 50 age structures. Dump it and start a new one. For instance, suppose that you started your sampling species age structure collection in area 513 when the ship was targeting on pollock. After only a few days, the ship moved to area 511 and began yellowfin sole operations. First examine a few catches to see if you could gather 100 - 150 pollock over the course of a day to continue your pollock collection. Also, the skipper might just be searching around and may return to better pollock catches. If this is not the case, you should examine your collection. If you have filled fewer than 50 vials with pollock otoliths, then dump the vials and start over with Pacific cod, a roundfish species, which would be present with YFS as bycatch. If you have filled more than 50 vials, then keep the pollock collection and start a new collection of cod otoliths (and scales in the case of cod).

LENGTH FREQUENCY SAMPLING METHOD

The length and age data from observer samples will be used to determine the relative abundance of each year class of target and selected bycatch species. Length frequency data provides information on abundance of fish of each size category while otoliths are read to determine the corresponding age. The age/length relationship may be quite different for each sex of a species.

Length frequencies should be collected each day from each sampling species selected. The day's length measurements may all be taken during one sample period or they may be taken from each sample period to ensure the measurements are representative when sizes are varying. It is important, however, that any given sample is not selected on the basis of size.

Length frequencies are usually taken from fish that were collected in a random, non-size selective manner during your species composition sampling. Sex all the fish you have set aside for length measurements (refer to "Sexing Fish" in the Appendix). If you wanted to sample 200 fish for length frequencies and the sample you set aside only has 192 fish, don't bother collecting another eight fish. It is too easy to bias your sample by "picking" them out in an inappropriate manner. Group the fish into baskets by sex. If you are unable to sex some fish, (usually the small ones), separate them into a third group to measure. Their lengths will also need to be recorded and their sex written in as "U" (unidentified).

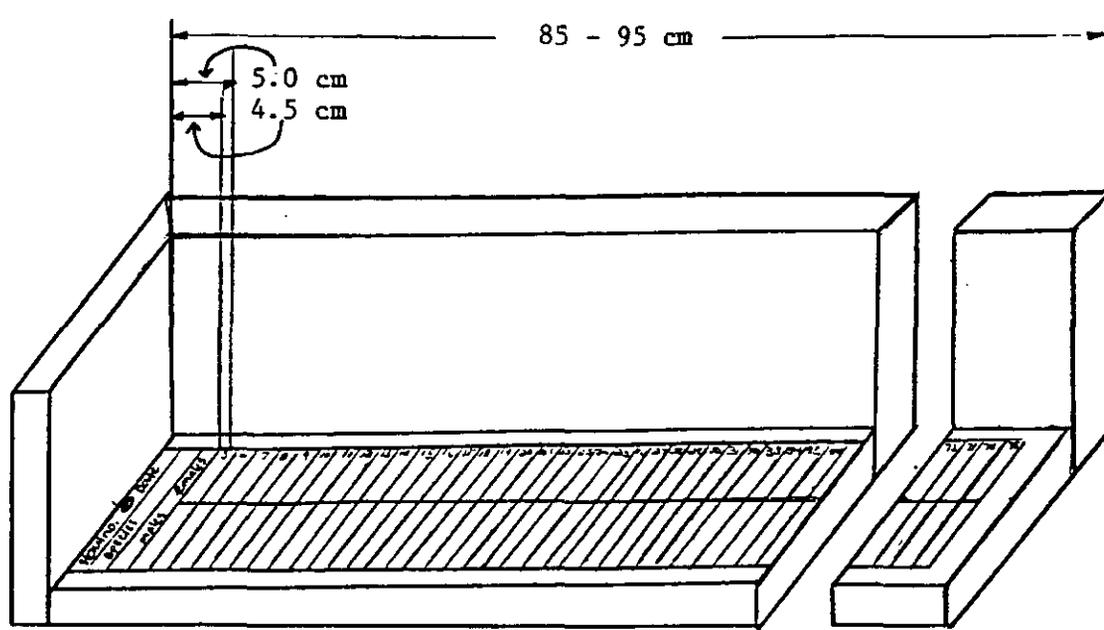
Next, set up a plastic strip on a measuring board, recording on it the haul number, date, and species. Observers on processors and trawlers must keep length frequency data for each tow separate. Record data for different hauls on different plastic strips. The plastic measuring strip is a long, narrow piece of white plastic divided into one centimeter spacings. The strip is attached to a 3-sided, wood measuring board (bottom, end, and back boards) 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 board across the end and the center of the 5 cm space is at exactly 5.0 cm from the end board. Mark each 10th centimeter strip unit to read 10, 20, 30...etc. For large fish, species whose length range commonly exceeds 75 cm, the measuring strip may be offset as shown in the illustration on the following page. To increase the length of a strip by ten centimeters for instance, offset the strip so that the first spacing line is at 14.5 cm from the end board and the center of the first centimeter space is at 15 cm. The tenth centimeter units of the strip may then need to be renumbered accordingly.

Take one of the baskets of sexed fish. Note that one side or half of the plastic strip is designated for males, and the other half for females. Position each fish on the measuring strip with jaws closed, snout against the end, dorsal surface against the back, and the fish body flat and straight. Spread the caudal fin with your hand to help determine the fork or midpoint of the fin's posterior margin. Fork length measurements should always be taken of fork-tailed sampling species, even if the tails are ragged and the exact location of the fork has to be estimated. This is often the case when measuring hake. 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.)

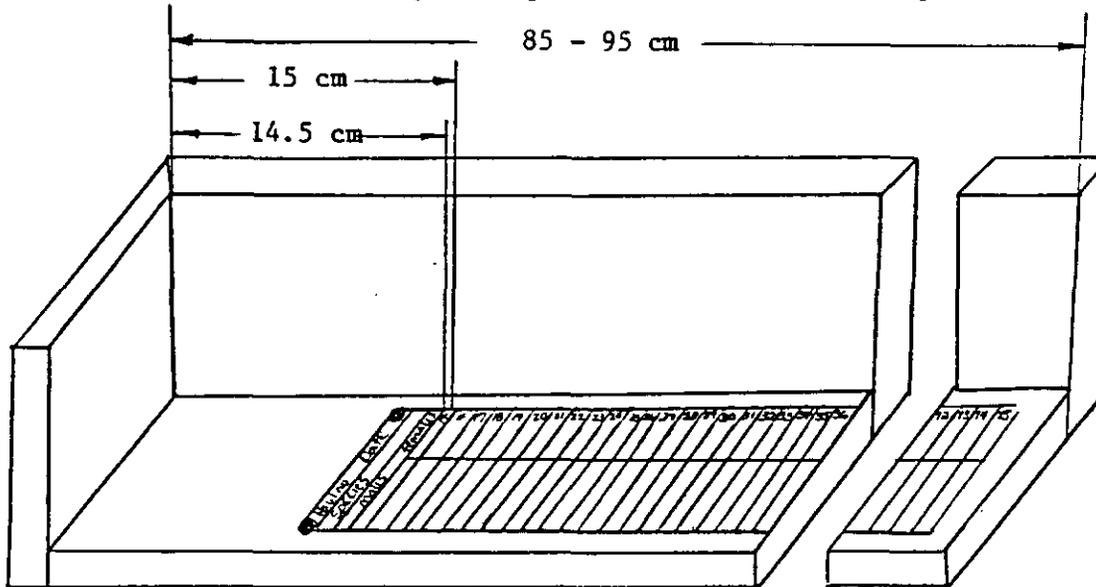
With a pencil, place a stroke on the appropriate half of the plastic strip in the centimeter space where the fork or midpoint of the tail falls. If the fork or midpoint of the tail lies right on a line, reposition the fish and check it again. If it's still on the line, record the length in the smaller (shorter), adjacent centimeter length space. After recording a length on the strip, some of these fish may be used or set aside for otolith or scale samples. (Refer to "Scale Samples and Random Stratified Otolith Samples" in the following section.)

When starting to measure another basket of sexed fish, verify their sex and check to be sure you are recording their lengths on the appropriate half of the strip. At the end of sampling, the number of pencil strokes per sex and centimeter length spacing will give the size group's frequency by sex.

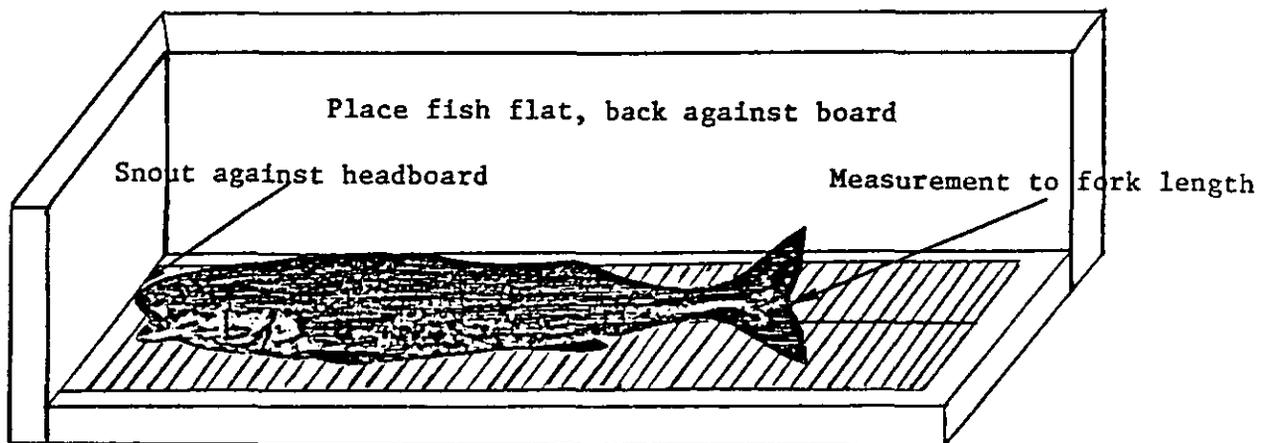
Length Frequency Measuring Board and Measurement



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.

FORM 9US INSTRUCTIONS

Form 9 is used for recording biological information concerning individual fish or invertebrates. It will most often be used in recording the sex, length, and weight of fish whose age structures (scales, otoliths, or fin rays) are collected for future age determination. It is the record of associated data that must accompany scales of salmon caught incidentally as well as the age structure collections of a sampling species which you may have been assigned.

1. Form 9US data sheets are filed separately by species and cruise. To make sure that you don't record coho salmon on the reverse side of a chinook salmon sheet for instance, 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 three-digit subarea corresponding to the catches on the sheet. Check the subarea you recorded for the haul/set on either 1US or 2US. If the vessel changes subareas during the day, you will need to use a different sheet to record data from the new subarea. (You may use the back of the previous form.)
3. Fill in the cruise number and vessel code (when known), date, species common name, and the species code corresponding to the common name. Start each day's measurements (or subarea if it changes during the day) on a new side.
4. Leading zeros should appear in the month and day only (columns 12 and 14 only, as needed).
5. Record the specimen type that is being collected:
 - 1--otoliths
 - 2--scales
 - 3--fin rays
 - 4--otoliths and scales
 - 5--otoliths and fin rays
 - 6--scales and fin rays
 - 7--otoliths, scales, and fin rays
6. Record the sampling system that was used: (you will be told which sampling system to use before you go out)
 - 1--stratified random--This is the most common system for collecting age structures in this program. Usually the fish are obtained from your length frequency samples and a tally sheet is used to ensure that age structures are obtained from no more than 5 fish per cm sex group.
 - 2--random--In this system, although the fish may be from your length frequency sample, no stratification is made by size and sex. Instead, you may be instructed to take age structures from every eighth, tenth, fifteenth (or other) fish to ensure that the fish selected are a random collection from the population at large. Salmon

scale samples are an example of this because scale samples are taken from all of the salmon or a random subsample of all of the salmon.

3--systematic--Fish are chosen from the length frequency sample in a random fashion (as in 2 above), but the haul/set to be sampled is selected in a "systematic" fashion. For example, the haul closest to the cumulative 200, 400, 600 metric ton catch may be chosen to be sampled.

7. Ignore "Total no. of specimens" and "Catalogue date," as this information will be filled in by others after you return.
8. On trawlers record the haul number in columns 25-27; on longline or pot vessels record the set number in those columns.
9. Note that data from several hauls/sets can be recorded per sheet as long as the hauls were begun to be retrieved or the set retrieval was completed on the date written on the top of the page and they were all taken from hauls/sets 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/set is in a different subarea.
10. The specimen number is the identifying number on the otolith vial, scale envelope, or other container with the specimen. There should not be any duplicate specimen numbers within a species. The specimen numbers should be listed in sequential number, which should be the case if the sampling directions were followed. (We want to avoid having specimen containers filled at random.) Salmon scale samples are numbered sequentially by species and are recorded on separate groups of pages.
11. If you board another ship during the same trip, you can continue with the same sequence of otolith numbers (or other specimen numbers), but keep the Form 9US's separate for the two different cruises.
12. It is best if the specimens are removed by sex group and recorded separately by sex on the form.
13. Record the sex of the fish using "M", "F", and "U" notation; not O and O. (M = male; F = female; U = unidentified)
14. Record the length of the fish to the nearest cm--no decimal places.
15. The weight is to be filled out to two decimal places.
16. If you recorded the length of the fish on the Form 7US forms (which should almost always be the case unless you picked this particular fish from someplace other than your length frequency sample), record a "Y" for "Yes" in column 41.
17. If you are requested to record maturity stage, record this in columns 42-43. Use the appropriate maturity scale for this species.

18. The columns to the right of maturity stage (columns 44 and above) are for the age readers to complete. If your project specifically directs you to write something, or if you note something extraordinary about the individual fish that you think people should be made aware of, write your comments small enough to allow the age readers to also record remarks, if necessary.
19. 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 9US's.
20. As with other forms, you will be recording your name and the ship name at the top of each set of forms. For the Form 9US this means that you should do this at the top of the first sheet for each species.

SCALE SAMPLES AND RANDOM STRATIFIED OTOLITH SAMPLES

RANDOM 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 a similar manner as tree rings to determine age. The fish you take age structures from are your biological sampling species and are a subsample of those in your length frequency sample, thus, the use of the name "random stratified" which is a subsample, stratified by length, from the random length frequency sample of fish.

A maximum of five pairs of otoliths per sex for each centimeter length group are to be taken for this type of collection (5 males and 5 females of each centimeter group). 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. It is expected that you will have only a scattering of one or two samples from fish whose lengths are at the extremes of the size range you see. The object of this collection is not to complete the 5/cm/sex categories on the tally sheet or to fill all the vials. The object is to obtain age structures from most of the commonly observed length groups in the length frequency collection so that age and length information can be used to evaluate the status of the fish populations.

Otoliths are always collected while taking length-frequency measurements by sex from the sampling species. A running tally of your otolith collection on your plastic form 9 helps you keep track of what sizes and sex of fish are needed for your collection. Thus a cumulative tally should be maintained for the sampling species, for each collection. (Usually an observer makes only one collection and a collection must be completed within one cruise.) After taking the length measurement, if the fish is of a size and sex needed, weigh the fish with the 2.0 kg or 5.0 kg scale. Record weight, sex, and length on the plastic otolith sheet after the vial number in which the otoliths (or otoliths and scales in the case of cod or sablefish) will be placed. The otolith vials are to be filled in numerical order and the sexes should be grouped.

Remove the pair of otoliths from each fish. Clean the otoliths by rubbing them between your fingers in water, or on a wet sponge or cloth, to remove slime and tissue and place them in the vial. There is one set of two otoliths per vial. Add the appropriate fluid if any, fill the vial half full, and cap it. Most roundfish otoliths are stored in a 50% ethyl alcohol-50% fresh water solution. Flatfish otoliths are stored in the glycerol solution as provided. Check the instructions for your sampling species in the table "Otolith and Scale Collection for Select Species" in the Appendix. 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. Try not to collect more than 20 age structures per day (10 males and 10 females). We would like the collection to be made over the duration of the cruise, not in one or two days.

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 otoliths 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 numbering sequence but start the second collection over with a new otolith tally sheet because it will be a

new collection. If you have collected less than 50 age structures from a sampling species and you must disembark and start a new cruise, you should dump the age structures that have already been collected and start over on the new ship. (Note: You may be instructed to take two separate sets of otoliths--simply start your tally sheet over the second month.)

OTOLITH REMOVAL

The otoliths are located ventrally and to either side of the brain tissue, about one eye diameter behind the eye in most fishes (refer to the diagram in the Appendix). There are three common methods of cutting into a fish's head to remove this pair of otoliths. On a roundfish, a horizontal cut, in an anterior to posterior direction which cuts off the top of the head can be done to expose the otolith cavity. This cavity can also be reached by going into the back of the mouth with a pair of forceps or scalpel and piercing up through the roof of the mouth. When beginning though, the easiest method to use in locating and removing otoliths is to make a vertical cut down through the top of the head to the location of the otolith pocket. This point is located by this simple rule of thumb: On the side of the fish's head, if you were to make an extension, (hypothetically), of the lateral line and of the curve of the preopercular bone, determine the point at which these two lines would meet. Cut down to that point. Though it may not be pleasant, firmly grasp the fish by putting thumb and forefinger into the eye sockets. Bear down on the knife with even pressure as you cut through the bone of the head. Pay attention to the amount of pressure you are required to apply to make this cut. As soon as the cutting gets easier, let up on the knife or you will slice through the otoliths. Put down the knife and break the head open. If you have cut to the correct point, the otolith cavities, (one on each side of the brain), will break open and expose the white, calcareous otoliths. They are then easily picked out with forceps and should be wiped clean before storage.

Some fish with bony skulls and small otoliths such as sablefish and some rockfish may pose problems at first. You may want to use a small hacksaw instead of a knife. Care should be taken not to break or crack the otoliths, but if an otolith is broken, and the fish is of an uncommon size, include all pieces in the vial. Otherwise simply discard the otoliths because you will probably see fish of that sex and size again.

Start with the lowest number of the vial number sequence when starting your collection and fill consecutively numbered vials. Attempt to take some otoliths each sampling day if the species seems readily available. If possible, you should not collect more than 20 otoliths per day (10 males and 10 females). When 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.

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

Salmon: For certain species of fish, the scale is the preferred structure for determining age; on some species, otoliths are used. Scale samples should be taken from all salmonids in the incidence of prohibited species samples, or from a few of each species of salmon present in your sample. (See instructions for subsampling under Biological Data Collected from Prohibited Species, and its' salmon data section.) Do not collect scales from salmon that are not part of your samples for prohibited species unless they are tagged salmon.

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. A minimum of five, good, readable scales from each fish must be collected. Place salmon scale samples dry, in small paper envelopes. Try to smear or spread-out the scales inside the envelope so that they will not stick together in one large clump. On each pre-printed envelope, fill in the requested information. If you should run out of envelopes, make some with paper and tape. Number the salmon scale samples sequentially, within each species group. Record their data on Form 9US on separate groups of pages by species. Each cruise should start with salmon scale number one for each species of salmon. Directions for collecting scales:

1. Rinse the fish off and/or lightly wipe the area to be sampled with a wet 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.
2. Examine the fish and select zone A, B, or other. Record the zone on the envelope. "A" is the preferred zone, "B" is next in preference. Refer to the figures in the Appendix (Location of Preferred Scale Sampling Zones). When there are no scales available in either zones A or B (on either side of the fish) then another area may be used.
3. Pluck salmon scales out with forceps so as to minimize the amount of accompanying mucus. For cod or sablefish, use a clean, thin-edged instrument (knife, scalpel, forceps), scrape within the zone in an anterior direction (toward the head).
4. Wipe off, inside the envelope or vial, 15 to 20 scales that adhere to the instrument. (Collect a minimum of five scales.) 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.

Cod and Sablefish: From Pacific cod and sablefish, scales as well as otoliths should be taken from a sample stratified by length and sex as explained in "Random Stratified Otolith Samples." Cod and sablefish scales should be put into the vials of alcohol with the otoliths instead of into scale envelopes. The primary reason for this is to prevent the scales from sticking together so they can be mounted easily for reading. Thus it is important to insert the scales into the alcohol solution or at least cover them with solution before they dry rather than add the alcohol later after they have stuck to the vial and each other.

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.

FORM 10US - MARINE MAMMAL INCIDENTAL CATCH DATA

This form is for the recording of whether marine mammals were incidentally taken and for the recording of any attempts to deter marine mammals from preying upon the catch. As in the incidence of other prohibited species, resource managers need to calculate the animals caught per unit of effort, so this form must be filled out even if no marine mammals were seen. It is also important to make sure that you are checking a representative sample of the catch for marine mammals.

On stern trawlers, or on processing vessels receiving unsorted codends, decide in advance whether or not you are going to check the catch for marine mammals. Observers usually watch the dumping of codends that they plan to sample for species composition and prohibited species, so they would know whether or not a marine mammal was in the catch. Therefore, as a minimum, an entry should be made for every haul the observer samples for groundfish. In addition, some observers have to estimate the haul size for every codend that is brought on board to reliably estimate total catch size. In most cases the observer should watch those hauls being dumped so that additional entries can be made on Form 10US A and B. Marine mammals, such as sea lions, tend to congregate around codends being brought in, so watch for any signs of deterrence at that time (such as the use of "seal bombs"). Deterrence might also be used if the codend is brought up to make a turn, or while the codend is being set. You will not be expected to watch for signs of deterrence at every possible time it might be used if you have never seen or heard anything which makes you suspect that deterrence is ever used.

Observers aboard longline vessels should also record data on Form 10US. Although it is less likely in this fishery that marine mammals will become entangled in the gear (it has happened), the use of deterrence to protect the catch is more likely in this fishery than in trawl fisheries. Record whether or not any deterrence has been used for each set that you observed. Record the details of the use of deterrence in your logbook--what form of deterrence was used, how effective it was, and whether the marine mammals appeared to be injured by it.

Form 10US has two parts--10A for recording marine mammal interactions with sampled hauls, and 10B (the back of 10A) for recording specimen data and remarks on any marine mammals subject to deterrence or taken in a catch. Form 10A is used only for sampled hauls, while form 10B can be used for any marine mammal interaction, whether in a sampled haul or not. *Hauls Sampled for mar. mammals*

Form 10A US

1. Fishery no. (col. 1-2) - Leave this code blank for the time being. (The fishery will be determined from the gear type, the area, and the depth fished (from 2US or 1US)).
2. Cruise no., vessel code, year (col. 3-13) - Fill in the cruise number (when known), vessel code and year in the heading; start a new sheet for each new cruise.

3. Date, haul/delivery/set number (col. 14-20) - Record the date and haul, delivery, or set number for each catch for which you know whether or not marine mammals were deterred or taken.
4. Marine mammal species - Write the common name of the marine mammal species involved. Write "None" if no marine mammals were taken or subjected to deterrence. If you are not sure of the identification, use the broader classification, such as unidentified pinniped or unidentified dolphin/porpoise. If more than one species of marine mammal was involved in the haul, set, or delivery, enter the second species on a separate line.
5. Marine mammal species code (col. 21-22) - Record the corresponding code (see attached table) for the marine mammal species you recorded in #4 above.
6. Number of marine mammals (col. 23-39) - Except for the deterred category, a marine mammal recorded in one of these categories should not appear in any of the other categories--the categories are mutually exclusive. It is possible that an animal that was earlier deterred (or at least subjected to deterrence) might later become entrapped or be lethally removed.
 - a. Deterred: those animals not entrapped that were subjected to harassment such as seal bombs.
 - b. Released or escaped alive (uninjured): those animals that are entrapped, but are released alive or escaped with no apparent injury (no bleeding, swam or dove strongly within a few seconds) and no fishing gear was attached to the animal.
 - c. Released or escaped alive (injured): Those animals that are entrapped, but are released alive or escape with apparent injury (bleeding, obvious trauma, unusually sluggish movement upon release) and/or with fishing gear attached to the animal.
 - d. Freshly dead (entangled or entrapped): Any dead animal brought onboard or released from the gear that is not obviously decomposed or gunshot. (The observers should not worry about how freshly dead the animal is.)
 - e. Unknown condition: Those animals that are entangled or entrapped, but are lost or discarded before the observer is able to judge the animals' condition.
 - f. Decomposed: The animal was entrapped, but it was obviously dead before contacting the fishing gear. Note smell, discoloration, bloating, or external trauma resulting from scavengers.
 - g. Lethal removal (not entangled or entrapped): An animal that is killed (e.g. shot or clubbed) to prevent serious damage or loss of gear, catch or human life, but is not in direct contact with fishing gear.
 - h. Lethal removal (entangled or entrapped): An animal that is killed (e.g. shot or clubbed) to prevent serious damage or loss of gear, catch or human life, and is in direct contact

with fishing gear.

7. Did you observe MM (Y/N)? (col. 40) - Record "Y" here if you actually saw the animal, and "N" if you did not.
8. Form 10B (Y/N)? (col. 41) - Record "Y" here if you have also filled out a Form 10B (the back of form 10A US) for this entry; record "N" if you had a marine mammal entry on this line and did not fill out a form 10B. Leave this blank if there was no marine mammal entry on this line.
9. Column 42 - Leave this column blank.

Form 10B US

Form 10B US (the back of Form 10A US) has space for specimen information and for remarks about entries on the front. Use this form whether or not you have a 10A entry (e.g., the animal comes from an unsampled haul). Fill out one Form 10B record (there is room for three records on the form) for every animal from which measurements or specimens were taken. You should also use the form for any comments about an incident. Use additional Form 10B's if you need more than three records to describe the Form 10A data.

Note that this is the place to record information on animals caught in unsampled hauls.

1. Fishery no., cruise no., vessel code, year, date, haul/delivery/set number, marine mammal species code (col. 1-22) - Copy these data directly from the associated form 10A US (if there was a form 10A entry).
2. Haul sampled for fish (Y/N)? (col. 23) - Code "Y" here if the haul was sampled for fish, and "N" if it was not.
3. Did you observe the marine mammal (Y/N)? (col. 24) - Record "Y" here if you actually saw the marine mammal, and "N" if you did not.
4. Sex (M/F)? (col. 25) - Record the sex of the animal. Code "U" if the sex is unknown.
5. Lengths: curvilinear and/or standard (col. 26-31) - Record the animal's length (in cm) in the appropriate field.
6. Tooth collected (Y/N)? (col. 32) - Record "Y" if you collected a tooth; otherwise record "N". If "N", please indicate in the Remarks section why you did not take the snout or tooth.
7. Photo taken (Y/N)? (col. 33) - Record "Y" if you took photographs; otherwise, record "N".
8. Remarks - Use this area to give features you used to identify the animals to species or species group. If the animal was subjected to a form of deterrent, document the particular circumstances, what deterrent was used, whether or not the animal was deterred, and

whether or not the animal seemed to be injured. If the animal was released or escaped alive after being entangled or entrapped, document what happened, what part of the gear the animal was in, and what type of injury or symptoms the animal was displaying (if any) upon release. If the animal was lethally removed, make sure that you document the entire circumstances on these sheets or in your logbook as well as recording any biological data on ~~a specimen form~~. Record what you can about the circumstances concerning animals of unknown condition.

Form 10B
US

In addition, ask the captain to have reported to you all marine mammals that are taken in catches while you are aboard. If you are informed about a marine mammal in a catch which you did not intend to sample, do not enter these data on Form 10A US, but do fill out the Form 10B US. Indicate that these animals are not recorded on a Form 10A and give the reason why.

Common and Scientific Names and
Corresponding Codes for Marine Mammals
(NE indicates no equivalent)

<u>Code</u>	<u>Common Name</u>	<u>Scientific Name</u>
CU	Northern fur seal	<u>Callorhinus ursinus</u>
EJ	Northern (Steller) sea lion	<u>Eumetopias jubatus</u>
ZC	California sea lion	<u>Zalophus californianus</u>
UO	Unidentified otariid (fur seals and sea lions with visible ears)	
OR	Walrus	<u>Odobenus rosmarus</u>
PV	Harbor seal	<u>Phoca vitulina</u>
PL	Spotted seal; larga seal	<u>Phoca largha</u>
PH	Ringed seal	<u>Phoca hispida</u>
PF	Ribbon seal	<u>Phoca fasciata</u>
EB	Bearded seal	<u>Erignathus barbatus</u>
MA	Northern elephant seal	<u>Mirounga angustirostris</u>
US	Unidentified phocid (hair or true seals without visible, external ears)	
UP	Unidentified pinniped (the order which includes both otariids and phocids)	
EL	Sea otter	<u>Enhydra lutris</u>
PD	Dall's porpoise	<u>Phocoenoides dalli</u> : dalli type
PT	Dall's porpoise	<u>Phocoenoides dalli</u> : truei type
PB	Dall's porpoise	<u>Phocoenoides dalli</u> : black type
PX	Dall's porpoise	<u>Phocoenoides dalli</u> : type unknown
PP	Harbor porpoise	<u>Phocoena phocoena</u>
DD	Common dolphin	<u>Delphinus delphis</u>
LO	Pacific whiteside dolphin	<u>Lagenorhynchus obliquidens</u>
LB	Northern right whale dolphin	<u>Lissodelphis borealis</u>
SC	Striped dolphin	<u>Stenella coeruleoalba</u>
TT	Bottlenose dolphin	<u>Tursiops truncatus</u>

SB Rough toothed dolphin
 GG Risso's dolphin
 SL Spinner dolphin
 SA Spotted dolphin (Central Pacific)
 SG Spotted dolphin (Eastern Pacific)
 LH Frasier's dolphin
 UD Unidentified dolphin/porpoise
 GM Shortfin pilot whale
 FA Pygmy killer whale
 PC False killer whale
 OO Killer whale
 DL Belukha; beluga
 UX Unidentified small whale
 PM Sperm whale
 BE Baird's beaked whale
 ZX Goosebeak whale
 MS Bering Sea beaked whale
 ER Gray whale
 MN Humpback whale
 BA Minke whale
 BX Bryde whale
 BB Sei whale
 BP Fin whale
 BL Blue whale
 BG Black right whale
 BM Bowhead whale
 MM Narwhal
 UZ Unidentified large whale
 UW Unidentified whale
 UM Polar bear

Steno bredanensis
Grampus griseus
Stenella longirostris
Stenella attenuata
Stenella attenuata
Lagenodelphis hosei
 NE
Globicephala macrorhynchus
Feresa attenuata
Pseudorca crassidens
Orcinus orca
Delphinapterus leucas
 NE
Physeter macrocephalus
Berardius bairdii
Ziphius cavirostris
Mesoplodon stejnegeri
Eschrichtius robustus
Megaptera novaeangliae
Balaenoptera acutorostrata
Balaenoptera edeni
Balaenoptera borealis
Balaenoptera physalus
Balaenoptera musculus
Balaena glacialis
Balaena mysticetus
Monodon monoceros
 NE
 NE
Ursus maritimus

FORM 10 B US - SPECIMEN DATA AND REMARKS ON MARINE MAMMAL SUBJECT TO DETERRENCE OR TAKEN IN CATCH

Fishery no.		Cruise no.					Vessel code					Year
1	2	3	4	5	6	7	8	9	10	11	12	13

Describe features used in identification; circumstances and effects of deterrents; particulars of entrapment or entanglement; types and extent of injuries; etc.

Date (MO/DAY)	Haul, delivery, or set number	Marine mammal species code	Haul sampled for fish (Y/N)?	Did you observe the MM (Y/N)?	Sex? (M/F)	Lengths						Tooth collected (Y/N)?	Photo taken (Y/N)?							
						Curvilinear (cm)			Standard (cm)											
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	

Remarks

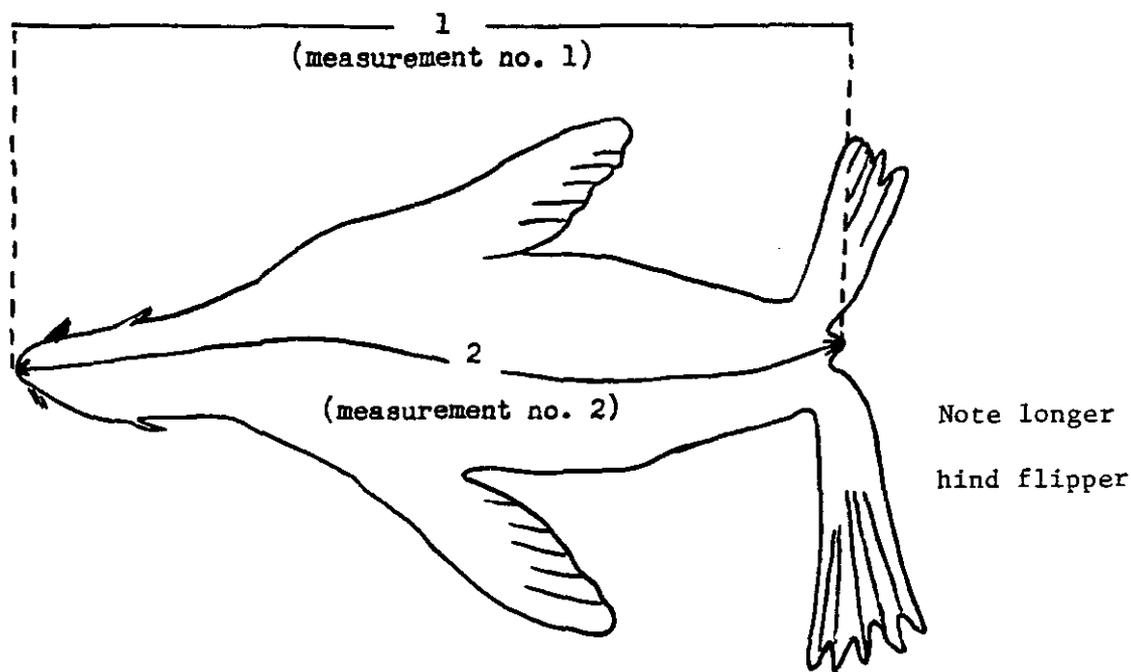
14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	

Remarks

14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	

Remarks

LENGTH MEASUREMENTS OF SEALS AND SEA LIONS

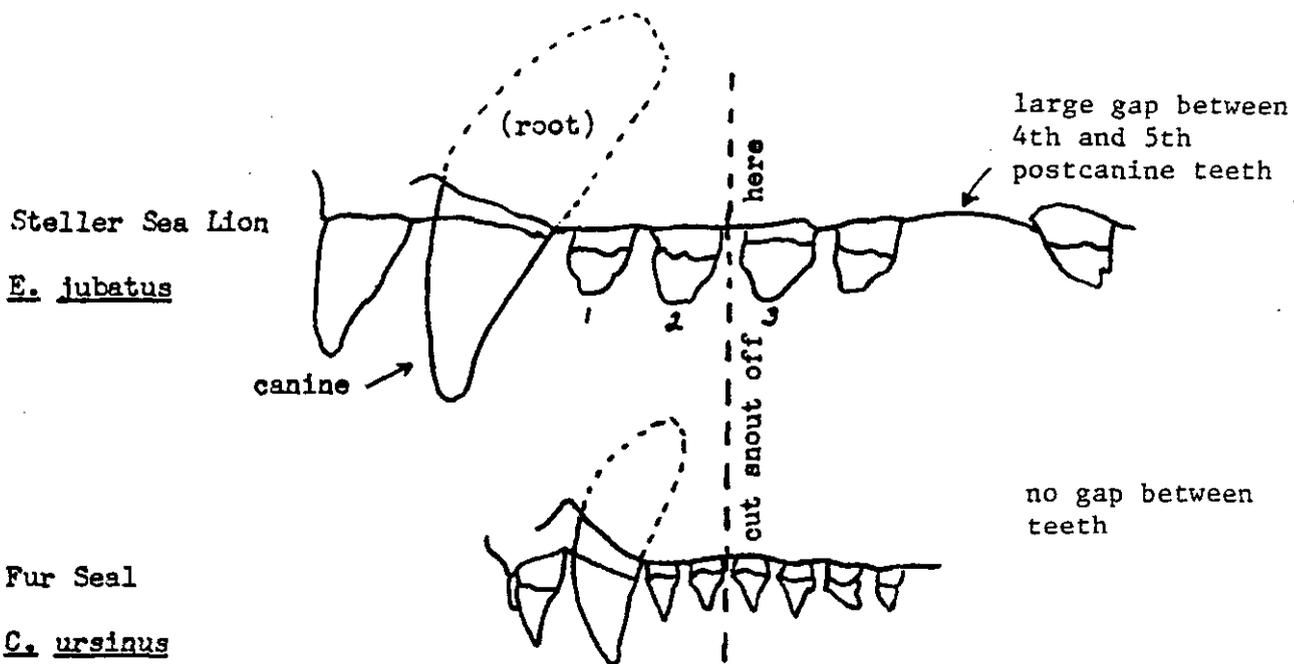


Upper half of diagram is of Steller Sea Lion, lower half is Northern Fur Seal.

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.

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.

FORMS 11(A) and 11(B) - MARINE MAMMAL SIGHTING AND EFFORT FORMS

These forms are designed to gain information about marine mammals sighted other than those brought up in the fishing gear. 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, and record the information on the form.

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 on the form. Records of unidentified marine mammals tend to lend credence to those records that include identification. Please make a complete description with copious notes and illustrations as necessary, to fully describe any new species of marine mammal sighted. Records of species which are not fully documented and have not been previously encountered, will probably not be verifiable at a later date.

Instructions for filling out Marine Mammal Sighting Form II(A)

(* = Do not fill in boxes preceded by an asterisk except as noted.)

1. NAME: In the upper left hand corner of the form, write the observer's and vessel's names.
2. DATE (7-12): Note proper sequence (yr./mo./day)

TIME (13-16): Time of sighting is logged when the animal is first seen. All times are logged in GMT.
3. LATITUDE (18-23): To tenths of minutes, if possible.
4. LONGITUDE (24-30): To tenths of minutes, if possible. Place E or W in box 30, depending on which side of the 180th meridian the sighting occurs.
5. SPECIES: Write in both the common and scientific name of the animals. Do not enter a species name unless you are absolutely positive. If you are the least bit unsure of the animal's identity, enter as "unident. large whale", "unident. porpoise", etc. Remember that an erroneous identification is worse than none at all. If more than one species are sighted at the same time, note the association (if any) in the comments section and fill out a separate sighting form for each species.

Important things to look for and make notes on when attempting to make an identification are: (Make notes under "17. Comments" and circle the characteristics on back of the Sighting Form)

- A. Shape and size of dorsal fin and its position on the body. If possible, also note size and shape of tail and flippers.
- B. Length. Size is difficult to estimate at sea, so if it is convenient, compare unfamiliar animals with a species with which you are familiar. For example--"about size of female Stellar sea lion" or "slightly smaller than adult male killer whale."
- C. General shape of body (slender or robust).
- D. Shape and size of snout. Is it long or short (estimated length in inches)? Is there a definite break between snout and forehead? Is the forehead markedly bulbous?
- E. Color pattern on fins and body (stripes, spots, patches, mottling).
- F. Shape, location, and direction of spout. Is it single or double? Where is spout located on head? Does it lean forward or go straight up?
- G. Scars and scratch marks

6. NUMBER SIGHTED (37-40): If unable to count the animals, estimate the number seen in terms of a range (e.g., 250 + or - 50). For Dall's porpoise, note if you see more roostertails than the actual number of animals that come to the boat. (There is evidence that schools may split up.)

7. BEHAVIOR: Record primary behavior observed. For example, the most frequently observed behaviors are as follows:
 - No specific behavior other than in the water
 - Following vessel
 - Bow riding
 - Porpoising
 - Attracted by fish nets
 - Feeding
 - Avoidance
 - Nonspecific contact/play
 - Roostertailing
 - Slow-rolling
 - Riding stern wake
 - Milling
 - Approach vessel-veer away
 - Slow roll-roostertail-slow roll

(Additional notes on behavior can be made in the comments section.)

8. ANGLE FROM BOW (47-48): Consider the ship a 360 degree circle when recording sighting angle; dead ahead being 000 degrees and dead astern being 180 degrees.

9. INITIAL SIGHTING DISTANCE: Note it in nautical miles, yards, or meters, whichever you are most comfortable with. Convert to 10's of meters and place in boxes 50-52. Remember that boxes 47-52 are right justified (e.g., 100 meters = 10 in boxes 51-52).

10. VISIBILITY: Note in miles, if good weather, or in meters, if poor (e.g., fog).

11. WAVE HEIGHT: Record wave height in meters.

12. VIS CODE: Do not fill in (note asterisk).

13. WEATHER: Rain, fog, blue skies, overcast, etc. Also note wind strength.

14. SURFACE WATER TEMPERATURE (54-56): In degrees Centigrade. If below freezing, place a "-" in box 54. Temperature is placed in boxes 55-56.

15. PLATFORM CODE: Do not fill in (note asterisk).

16. TIME ZONE: Do not bother to fill this in (note asterisk).

17. **IDENTIFICATION:** This section is one of the most important parts of the observation. **Remember, if you identify the animal, say how you did it**, (e.g., Sperm whale - 35 ft., large square head, no snout, spout at end of head and leaning forward).

Everything that you observed about the animal and used to identify it should be entered. Be liberal with sketches! Use as much room as you need to get everything down (the back of the sheet, if necessary). In addition to details of the animal's appearance, note:

1. Kinds and numbers of other associated animals (fish, birds, squid, mammals, etc.) and their behavior.
2. Anything else you think might be of interest.

BEHAVIOR COMMENTS: Be generous with narrative of animal behavior. If there are several animals, are they in a tight school, a loose school, or scattered either singly or in small groups? Do the animals approach the vessel and ride the bow wave? Note their diving behavior. How many times do they blow when they come to the surface? Do they raise their tail flukes when they dive after their last blow? How long do they stay down between each series of blows? Do they leave "tracks" or swirls on the surface when they are submerged? Do they jump (breach) clear of the water? If so, do they jump in a smooth arc or do they sometimes belly-flop, somersault, or spin?

Note how close the animal approached the vessel.

Were the marine mammals attracted to the ship by the net retrieval? Were they feeding off discarded fish and fish parts? Are these mammals possibly the same ones that you have previously reported seeing?

FOREIGN FISHING OBSERVER
MARINE MAMMAL SIGHTING FORM

* DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK

CRUISE NO. _____

VESSEL CODE _____

1. OBSERVER NAME Charlie Tuna
VESSEL NAME American Boat

RECORD ID *

--	--	--	--	--	--

1 2 3 4 5 6

2. DATE (Yr./Mo./Day) & TIME (GMT) OF SIGHTING

YR	MO	DAY	TIME (GMT)			
8	9	10	1	1	0	3
7	8	9	10	11	12	13

3. LATITUDE (degrees/minutes/10ths)-N/S

DEGREES	MIN.	10ths	*	N
5	4	5	9	4
18	19	20	21	22

4. LONGITUDE (degrees/minutes/10ths)-E/W

DEGREES	MIN.	10ths	E/W
1	5	7	3
24	25	26	27

5. SPECIES Unidentified Balenoptera Balenoides sp.
Common name Scientific name

*

--	--

 TENTATIVE *

--

33 34 35

6. NUMBER SIGHTED 7 ± 2

C.I. *

--

			7
--	--	--	---

36 37 38 39 40

7. BEHAVIOR Appeared to be feeding; short shallow dives in a concentrated area *

--	--

45 46

8. ANGLE FROM BOW

	90	
--	----	--

47 48 49

9. INITIAL SIGHTING DISTANCE 2 statute miles

10's of meters

3	2	2
---	---	---

50 51 52

10. VISIBILITY 5 statute miles

11. WAVE HEIGHT (meters) 1.5 m

12. VIS CODE *

--

53

13. WEATHER Lt. Rain/Fog; Wind 10k @ 200°
(& WIND SPEED)

14. SURFACE WATER TEMP. (° C) ±

+

0	9
---	---

54 55 56

15. PLATFORM CODE *

1	9	9	4
---	---	---	---

57 58 59 60

16. TIME ZONE *

--

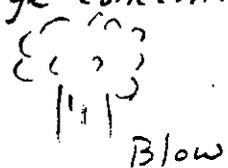
 *

	0
--	---

61 62 63

17. How did you identify animal(s)? Sketch and describe animal; associated organisms; behavior (include closest approach); comments.

Straight tall blows, very falcate dorsal fin. 7 ± 2 animals about 2 miles off starboard beam heading slowly away from ship. Observed blows followed by dorsal fin after blow disappeared. Chief Officer pointed out on fish finder, a large concentration of plankton in the area.



--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

To aid in your identification of whales and porpoises, circle the characteristics corresponding to the features you observed.

Body length (estimation):

< 10 feet

10-25 feet

25-50 feet

50-80 feet

Dorsal fin?

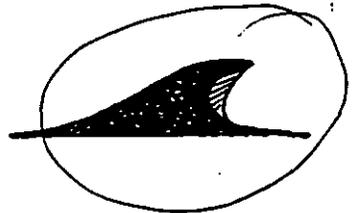
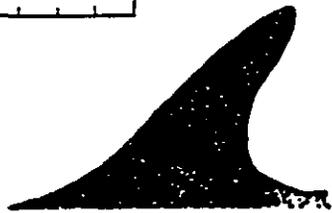
Yes

No

Shape of dorsal fin:

Porpoises/dolphins 0 2 feet

Whales 0 5 feet



Prominent blow?

Yes

No

Number of blows before a long dive:

N/A

1-3

4-7

8-15

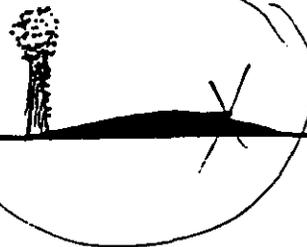
Length of dive:

≤ 2 minutes

5-7 minutes

10-20 minutes

Shape of blow:



Showed flukes upon dive?

Yes

No

Other behavior characteristics:

No specific behavior
Following vessel
Breaching
Stern riding

Bow riding
Slow rolling
Porpoising
Other

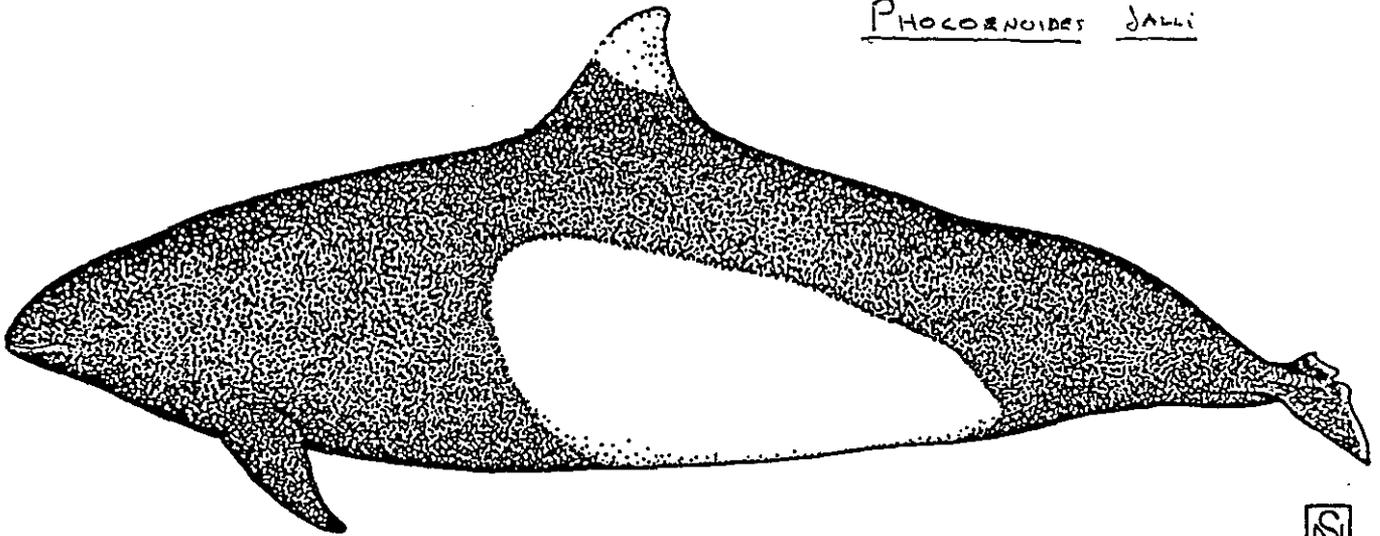
Feeding?

Distinctive markings (scarring; white patches, etc.):

None observed

DALL'S PORPOISE

PHOCOENOIDES DALLI



LENGTH To 2.2 m. Newborns are approximately 1 m long.

BODY SHAPE Extremely robust body with tiny head and small flukes and flippers. The tail stock has a pronounced keel, exaggerated in adult males.

DORSAL FIN Variable in shape, basically low and triangular with a long base. Usually bicolored, dark on lower forward half and white on upper trailing half.

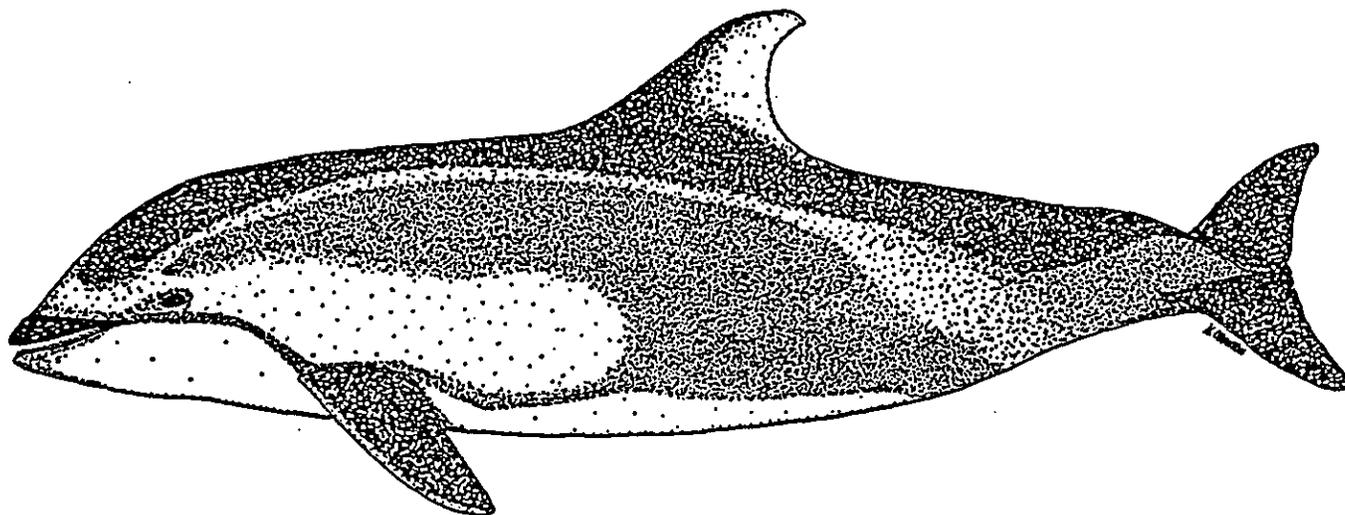
SNOUT/BEAK Forehead slopes steeply to a short poorly defined beak.

COLOR PATTERN Striking black and white pattern is very distinctive. Shiny black body with a large, conspicuous oval white patch at each side. White flank patch begins below dorsal fin in the dalli color type (pictured here), but extends anteriorly to the head in the truei color pattern. Some all black individuals have also been observed.

BEHAVIOR Small bands, usually with only 2-20. Sometimes seen with Pacific white-sided dolphins. Exhibit the distinctive "roostertail" -like splash when surfacing. Almost never porpoises.

PACIFIC WHITE-SIDED DOLPHIN

Lagenorhynchus obliquidens



LENGTH To at least 2.3 m. Length at birth is 80-95 cm.

BODY SHAPE Chunky, not as robust as Dall's porpoise but heavier-set than striped or common dolphins.

DORSAL FIN tall and strongly recurved, long base, located at mid-back. Dorsal fin has a dark leading edge, the latter 2/3 being white; gives the appearance of a "hook-fin".

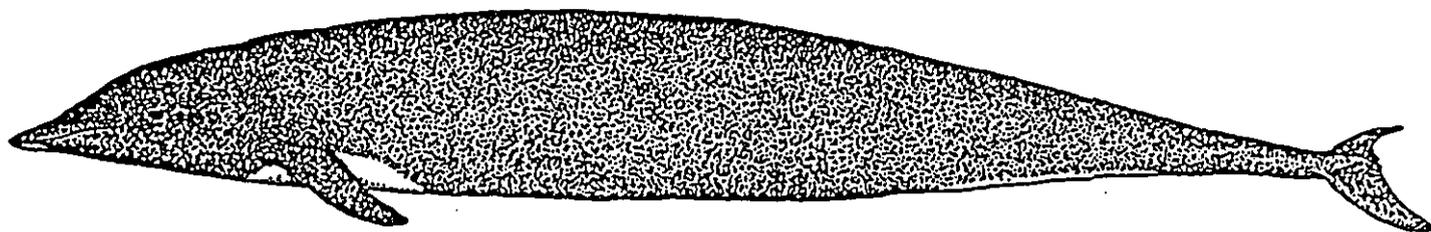
SNOUT/BEAK Head tapers continuously and smoothly, dolphin has only a very abbreviated beak.

COLOR PATTERN Complex. Black back, light gray sides, and white belly. The black back is interrupted on each side of the dorsal fin by a light gray stripe beginning at forehead, curving up and over the head and back, then widening and curving down to the anal area. These stripes are known as "suspenders". The color pattern is highly variable.

BEHAVIOR extremely gregarious, occurring in herds up to several thousand. Groups of less than 200 are more common. A temperate water species.

NORTHERN RIGHT WHALE DOLPHIN

LISSODELPHIS BORRHALIS



LENGTH Maximum length of adult males is 3.0 m, females to 2.3 m. At birth from 80-100 cm.

BODY SHAPE Long and slender, tapered anteriorly and posteriorly. The extremely narrow tail stock has no keel.

DORSAL FIN None--the only small cetacean in the North Pacific without a dorsal fin.

SNOUT/BEAK Virtually no forehead or chin. Short beak is very indistinctly set off by a faint area above the mouth. Has a white tip on the end of the lower jaw.

COLOR PATTERN Body is all black on back and sides; variable white pattern ventrally. This white extends from the tail to the head, with a widening in the thoracic area. Calves are much lighter, cream to light gray.

BEHAVIOR Gregarious--seen in herds of more than 100 animals. Often mixes with Pacific white-sided dolphins. Not usually found in waters warmer than 19°C.

GENERAL DIRECTIONS FOR OBSERVERS ON LONGLINERS

Longline boats may be the "catcher only" type that ice and deliver their fish to a shoreside plant or to a mothership for processing, or they may be catcher/processors. "Heading and gutting, **without freezing or additional preparation**, is not considered to be processing for purposes of reporting to NMFS. If your operation only heads, guts, or ices fish, or cools fish in a recirculation seawater system, NMFS does not consider your operation to be processing." If your vessel is not "processing," follow the report week instructions (in the catch message section) for catcher boats, i.e. all hauls are attributed to the week in which the **delivery** of catch is completed.

Longliners catch fish using a line with baited hooks attached to it (refer to the gear diagram). Hooks are each attached to the longline by a length of light line called "gangen." The "long line" is usually maintained aboard in sections coiled onto "skates", into tubs or onto a rack and called "magazines". During retrieval of the line, the end of one skate, magazine, or half magazine and the start of the next may be flagged by a line marker or a weight attached to the line. A longline is put out to fish or "set" from the stern of the vessel. Each end of the longline is anchored and marked with bouys. The set is then left to soak for a couple hours while the fishermen go to set or retrieve another line. Later the vessel returns and starts retrieval of the line over a roller onto the weather deck or into a cutout in the starboard side of the vessel called the "pit". On a longliner, the fish are removed from the hooks one at a time as line is retrieved and are immediately processed or put into the tanks. Longline fishing is labor-intensive but it produces a very high quality product. There are typically three sets made and retrieved each day, and the target groundfish species are sablefish (also called black cod), Pacific cod, or Greenland turbot. Halibut are primarily fished with longline gear also but as they are managed separately from groundfish species, observer coverage is not required during halibut season openings.

CATCH RATE ESTIMATES

The skipper's catch weight estimates are always based on line counts and production data. There are no deck or bin estimates of catch weight. Longliner catches are logged by set, and all sets are attributed to the day that the retrieval of that set was completed. Just as for trawlers, the only time a noon position is recorded on form 1US is on a non-fishing day. (Refer to Form 1US of a following page.) Observers on longliners should be able to estimate the total catch of each sampled longline set using the following proportion:

$$\text{Estimated catch weight} = \text{weight sampled} \times \frac{\text{Hooks retrieved}}{\text{Hooks sampled}}$$

(for that set)

Since part of the observer's catch estimate is dependent upon the number of hooks, observers should try to periodically verify their number. Some methods for determining this are as follows:

1. Obtaining hook count from the automatic baiter.
2. Actual count of hooks on several skates (or units of gear) and tallying skates during retrieval.
3. Overall timing of the setting of skate with a calculation of the average number of seconds to set one skate.
4. A conversion of miles of gear set to skate using the video course plotter.

If some sections of line or some pots 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 this lost gear in the total catch estimation.

INSTRUCTIONS FOR FILLING OUT DOMESTIC LONGLINE AND POT VESSEL FORMS

Form 1US - Catch Summary

This form is used to collect the fishing effort and total catch data for either longline or pot/trap vessels. Most of the form is filled out by observers on both longline or pot vessels, but there is a part of the form that is specific for each type of vessel. Points to note :

1. Collect Form 1US data for the entire period you are aboard. Make certain that you have all of the sets recorded for the days you begin and end sampling.
2. The identifying cruise number and vessel code will be assigned after you return and will be different for each vessel you are on. Keep the data for each cruise separate.
3. Place a check mark in the far left column to indicate which sets of longline or strings (sets) of pots you sampled.
4. A given set number should be used only once - no duplicates. The set numbers must be in numerical sequence (like haul numbers). Make sure that the set numbers do not exceed 3 digits. All sets must be recorded unless there was a gear malfunction resulting in a zero catch. A set number must be assigned to every set. If you reach set number 999, the next set should be "1", not "0." Set number "0" means that the vessel did not finish retrieving any set that day.
5. Enter the gear type:

6 - pot or trap vessel
8 - longline vessel
6. Enter the gear performance code:

- 1 - no problem
- 6 - gear conflict (groundline cut)
- 7 - considerable predation of catch by sea lions
- 8 - considerable predation of catch by killer whales (orca)

7. Enter the processing mode: (Indicates where the utilized fish from that set are processed)
- 1 -Most of the processing is done on board the catcher vessel (a catcher/processor). The products are placed in a freezer hold and the trip usually lasts more than a few days.
 - 2 -The catch is delivered to a mothership at sea for processing.
 - 3 -Utilized catch is delivered to a shore-based processing plant. The trip usually lasts no more than 3 to 4 days and in the meantime the catch is kept on ice.
8. For the location code, enter R if the location in columns 25-33 is the location that the last of the set was retrieved or N if it is a noon position on a nonfishing day.
9. 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 vessel in columns 24 - 32 and enter 0 in the set number column. In columns 33 - 74, comment on the reason there was no fishing. All days at sea must be accounted for in this manner.
10. The location entered should be the latitude and longitude of the ship at the time the retrieval of the set was completed. This position determines the designated area of the set. Make sure that all positions are reasonable, i.e. 58-63' does not exist; double check positions that indicate large movements if you have not been aware of any. The first digit of longitude (1) is understood, so record only the following digits. Each longline or set of pots must have a position. On days in which no retrieval of a set is completed, record noon position in these columns.
11. Enter the soak time of the set - 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. The elapsed time should be entered in hours and minutes; the two digit hour designation (use leading zeros as necessary), should be entered in columns 33 and 34 to the left of the dashed line, and the minutes (use leading zeros again as necessary) should be entered in columns 35 and 36 to the right of the dashed line. For example, a soak time of 38 hours and 5 minutes would be entered as 38|05.
12. A set is assigned to a day according to the time the retrieval of the set is completed, which is not necessarily the same day that the set was begun to be laid or the day that you sample. Sets whose retrieval is completed before 0000 hours are attributed to the

previous day, and sets whose retrieval is completed on or after 0000 hours are assigned to the next day.

13. The average bottom depth (cols 37 - 40) can be recorded in either fathoms (more likely) or meters, depending on the depth recording instruments that the vessel has, and in some cases, what units they are set at. Make sure that you indicate the units (fathoms or meters) with an "F" or an "M" in column 41 for every depth that you record.

14. Longline vessels only:

The number of skates (columns 42-44) should represent the number of units of longline that are retrieved from the set, not necessarily the number that are set. If possible, however, keep track of the number of skates that are lost and include that in your daily log and final report.

The skate length (columns 45-48) should represent the length of groundline that the average skate consists of. The length should be recorded in fathoms, not feet or meters, so convert the length to the proper units, if necessary (see Table of Equivalents). If the set consists of skates of different lengths, record the mean length (proportional average).

The average number of hooks per skate should be recorded in columns 49-52. This number usually remains constant throughout the cruise. Sometimes a line consists of alternating skates with different numbers of hooks - find out what the pattern is and note this in your final report.

15. Pot/trap vessels only:

Record the number of pot/traps retrieved per set or string in columns 53-55. If pots are lost, then this will not be the same number as was set. If possible, keep track of the number of pots that are lost and include that in your daily log and final report.

Record the total length of the groundline of the set in columns 56-59. This length should be recorded in fathoms, not feet or meters, so convert the length to the proper units, if necessary (see Table of Equivalents).

16. Retained catch: this is the amount of catch (in metric tons, not pounds or short tons--see Table of Equivalents) that is retained aboard the ship. On catcher processors, generally the retained catch is just the round weight of the fish that are actually utilized for products. The retained catch may thus be the ship's estimates of the products (converted to round weight using product recovery figures and from pounds to metric tons).

On vessels that deliver catch to shoreside processing plants, there may be some discard of prohibited species, small fish, and nonutilized species at sea, but the main discard of fish may occur at the processing plant. Your job will be to estimate the amount that is actually discarded at sea and hence, by subtraction, the amount that is delivered to the

processing plant, not what is eventually retained by the processing plant. On longline vessels, probably only the utilizable species and sizes are being retained. If discard is occurring at sea, the best way to determine how much, may be to estimate the amount of utilizable species in the set using the observer sampling data for the set or the day, and a rough estimate of the amount of the undersized target species that were discarded.

Use your judgement as to how to obtain the most accurate data--this figure should always be filled in, even for nonsampled sets, and must be recorded to two decimal places. Give a complete description in your report of how these figures were obtained.

17. Official total catch (mt.): this will be the official catch weight for the set, and should be used in all calculations involving set weight on Forms 3US and radio message worksheets. This should be the best estimate of total catch (all species included), and in most cases it should be based on the ship's estimate of retained catch (round weight), adjusted for the nonutilized species (using the observer's sample data). To adjust sets for which you do not have sampling data, calculate an adjustment factor for the day (see example below) and multiply the retained catch for that set times the adjustment factor for that day. If you observed the set but did not sample it, and feel that the adjustment factor for that day would not give an accurate estimate of the total catch, then use your judgement as to how to obtain the best estimate of total catch. If the vessel officers can provide good estimates of total catch (all species included), then convert these estimates from pounds to metric tons and use them as the official catch weight. This figure must always be filled in (record it to two decimal places). Note at the top of the form the origin of the official total catch estimate. (The first sheet is sufficient unless it changes.) Give a complete description in your report of how these figures were obtained.

(see form 2US notes for directions for adjusting a sampled set)

sum of adjusted ship's estimates for the sampled sets for the day		=	adjustment factor for the day
sum of the retained catch estimates for the sampled sets for the day			

adjustment factor for the day	x	retained catch est. for a nonsampled set	=	adjusted ship est. for that set
-------------------------------------	---	--	---	------------------------------------

18. Observer's estimate: record your estimate of the sets that you sample. This will be an extrapolation of your sampling data for the skates/pots that you sampled to the total number of skates/pots in the set. (See your sampling manual for a more detailed description of the extrapolation.) Record it to two decimal places.
19. Enter the 6-digit ADF&G statistical area that the end position of set (cols 24-32) places

each set in. Refer to the special supplement on the ADF&G statistical areas for your determination of the correct area.

20. Leading zeros should be in the dates (cols 12 & 14) and the soak time (cols 33-35) only, as needed.
21. Skip a line after each day.
22. Any notes, or comments (other than notes for nonfishing days) should be placed in a part of the form that is not keypunched.

OBTAINING SPECIES COMPOSITION ON LONGLINERS

Unlike the situation on a 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. Observers have noted "patchiness" of fish on a longline set. The change in species composition in different portions of the set makes it important to get samples that are representative of the entire set. Try to get as large a sample size as possible, that is, sample large portions of the longline set.

The large size of the target fish makes basket sampling impractical since the sample baskets would fill up quickly and contain few fish. Tally sampling is the most practical method for observers on longliners. 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, tally 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. Note also how many units of gear were retrieved during the sampling period using a thumb counter or tally marks on a plastic sheet.

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. As close as possible to your sampling period, gather several baskets of the species that you tallied, making sure that you get every fish in your 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.

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. Be aware that the back-up gaffer has a long gaff pole and can jab you in the face with the upper end of it when he pulls in a fish if you're not careful. Wherever you choose to stand, 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 the following easier sampling method. Simply place all of the catch in your sample baskets until they are filled. Note how many hooks it takes to fill the baskets. Take as many basket samples as possible to increase the sample weight. Weigh and count the species groups.

FORM 3US - SPECIES COMPOSITION FOR LONGLINE OR POT VESSELS

This form is very similar to the 3US form for trawlers - only some of the labels for the sampling type and column headings are different. In fact, if you do run out of longline/pot forms, you can substitute the trawler forms (and vice-versa), so long as you realize what ought to be recorded in the columns. At this time I will not reiterate column by column what should be recorded on this form, but will simply indicate the features that make this different from the U.S. trawler forms.

1. Column 23: note the sampling type code. Use an "L" for longline and a "T" for trap/pot vessel. Do not use "P" for pot, because P is already reserved for "partial whole-haul sample." Use a "V" if you are sampling the set only for viability (in which case, use a separate sheet). In most cases you will be recording the viability data for the same set (though possibly a different portion of the same set) and you will be able to use the same form.
2. Columns 41-51: Number of hooks or pots sampled: use the same sample size (number of hooks or pots sampled) for all of the species. If you sample multiples of whole skates, all you need to do to obtain the number of hooks sampled is to multiply the number of skates sampled times the average number of hooks per skate. With pot vessels, you will probably sample a *random number of pots and record everything that was in those pots*. If you do run into a large number of small individuals of a given species, the form does allow you to sample a smaller random sample of pots for those species, and a larger number of pots for the larger, rarer species. If you do use different numbers of pots to sample different species, remember to take this into account when you do your extrapolation for your catch messages.
3. A reminder: just as for the trawler form, it is necessary to indicate the sample size for halibut, salmon, king crab, and Tanner crab, even if you do not see individuals of those species in your samples. If no individuals of a given species group were observed, then the observer should enter that *group name, species code (use codes 2, 3, 101, 220), sample type, number of hooks or pots monitored for that species group, 0 for the number, and 0.0 for the weight*. Use the checkoff boxes above the viability column to *remind yourself to record those groups not seen*.

LENGTH FREQUENCY AND AGE STRUCTURE SAMPLING

The workload of taking lengths of approximately 150 of your sampling species each day may be too difficult on a longline vessel if, 1) the fish are processed immediately upon landing, 2) slitting the belly to sex the fish would destroy the product, and/or 3) the fish are large and therefore more work to handle. You may find it necessary to reduce the number of length measurements taken each day. Sexed lengths are much more useful to us and so these are preferred but if this is proving too difficult, try to sex some of the fish being measured (random subsample) and take unsexed length measurements of the rest. If this is too difficult, unsexed lengths are better than no length data - do what you can. Age structure collecting is a lower priority than length frequency measurements and so here again, do what you can. Remember

that good composition data and biological data on the prohibited species found in your samples takes precedence over length measurements and special projects. For forms 7US and 9US, refer to the instructions included with the trawler forms.

WEEKLY CATCH MESSAGES

Longline and pot vessel observers must extrapolate sample data to the set and sets sampled up to all set retrievals completed that day (by area) just as trawler observers do. Longline observers should use the RM, RM-1, and RM-3 worksheet forms as do observers on the other vessel types. On the RM-1 worksheet there is a note to longline and mothership observers. Please disregard those instructions.

On the RM worksheet, column A is the set weight in metric tons. The official total catch is often the observer's estimate, calculated as shown in the Catch Estimate section above. As longline data is the equivalent of the "basket sampling" sample type on a trawler and there is only one sample type, there will only be a single line of entry per set on the RM forms. Column B on RM will be the sum of the species weights from the form 3US keypunch check line at the top of columns 30 -40. On the RM worksheets, the sum of the column C's should equal the column B entry and the sum of the column D extrapolations should be close to the column A entry. Check your work! If all sets were sampled in a day, the only reason to fill out the RM-1 worksheet is to summarize that day with other days whose sets were not all sampled.

SAMPLING AND DATA RECORDING INSTRUCTIONS FOR SHORESIDE PROCESSING PLANTS

As a result of the implementation of amendments to the Fishery Management Plans for the Groundfish Fishery of the Gulf of Alaska and Bering Sea and Aleutian Islands Area, managers of shoreside facilities that annually receive 10,000 mt or more of groundfish are required to have an observer at the facility each day it receives groundfish. Also, managers of shoreside facilities that annually receive between 1,000 mt and 10,000 mt of groundfish must have an observer present at the facility for 30 percent of the days it receives groundfish for each 3-month quarter of the fishing year. Some of these plants may also receive deliveries of crab, halibut or salmon. Observers are only to work on deliveries of groundfish. Individual observer assignments will vary; some observers may be stationed at only one 100% coverage plant, others may be expected to cover one 100% coverage plant and one or two 30% coverage plants, while others may cover two 100% coverage plants that are owned by the same company and are in close proximity to each other.

SAMPLING WORKLOAD

Collecting Delivery Information: The Form A Port Sample Summary Form corresponds to the Haul Form 2US or the Set Form 1US. Information must be gathered and recorded for all groundfish deliveries to a plant whether or not those deliveries were sampled by the observer. The Skipper Interview Form is a worksheet for the port sampler to work from when going to the boat to collect data from the skipper, observer aboard or the vessel logs. The Skipper Interview form is optional and does not need to be turned in.

Prohibited Species Sampling: As often as is possible and practicable. This is a high priority, but you must be able to sample the entire delivery and the delivery must be from a vessel where the catch has been sampled by an onboard observer.

Length Frequencies: For 100% coverage plants--150-200/day; for 30% coverage plants--150-200/day on days that you work at the plant (you'll be working at this plant approximately 30% of the time). You may sample deliveries that come from vessels that do not have observers onboard.

Age Structures: For 100% coverage plants--200-300/plant/mo; for 30% coverage plants--300/plant/3 mo. period. You may sample deliveries that come from vessels that do not have observers onboard.

Product Recovery Rates: Collect product recovery rate information (PRR) for major products on a time available basis. This is not a high priority duty but the information is of value.

Density Determinations: Collect density information for the most common species and species mixes. Accurate density measurements can be acquired at shoreside plants much easier than onboard ship. Large, uniform-sized fish totes can be used and accurate weights can be achieved with little trouble. There is no data form for this information at this time. Record information on an eyeball estimate of species composition, the sample weights and volumes in your logbook. (If density samples of are taken from deliveries of observed vessels, the vessel observers

composition could be accessed and a comparison of at-sea versus plant density values could be made). This is not a high priority duty but there is a great need for information of this kind.

Special Projects: Observers are sometimes asked to collect special biological information such as pollock maturity or stomach samples. If you are assigned a special project, follow the directions that will be provided.

FORM A - PORT SAMPLE SUMMARY FORM

Keep the data for each plant separate. Instructions for filling out Form A are given below. Follow the instructions in the manual for forms 7US and 9US. Remember that you will not be doing any species composition sampling at shoreside processing plants.

1. Maintain a separate set of Form A's for each plant. At the top of each set of forms, enter your name and the name of the processing plant. You should make an entry for every delivery made to the plant, whether or not it was sampled.
2. Port sampler no. (col. 3-5) and Processing plant code (col. 6-9): These columns will be filled out upon your return to Seattle, so leave them blank. On Forms 3US, 7US and 9US the Port sampler no. will substitute for the "Cruise no." and the Processing plant code will substitute for the "Vessel Code".
3. Year (col. 13-14): Enter the last two digits of the year.
4. Place a check mark in the far left column to indicate which deliveries you sampled. (Remember, you must enter data for all deliveries, not just the ones that you were able to sample.) Also place a check in the column labeled "Observer Onboard", if the delivered catch has been sampled by an onboard observer. This will enable staff at NMFS to easily know if the delivery had been previously sampled at sea.
5. Delivery no. (col. 10-12): Enter the delivery number which applies to the catch being delivered to the plant. Delivery numbers for each plant should be sequential and there cannot be any duplicate numbers within each port sampler/processing plant set of forms. Much of the delivery information can be obtained from the NMFS processing plant logs, NMFS ship logs, or through a skipper interview or interview with processing plant personnel. It is especially important to enter on this form every delivery that you sampled. On Forms 7US and 9US this number will substitute for the "Set/haul no." As with haul numbering on form 2US, you may use the delivery numbering system that is already being used by the processing plant as long as it meets the criteria stated above. This will probably be less confusing for you. However, if you choose, you may set up your own numbering system.

6. Delivery date (col.15-18): Enter the local date (not GMT date) that the catch was delivered to the processing plant. This should coincide with the date that is used in the NMFS processing plant logs and on the ADF&G fish ticket. If the catch is delivered over a period of two or more days, use the date that is on the processing plant logs. This will not necessarily be the date that you sampled the catch. You should use this same date (again, in some cases not the sampling date) on the Forms 3US, 7US and 9US.

7. Gear type (col. 19-20): Enter the appropriate code.

- 1 = bottom trawl
- 2 = midwater trawl
- 3 = unknown or mixed trawl haul
- 6 = pot or trap gear
- 8 = longline gear

If you are unsure of the gear type, take notes, leave this column blank for the time being, and discuss it with NMFS staff.

8. NMFS area code: This is the 3-digit code for the area in which the vessel fished (refer to the map in the radio message section of the manual). If the vessel fished in two or more areas for the catch delivered, record the area in which most of the fish was caught, but enter an *, and note on the back of Form A.

9. ADF&G statistical area: Refer to the maps supplied during training, giving the statistical area, using the more detailed map whenever possible, and record the 6-digit statistical area code for the area in which most of the fish were caught. (If you get this information through an interview with the skipper, it is best to take along copies of these maps when you interview the skipper, and have him point out the area or draw the area on the map so that there is no mistake.) If the vessel fished in two or more areas for the catch delivered, record the area in which most of the fish was caught, but enter an *, and note on the back of Form A all of the areas in which the catch was caught. If the skipper is reluctant to give you this detailed information, try to at least get the NMFS area.

10. No. of tows: record the number of tows that were made during the trip. If the vessel is a longliner or a pot vessel, record the number of sets. This information can be obtained from the NMFS ship logs.

11. Average duration: record the average duration of the tows in minutes. Get the actual length of each haul from the NMFS logbook, add up the durations and divide by the number of hauls to get the average duration. You can go up to 9999 minutes for the average length of soak for a longline or pot set.

12. Total weight delivered (lbs or mt): Record the total weight of the catch delivered to the processing plant for that trip. This can be taken from the NMFS processing plant logs. (See note below regarding how to handle cases in which a vessel delivers catch

from a single trip to several different processing plants.) In most cases, this should be the same as the sum of the groups reported on the ADF&G fish ticket, but make sure that this includes all of the discards from the plant.

14. **Sample species code:** This is the three-digit code number for the species of fish referred to on the rest of this row. If you sampled this delivery, you must be sure to record the information on the species that you sampled, and in most cases, you will want to record on additional rows the other major species that were delivered. (Refer to the species code list in the reference section of your manual--use the NMFS species codes and not the ADF&G species codes.)
15. **Sorted? (Y or N):** this question refers to whether or not any of the individuals of the species in columns 43-45 were sorted out of the catch and discarded at sea. Fishermen might discard undersized individuals, or fish of a given sex. It is important to know this, because this might affect the length frequency data. This does not refer to any sorting and discarding of other species, such as prohibited species or some other unwanted species.
16. **Sample species discarded at sea:** if the species in question was sorted for size or sex (as indicated with a Y for "Yes" in no. 15, or if some of the catch was dumped because the holds were already full, the fish were too old, or for some other reason, indicate the approximate amount in pounds that was discarded at sea. This information should be in the NMFS processing plant and ship logs.
17. **Main product:** the code for the main product that is made by the plant from the species in question. If the plant is making surimi out of pollock and also taking roe from mature female pollock, list the main product as surimi. (Refer to the "List of Alaska Product Types" in the appendix of the manual.)
18. **Abbreviation of delivering vessel:** There are 15 columns available for the vessel name. In most cases you will be able to write down the full name in the spaces provided--if not, choose an appropriate abbreviation. If you must abbreviate, make the abbreviated name as close to the original as possible. Do not use periods and count the space between words as one of the 15 columns. Check the list of joint venture catcher boats to see if NMFS already has an abbreviation.

What to do when vessels deliver to more than one plant: If you discover that a vessel is delivering fish caught in one trip to more than one plant, you should enter Form A information on only one set of Form A's, preferably the Form A's for the plant where most of the catch was delivered. Note on the back of Form A, or on an attached sheet, the amounts of fish delivered to each plant, but enter on the Form A the total amount delivered to all of the plants, the total amount of sample species delivered to all of the plants, and the total number of tows made during the trip. You may sample the catch from more than one of the deliveries (in fact, it might be a good idea, because you would be apt to sample catch from different parts of the hold), but enter the data on the Form 7's and 9's corresponding to the entry you made on the Form A. Note what you did on a non-keypunched portion of the forms. The two or more length frequency samples from the different plants may be kept as separate length

frequencies on the Form 7's--the computer can add them together if necessary, or they may be analyzed separately for variance. Make sure that you do not have any overlapping otolith numbers when you reassigned the otoliths to the same plant.

NMFS Skipper Interview Form:

The skipper interview form is a form you may chose to use in part or in whole, to help in collecting information needed to fill out the Form A. It might also be useful as a place to record anything unusual about the catch, the skipper's comments, more detailed information on the location of the hauls, and anything else that cannot be recorded on Form A. As the data needed for Form A has already been discussed, you should find the questions on the skipper interview form largely self-explanatory. A reminder: the questions referring to whether or not the catch was sorted, and if so, what percent was discarded, do not refer to a selective discard of prohibited species or some minor unwanted species--they refer to any size selection or sex selection of the main delivered species, although you may enter a more detailed explanation of exactly what was sorted and discarded at sea for clarification purposes.

Other Skipper Interview Notes:

Other useful information to collect during an interview might consist of information on schooling behavior of the target species, maturity of the fish, anything unusual about the hauls, or comments on areas in which he spent time searching for fish, whether or not anything was caught. If the vessel has a paper-recording fish finder, you might encourage the skipper to save the paper tape (labelled with haul # and depth) for some of the schools seen. Be sure and thank the skipper for any information that he provides, and explain its usefulness in determining the status of fishery stocks. (Note: Don't pursue this line of questioning if the skipper complains that the shipboard observer has already asked him for this information, or if you know for a fact that the shipboard observer has already collected this kind of information--use tact, diplomacy and common sense during any interview. Also, stress that all information collected will be held in strict confidentiality.)

Gear diagrams--if possible, get the skipper to fill out net diagrams for the nets used on vessels that do not have an onboard observer. There are two diagrams, one for midwater trawls (a Polish rope-wing trawl), and one for bottom trawls. Modify the diagrams as necessary to reflect what the nets are really like. If you can get only some of the information, try to at least get mesh size, especially codend mesh size. If the fisherman used two different nets on a trip, note that on the interview forms. The next time the vessel comes in there is no need to get another gear diagram, so long as the fisherman used the same nets as before--just confirm that fact.

NMFS SKIPPER INTERVIEW FORM

Port sampler no. _____ Processing plant code _____

Delivery no. _____ Delivery date _____

Date of interview _____ Time _____ AM PM

Vessel name _____

Person interviewed _____

Skipper? Yes, No, if not, position _____

Vessel length _____ tonnage _____ horsepower _____

Gear: midwater, bottom, mixed, other

Description of gear (refer to trawl diagrams) _____

NMFS area fished _____ ADF&G stat. areas fished _____

Average steaming time to/from grounds: _____ Searching time: _____

Number of tows: _____ Average haul duration (minutes): _____

Was catch sorted (size, sex, etc) prior to delivery? yes no

If sorted, what percent discarded? _____ %

<u>Species</u>	<u>Total wt. delivered</u>	<u>Amt. discarded at sea</u>
	lbs	lbs
	lbs	lbs
total all species:	lbs	lbs

Method used to determine total weight of target species:

Method used to determine total weight of fish delivered:

Was observer aboard this trip? No, Yes--NMFS, Yes--ADF&G

General comments (fishing success, fish size, school size, comparisons to previous years, etc):

SAMPLING INSTRUCTIONS

Prohibited Species Sampling:

An important emphasis is to be placed on prohibited species sampling. Your efforts at this time in the development of the domestic observer program will enable program managers to analyze whether the prohibited species sampling effort carried on at sea is sufficiently accurate.

Deliveries sampled for prohibited species must be from a catcher boat that has an observer on board. The observer on board the delivering vessel must have whole haul sampled all hauls making up the delivery, for prohibited species. The entire delivery must be delivered to a single plant and the port sampling observer must be able to sample the entire delivery for prohibited species. Thus, the shoreside observer should be mindful of the amount of time it will take to sample the entire delivery for prohibited species. It is essential that the observer monitor the entire delivery, since the purpose of the work is to determine the accuracy of the sampling methods employed at sea. Refer to the prohibited species tally forms for both port samplers and shoreside delivery boat observers following this section.

As an example, consider that the shipboard observer estimates that five salmon fell into the holds and were not sorted out before delivery, and the shoreside observer monitors half of a delivery and counts five salmon, should the shoreside observer conclude that he has accounted for the five salmon that the shipboard observer saw fall into the holds?, or should the shoreside observer extrapolate the salmon figures and assume that there are ten salmon in the entire delivery? It's the classic dilemma of sampling for the incidence of a species that occurs only very rarely in the catch--an observer must sample the entire catch. This example points out another area of concern. It is crucial that the shipboard observer record the number of prohibited species that were estimated in their sample (if there were any). Otherwise, (as in the example above) one could not tell whether the five salmon sorted out of the delivery by the shoreside observer have already been counted by the shipboard observer, or whether these five salmon were entirely missed by the shipboard observer, and the total salmon bycatch for that ship should be at least fifteen salmon. (Note: If the shipboard observer is estimating prohibited species that have been thrown overboard and dumped into the holds, then a distinction between the two should be made on the shipboard observer's form 3US.)

Observers should be cautioned against relying on plant personnel to sort, save and or count prohibited species for them. They should also not use the prohibited species figures that are recorded in the "Alaska Groundfish Daily Cumulative Production Logbook" for shoreside processing plants. These logs can be useful for comparison of figures, but they cannot be used as a substitute for an observers sampling effort.

Length Frequency Sampling:

Collect lengths from the major or target species that are being delivered to the plant. If more than one target species is being delivered to the plant you may collect length frequencies from more than one species, however, you must collect 150-200 lengths from each species that you collect lengths from on that day. It is important to strive for random, unbiased sampling;

therefore select fish from several samples spaced throughout the delivery. If you are sampling at a plant that requires 100% observer coverage, you should strive to collect 150-200 lengths per day. When you are sampling at a plant that requires 30% observer coverage, you should collect at least 150-200 lengths for each day that you work at that plant. Since, the plant only requires approximately one-third of the sampling effort, it will most likely be sampled only every third day or so.

Age Structure Collection:

Observers are asked to collect 200-300 age structures per plant per month, when working at a plant that requires 100% observer coverage. When sampling at plants that require only 30% observer coverage, the observer should collect 300 age structures per plant per three month period. Since most observers are hired for 2-3 months, they will be expected to complete one collection of about 300 age structures, for each plant requiring 30% observer coverage, during their tour of duty.

Age structure collections should be stratified/random collections (5 per cm. per sex) unless otherwise instructed. When you start a second collection at a plant (second month at a 100% coverage plant), continue the numbering of the vials from where you left off, because you can't have duplicate age structure numbers for the same port sampler/processing plant code.

The "roundfish" species of the highest priority for age structure collections are: Pollock, Pacific cod and all rockfish species including thornyheads (Sebastalobus spp.). The flatfish species of most importance are listed below in order of priority:

<u>Bering Sea</u>	<u>Gulf of Alaska</u>
Yellowfin sole	Rock sole
Rock sole	Flathead sole
Flathead sole	Rex sole
Alaska plaice	Dover sole

If you have collected lengths from more than one species in a month, do not split your age structure collection between the two species. Collections are of most value if they consist of about 200 age structures for any one species. If you begin an age structure collection and then find out that the species that you are collecting lengths and age structures from, is no longer going to be delivered, you have a decision to make concerning whether or not to keep the partially completed age structure collection. The rule of thumb to use in making this decision is: if the collection contains more than 50 age structures, go ahead and keep it, and use the remaining empty vials from that collection for another species; conversely, if the collection contains less than 50 age structures, dump it and use the entire collection of vials for a new species.

Product Recovery and Density Determinations:

Observers should follow the directions in the manual when determining product recovery rates. Use the form 8 and also use the form 8 worksheets. One difference in the directions

for the from 8 worksheet, is that each test should consist of three samples of 50 fish, regardless of size. Product recovery rate determinations should be gathered for the most common products that are being made and need not be attempted for surimi.

Density measurements can be taken whenever it is practical and should be tailored to measuring the density of common assemblage mix of species as well as single species such as pollock. Since there are large, easy to measure, fish totes and accurate scales, density data gathered by port samplers will eventually replace the need to sample for density values at sea.

WEEKLY MESSAGES

Messages from shoreside processing plant observers need not follow the same format as those from observers aboard domestic vessels. They can be self-designed, but must include brief explanations of the work accomplished that week. Messages should include the following (at a minimum) for each plant that the observer worked at during the week:

1. Number of deliveries (and total weight of deliveries).
2. Number of deliveries sampled (also number of deliveries sampled for prohibited species).
3. Total delivery weight by species group.
4. Number of prohibited species and weight of halibut (if prohibited species sampling was done).
5. Rough estimate of number of lengths taken, and age structures collected.
6. Report product recovery rate work and density determinations accomplished, as well as progress on other special project assignments.

DOMESTIC OBSERVER PLANT REPORT

Introduction: Describe the type of plant, it's location, targeted species utilized, dates worked at the plant, etc.

Description of the Plant: Discuss the aspects and operation of the plant. Be specific. Provide detailed information on delivery systems. Diagrams are most useful.

Gathering Form A Information: Describe how delivery weights, bycatch information, trawl data from the delivery vessels, etc. were obtained.

Sampling Procedures: How was prohibited species sampling accomplished. Include pertinent diagrams. Discuss how lengths, otoliths or special project data were obtained. Were any product recovery tests performed or was density information gathered? Where was your

sampling area and what was it like? What equipment or facilities were available to you that you found useful for your work?

Living Conditions: Describe in detail where you lived, roommates, bathroom facilities, galley food and anything important the next observer should know.

Interaction With Plant Personnel: List the management structure of the plant, who you had to deal with to do your work or gather information. Discuss any problems with plant workers. Discuss safety considerations, hazardous areas in and outside the plant.

Problems Encountered: Describe any problems associated with you and your work, and any other problem encountered while working there.

Comments/Conclusion: Discuss working relations with delivery vessel observers. Report any innovative plant designs or processing machinery. Discuss your feelings about working there and anything else the next observer should know.

TELEPHONE, RAPIDFAX, TELEX NUMBERS, ETC.

Alaska Fisheries Science Center (for sending or phoning catch messages; for between-trip debriefing or sampling questions) :

Telex: 329422 callback=NWASC-SEA
(backup telex in Bldg.#1 at NWAFC = 9104442786)

Rapidfax: (206) 526-4066

Phones: (persons answering will accept collect calls)

For catch messages - Becky Renko or, when she's not in, the message recorder -
(206) 526-4205 (You can leave up to a 5-minute message, but the recorder
won't accept collect calls).

Ron Erickson, Administrative assistant, (206) 526-4207

Angela Dougherty, debriefing (206) 526-4192

Bob Maier, Program manager, (206) 526-6695

Instructors (for sampling questions by phone) Karen Teig and Mike Brown, (206)
526-4191

Address: Janet Wall
Alaska Fisheries Science Center
7600 Sand Point Way NE
BIN C15700, Bldg. 4
Seattle, WA 98115-0070

Alaska Regional Office

Telex: 45377 callback = NMFS AKR JNU

Rapidfax: (907) 586-7131

Phone: (907) 586-7229 (Janet Smoker/Jessie Gharrett)

Address: Janet Smoker
National Marine Fisheries Service, FAK
P.O. Box 1668
Juneau, AK 99801

National Marine Fisheries Service, Kodiak Laboratory

(to store, or obtain access to stored gear)

Phone: (907) 487-4961 (-4962)

Address: P.O. Box 1638, Kodiak, AK 99615 (on Coast Guard base)

Alaska Department of Fish & Game (ADF&G)

ADF&G in Kodiak

phone: (907) 486-4791 (Leslie Watson)

address: 211 Mission Road, Kodiak AK 99615

ADF&G in Dutch Harbor (to obtain extra supplies from Foreign Fishery

Observer Program supplies)

Ken Griffin (907) 581-1239

Carolyn Griffin (907) 581-1529

GENERAL INSTRUCTIONS FOR WEEKLY CATCH MESSAGES

One of the primary tasks of the Observer Program is the estimation of the catch of groundfish and prohibited species throughout the year to insure that these catches remain within the quotas established by the management councils. In order that the observer's data may be utilized before returning from sea, a catch message is sent each week to the Alaska Fisheries Science Center summarizing the week's fishing activity. The first part of the message will give the estimated catch by species group (species composition data) for each area and gear type, the second part will provide data on the catch of prohibited species also by area and gear type, and the third section will provide fishing effort information and, for trawlers, a marine mammal catch report.

The report week is always SUNDAY through SATURDAY, Alaska Local Time and date regardless of the date the message is actually sent. Catch data is attributed to a report week according to the date of completion of the tow or delivery. (Refer to the next section on "Determination of Report Week of Catch for Catch Messages" for explanation.) The reporting areas to be used for catch messages are shown in the maps on the following pages. The catch report messages should be sent as soon as possible after the end of the report week. Catch messages are critical and must be sent on time. When asked to repeat a message, please do so immediately and do not wait until the end of the week.

When you are at sea for more than one week, prepare a catch message for transmission from the vessel and request that it be sent to NMFS in Seattle by telex or rapidfax. (See the letter of introduction for the different possibilities for transmission.) When preparing a message for fax transmission, use the catch message form and write your message in larger than normal, block, dark lettering. If your messages are not being sent or are not getting through to our office, ask whether they are getting communications through to their company office. If they can send messages to their office, have your weekly message sent there with a note to the addressee such as, "Unable to transmit message to NMFS directly. Please forward this message to: Janet Wall/ AKC/ Seattle WA/ Telex 329422 (Callback NWASC SEA)/ Fax (206)526-4066/ Phone (206)526-4195."

Failing this, it may be possible to phone in your weekly message via a ship-to-shore, collect, radio telephone call. Call our logistics office at (206) 526-4205. Whenever catch (or any other) information is being relayed by radio telephone, anyone can listen and it must be kept in mind that the conversation is public. As catch information must be kept confidential, be sure to use the alphabetic code for the area fished, report group code, and catch weights or numbers. Do not voice the species names with their catch tonnages. Using codes would also be appropriate if it is necessary to relay catch information for one vessel from another, subsequent vessel.

If your vessel is unable to transmit any messages, or you are aboard a vessel for a week or less, (as is commonly the case in shoreside delivery vessels), or you have just gotten off a vessel and have the last few day's data to send in, fax or phone in your catch message after you have returned to port. Keep a copy of all messages sent and received. You will be asked to transfer the weekly catch message information to the summary forms RM-2, RM-4 and RM-6 for verification purposes in debriefing.

Determination of Report Week of Catch for Catch Messages

The way in which an observer attributes catch to a particular week varies according to vessel type. Domestic processors group and report their catch in the NMFS daily cumulative production log based on the date the catch was made into product. We have attempted to approximate this by grouping the observer's catch data according to the date of completion of the tow or delivery. Below are the options for catcher boats, motherships, or catcher/processors. (This grouping is not used for the observer's 2US or 3US forms. On these forms the haul information is grouped by using the net retrieval time.)

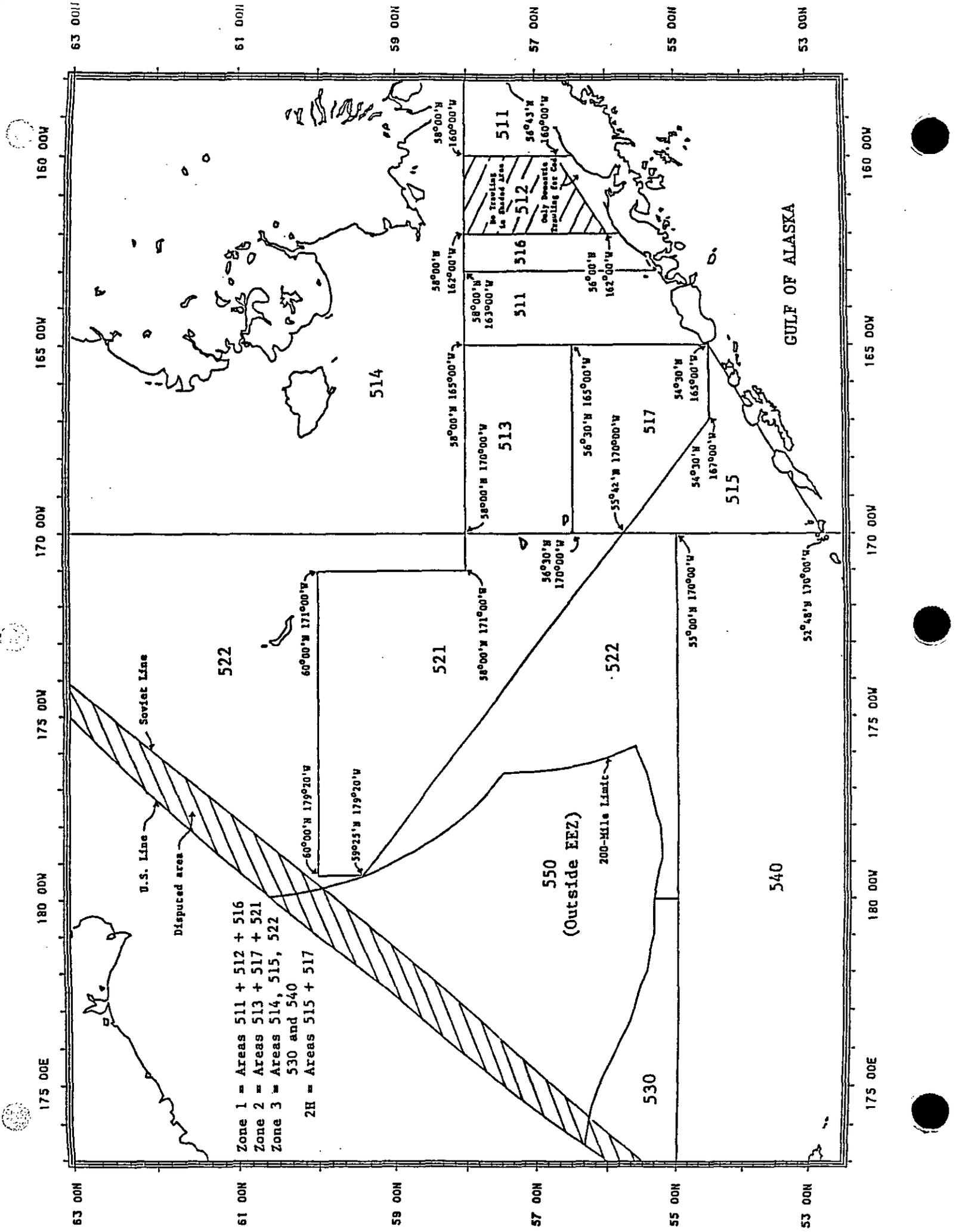
1) Observers on catcher/processors attribute catch according to when the retrieval of the net begins. (example - if a catcher/processor set a net on Saturday at 2300 ALT, but does not start retrieving the net until 0300 ALT on Sunday the catch would be attributed to the next week ending date.)

2) Observers on catcher boats attribute catch according to when the final delivery of catch is completed. All of the hauls made for a delivery are attributed to the week in which the last delivery of catch was completed. (example - a catcherboat makes tows on Wednesday, Thursday, and Friday, but does not finish making it's delivery to a shoreside plant until Sunday. Another catcher boat make tows on Friday, Saturday, and Sunday and completes it's delivery to a floating processor on the same Sunday. The observers on both of these vessels would attribute all of the catch to the next week ending date. Another possibility might be that a catcherboat delivers part of it's catch to Plant A on Saturday, but makes a final delivery to Plant B on Sunday. In this case, the catcher boat's observer would attribute all of the catch to the next week ending date.)

3) Observers on motherships that are receiving unsorted catch from catcher boats attribute catch according to the date that the codend was received. (example - the catcher boat's net arrived at and left the fishing depth on Saturday, but the codend was not delivered until Sunday. The mothership's observer would attribute the haul to the next week ending date.)

Notes for Observers Aboard Motherships

Observers aboard motherships may choose to coordinate the transmission of catch messages from observers on the catcher boat fleet by collecting all messages and sending them at the same time with their own message from the mothership. This sort of arrangement may serve to be the easiest and most efficient for all parties concerned.

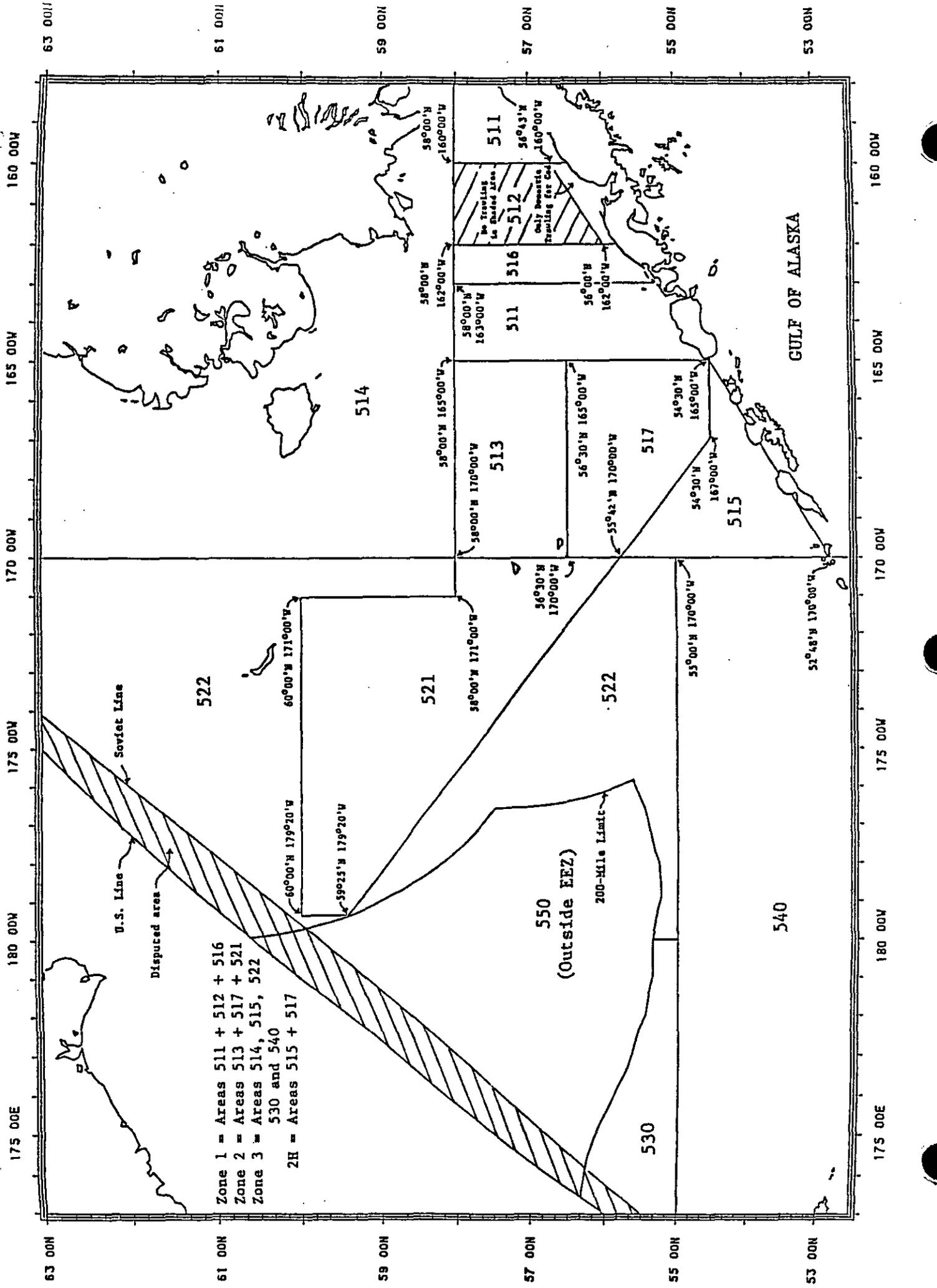


Zone 1 = Areas 511 + 512 + 516
 Zone 2 = Areas 513 + 517 + 521
 Zone 3 = Areas 514, 515, 522
 530 and 540
 2H = Areas 515 + 517

550
(Outside EEZ)

No Trailing
 in Hatched Area
 Only Beneath
 Trailing for Code

GULF OF ALASKA

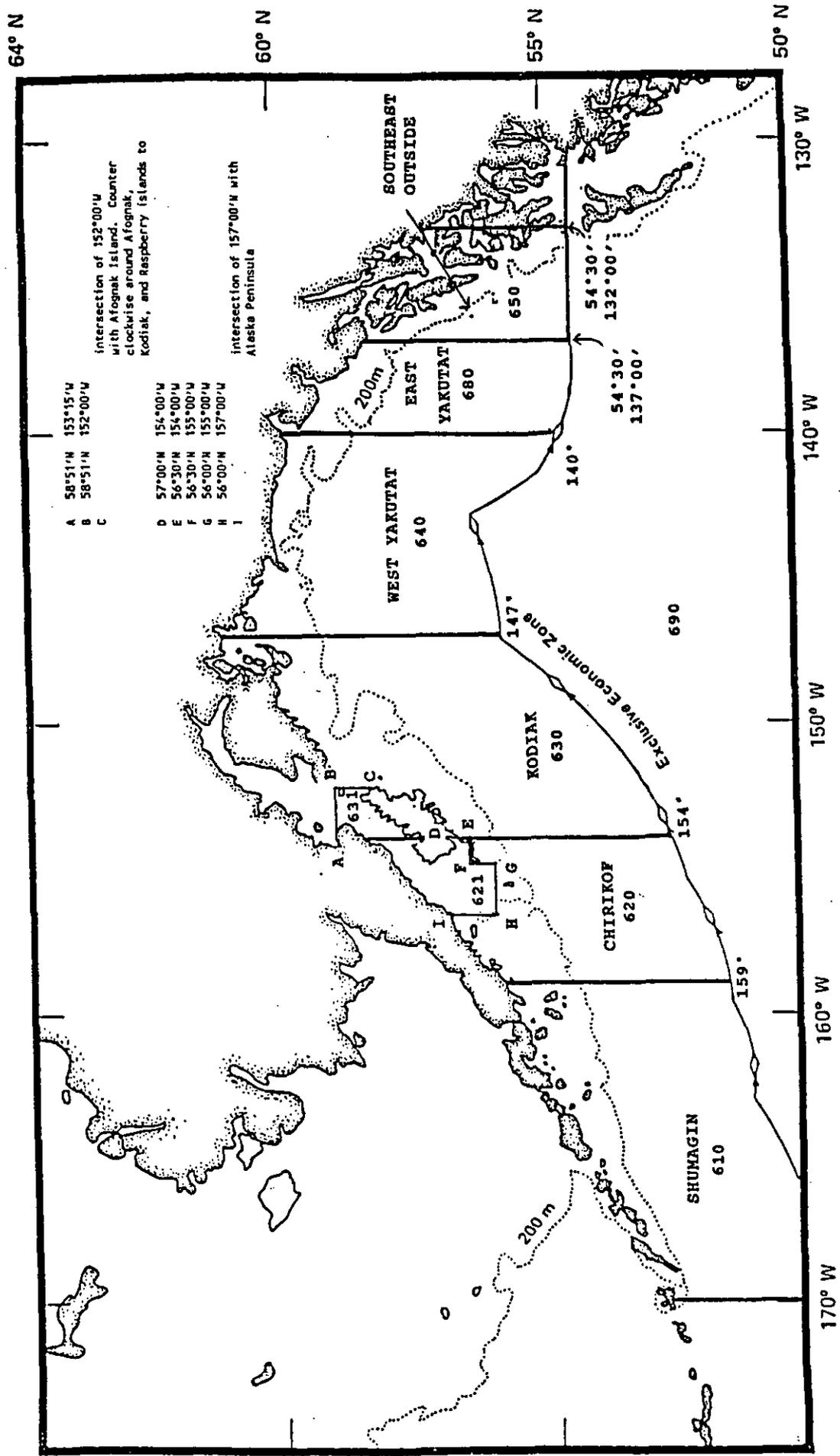


Zone 1 = Areas 511 + 512 + 516
 Zone 2 = Areas 513 + 517 + 521
 Zone 3 = Areas 514, 515, 522
 530 and 540
 2H = Areas 515 + 517

550
(Outside EEZ)

No Trailing
 in Hatched Area
 Only Beneath
 Trailing for Code

GULF OF ALASKA



Regulatory and reporting areas of the Gulf of Alaska.

REPORTING GROUPS FOR SPECIES COMPOSITION CATCH MESSAGES

Bering Sea/Aleutians (Areas 510 - 550)

<u>Species Group</u>	<u>Report Group</u>	<u>Abbreviation</u>
Squid	Squid	SQU
Yellowfin sole	Yellowfin sole	YELL
Rock sole	Rock sole	RSOLE
Greenland turbot	Greenland turbot	TURB
Arrowtooth flounder	Arrowtooth Flounder	ARROW
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	POP Complex *	POP
Rougheye rockfish		
Northern rockfish		
Sharpchin rockfish		
Shortraker rockfish		
All other rockfish (<u>Sebastes</u> and <u>Sebastolobus</u> 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) Miscellaneous items	Non-allocated	NON

* The POP report group has changed to a group containing the following five rockfish species: Pacific ocean perch, Rougheye rockfish, Northern rockfish, Sharpchin rockfish and Shortraker rockfish.

Gulf of Alaska (Areas 610 - 680)

<u>Species Group</u>	<u>Report Group</u>	<u>Abbreviation</u>
Rex sole Dover sole Flathead sole	Deepwater flatfish	DFLT
Arrowtooth flounder	Arrowtooth flounder	ARROW
Rock sole Yellowfin sole Butter sole Starry flounder All other flatfish (except halibut)	Shallow-water flatfish	SFLT
Pollock	Pollock	POLL
Pacific cod	Pacific cod	COD
Sablefish	Sablefish	SAB
Pacific ocean perch (<u>S. alutus</u>) Northern rockfish (<u>S. polyspinus</u>) Rougheye rockfish (<u>S. aleutianus</u>) Sharpchin rockfish (<u>S. zacentrus</u>) Shortraker rockfish (<u>S. borealis</u>) Aurora rockfish (<u>Sebastes aurora</u>) Blackgill rockfish (<u>S. melanostomus</u>) Chilipepper rockfish (<u>S. goodei</u>) Darkblotched rockfish (<u>S. crameri</u>) Greenstriped rockfish (<u>S. elongatus</u>) Harlequin rockfish (<u>S. variegatus</u>) Pygmy rockfish (<u>S. wilsoni</u>) Red banded rockfish (<u>S. babcocki</u>) Shortbelly rockfish (<u>S. jordani</u>) Splitnose rockfish (<u>S. diploproa</u>) Stripetail rockfish (<u>S. saxicola</u>) Vermilion rockfish (<u>S. miniatus</u>) Yellowmouth rockfish (<u>S. reedi</u>)	Slope Rockfish	SLPRF

Gulf of Alaska (Areas 610 - 680) cont.

<u>Species Group</u>	<u>Report Group</u>	<u>Abbreviation</u>
Bocaccio (<u>Sebastes paucispinus</u>) Canary rockfish (<u>S. pinniger</u>) China rockfish (<u>S. nebulosus</u>) Copper rockfish (<u>S. caurinus</u>) Quillback rockfish (<u>S. maliger</u>) Redstripe rockfish (<u>S. proriger</u>) Rosethorn rockfish (<u>S. helvomaculatus</u>) Silvergray rockfish (<u>S. brevispinus</u>) Tiger rockfish (<u>S. nigrochinctus</u>) Yelloweye rockfish (<u>S. ruberrimus</u>)	Demersal Shelf Rockfish	DEMRF
Black rockfish (<u>Sebastes melanops</u>) Blue rockfish (<u>S. mystinus</u>) Dusky rockfish (<u>S. ciliatus</u>) Widow rockfish (<u>S. entomelas</u>) Yellowtail rockfish (<u>S. flavidus</u>)	Pelagic Shelf Rockfish	PELRF
Longspine thornyhead (<u>Sebastolobus altivelis</u>) Shortspine thornyhead (<u>Sebastolobus alascanus</u>)	Thornyhead Rockfish	THRN
Report group specifically for: sharks, skates sculpins, squid, Atka mackerel, eulachon, smelts, capelin and octopus.	Other fish	OTH
All remaining fish spp. Prohibited spp. (includes herring) Invertebrates (except squid and octopus) Miscellaneous items	Non-allocated	NON

INSTRUCTIONS FOR FORM RM

For catch messages, 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 report group of each sampled haul:

1. Determine the three digit, federal statistical area of each catch sampled. Data for each area should be recorded on separate sheets of Form RM. Observers on trawlers must also keep data separate by gear type (pelagic or bottom nets) within each area.
2. According to the list by region, (BSA, or GOA), write the species report group abbreviations, in order, across the tops of the columns on Form RM. (Note: There are not enough columns on the form to enable you to enter all of the report groups. You will have to omit one or more report groups that you don't expect to see that week.)

For each sampled catch:

3. Enter the date and haul (or set) number in the first column.
4. Column A: Enter the haul weight, in metric tons, from the "Official Total Catch" columns on Form 1 or 2US or 2MUS.
5. Column B: If you have different sample sizes for the same haul, as in the example for haul 104, enter the data for each sample type on separate lines, the largest sample weight first, in kilograms, from Form 3US.
6. Column C: (For each species group within a sample type) - Enter the weight for the species or species group, in kilograms, from the sample data on Form 3US.
7. Column D: (For each species group of a sample type) - Calculate the total catch of each species or species group as shown below. **Record the result to the nearest .001 mt.** (Tonnages of .00049 or less may be recorded to the nearest .0001 and carried through the calculations to the summary for the week.)

Assuming the sample is representative of the haul, the **ratio** of each species weight to the sample weight should be the same as the ratio of the weight of each species in the haul to the total haul weight, that is:

$$\frac{\text{sp. wt. in haul (in mt)}}{\text{total haul wt. (mt)}} = \frac{\text{sp. wt. in sample (in kg)}}{\text{total sample wt. (kg)}} \text{ or, (see Form RM), } \frac{\text{Col. D}}{\text{Col. A}} = \frac{\text{Col. C}}{\text{Col. B}}$$

Solving, then, for the unknown quantity:

$$\frac{\text{Col. A}}{1} \times \frac{\text{Col. D}}{\text{Col. A}} = \frac{\text{Col. C}}{\text{Col. B}} \times \frac{\text{Col. A}}{1} \quad \text{and, Col. D} = \frac{\text{Col. A} \times \text{Col. C}}{\text{Col. B}} \text{ or,}$$

$$\text{Col. D} = \frac{(\text{Col. A})}{(\text{Col. B})} \times (\text{Col. C}). \quad (\text{Don't round the } A \div B \text{ ratio constant.})$$

Note: If you whole haul sampled for species composition, the entry in column D is simply a conversion of kilograms, in column C, to metric tons, rounded to three decimal places. Whole haul sample data must be entered in this manner, however, for clarity and ease of grouping and summations.

8. **More Than One Sample Type:** If you have different sample sizes for the same haul, repeat steps 5 - 7 for the other sample types. **Except:** In basket sampling, the observer is actually sampling only the species that remain. The basket sample data for species composition should not be expanded to the entire catch weight but to the catch weight minus the extrapolated weight of the species that were partial or whole haul sampled. The entry of data for haul 104 illustrates this.
9. **Math Check:** To make certain all weights were transcribed and that they are correct, add the kg sampled for each species group. This should equal the summation on the 999 line of form 3US in the sample weight column **exactly**. After computing column D for each species group, check your math by summing all the column D entries for a haul or set and comparing the summation to the total catch weight (on the first line for the haul, in column A). Make note of the variance in the margin so you can go back to it later. A variance of more than + or -.003 MT indicates the strong probability of a calculation error.
10. For the day's totals of sampled hauls by area, sum the total catches for the sampled hauls and each column D. Skip a line between days.
11. Number pages consecutively regardless of area designation.

The aforementioned procedure was an extrapolation of the species composition data from the weight by species in the sample to the weight by species for the entire **sampled** haul. Observers now need to extrapolate the weight by species **from sampled hauls** to the weight by species for the **total catch of the day**, and sum these data for the week.

FORM RM-1 - FOR ALL VESSEL TYPES

1. At the end of each day, determine the correct statistical area of each catch. The position which determines the statistical area is the retrieval position. The noon position determines the area on non-fishing days. Data for each area should be recorded on separate sheets of Form RM-1.
2. Again, according to the list by region (BSA, or GOA), write the species report group abbreviations, in order, across the tops of the columns. (If all of the species report groups will not fit on the form, then leave out one or more report groups that you do not expect to see in that weeks' catch.)
3. Enter the date.
4. Column A: Record the total weight of catch landed by the vessel in the area that day. This is the sum of all individual catch weights from within the area for the day (both sampled and not-sampled catches), from Form 1US, 2US or 2MUS.
5. Column B: Enter the sum of the catch weights of sampled hauls or sets. This is in metric tons, not kilograms.
6. Column C: (For each species report group) - Record the total weight of each species report group from the day's species composition sample. This is the sum of each Column D for the day from Form RM and is recorded in metric tons to the nearest .001 mt.
7. Column D: (For each species group) - To calculate the total daily catch of each species report group, divide the total landed catch for the area (Column A) by the total weight of **sampled** catches in Column B. Store this constant ratio in the calculator memory and multiply it by the weight of each species in sampled catches, Column C. **Record the results to the nearest .001 mt.** (Tonnages of .00049 or less should be recorded to the nearest .0001 and carried through the calculations to the summary for the week.)
8. Check your calculations by adding the Column D's across for each day or set and comparing with Column A. A tolerance of +/- .01 mt is acceptable.
9. For the week: Sum Column A. Sum Column D's for each species report group. All summations should be recorded to either two or three decimal places consistently. Add the Column D's across. The total of the Column D's should be within +/- .02 mt of the sum of Column A for the week.
10. If the difference between the sum of Column D's and Column A is within the tolerance specified, it is probably due to rounding. When reporting groundfish catch by species however, the report group weights must equal the total weight exactly. Differences due to rounding must be eliminated by adjusting a predominant species weight sum (Column D). The correct figure should be circled and the adjusted figure written below it. The column A total and the column D total for each report group are the weights to report in section 2 of the weekly catch message.

SPECIAL PROBLEMS

If Your Ship Fishes Outside of the EEZ

Continue to sample and send catch reports for any catches taken outside the EEZ. In the Bering Sea report the catch as coming from Area 550. Outside the EEZ in the Gulf of Alaska is Area 690. (Refer to the charts on previous pages.)

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 catch message, include only 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 in a separate sentence.

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.

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 should sample both types of catches each day and be able to designate each haul or set made by the vessel as one of the two types of fishing.

Then, 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. 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 totals into two types of hauls.

Reporting Discards

Discards of any species or species report group need to be recorded separately from retained catch in the species composition section (section 2) of the catch report. Observers working at shore-side processing plants need not report discards in their catch messages. Observers should attempt to their best ability to independently estimate the amount of whole fish that are discarded, and then report those estimates in their catch message to the nearest 0.01 mt. If you consider your independent estimates of discard to be less accurate than the ship's estimates of discard, use the ship's estimate of discard in your catch message. However, continue to work to develop a more accurate technique of sampling for discards, so that you can report your own estimates of discard in the catch report. (On the other hand, a higher

priority must be given to good species composition and prohibited species sampling.) As listed on the catch message report form (below), each report group has two codes, one for the round weight of retained and one for the round weight of discard. Remember that discard weight is only for whole fish that are discarded, not the offal from production lines.

FORM RM-3 - FOR ALL VESSEL CLASSES

The following instructions pertain to the data you have collected on the incidental catch of prohibited species (king crab, Tanner crab, halibut and salmon) and their inclusion in Paragraph 2 of the weekly catch message.

1. Entry of data on Form RM-3 will be made for every haul or set you sample (even if none are found in your samples).
2. All data should be separated by area (i.e. 513, 517, 521, etc., see charts on previous pages) and gear type and each area/gear type should be recorded on separate sheets of Form RM-3.
3. Enter date and the haul or set number.
4. Column A: Enter the "Official Total Catch" weight. Enter the weight in tons (mt), not kilograms.
5. Column B: Enter the weight of groundfish catch sampled for each of the prohibited species report groups in metric tons.

On RM-3 use the following list of report groups and their abbreviations.

<u>Abbreviations</u>	<u>Meaning</u>
HW	haul weights, the sum of Column A on Form RM-3
REDKNG	Red King Crab
BLUKNG	Blue King Crab
OTHKNG	Golden & Couesi King Crab
BTAN	Bairdi Tanner Crab
OTHTAN	Opilio, Hybrid, Angulatus, & Tanneri Tanner Crab
HBT	Pacific Halibut
CHIN	Chinook Salmon
OTHSAL	the other species of salmon including steelhead

6. Column C: Enter the number observed for each prohibited report group. If you subsampled a prohibited species group, you need to extrapolate the data (by number) to the number observed for each report group before entering the results on the worksheet. For example: you entered 1000 Tanner crab on form 3 but you subsampled 100 for their species composition, sex and viability, obtaining 25 Bairdi, 50 opilio, and 25 angulatus. On the RM-3 worksheet you would enter 250 Bairdi and 750 other Tanner crab.
7. Column D: Compute the estimated number of individuals caught of each species and record the result to the nearest 0.1.

$$\text{Column D} = \text{Column A} \times \text{Column C} \div \text{Column B}$$

8. Column X: Enter the average weight to the nearest 0.001 kg for the halibut you observed on Form 3. (Please note that halibut is the only prohibited species that requires weight data on RM-3.)
9. Column Y: Compute the estimated weight of the halibut and record the result to the nearest 0.01 kg.

$$\text{Column Y} = \text{Column D} \times \text{Column X}$$

(Note: If you whole haul sample and weighed or measured all of the halibut, simply enter the total number of halibut in column D and their total weight in column Y. Don't introduce rounding error by going through needless calculations.)

10. At the end of each week, sum columns A, D, and Y by area for each species.
11. Skip a line between weeks.

FORM RM-3 WEEKLY RADIO REPORT WORK SHEET FOR PROHIBITED SPECIES

Gear -> btr

CRUISE NO. 114 VESSEL CODE A121 AREA 521 * $9/195 \times 562 = 538 + 91 = 629$
 $4/195 \times 562 = 24 + 4 = 28$

$D = \frac{A}{B} \times C$

DATE AND HAUL NO.	HAUL OR DAY WT (mt)	KING CRAB										TANNER CRAB										PACIFIC HALIBUT						SALMON					
		REDKMS		BLUKMS		OTHKMS		BTAN		OTHTAN		3(1) Sample wt		HBT		3(1) Sample wt		CHIN		OTHSAL		3(1) Sample wt		CHIN		OTHSAL							
		No. Observ.	Est. No.	3(1) Sample wt	Avg. wt (kg)	No. Observ.	Est. No.	3(1) Sample wt	Avg. wt (kg)	No. Observ.	Est. No.	No. Observ.	Est. No.	No. Observ.	Est. No.	No. Observ.	Est. No.	No. Observ.	Est. No.														
9/10 101	16.00	0	0	0	0	0	0	0	0	0	16.00		2	2	16.00	16.00	2	2	3	3	0	0	16.00	16.00	3	3	0	0					
103	20.00	0	0	0	0	0	0	0	0	0	20.00		1	1	20.00	20.00	1	1	0	0	20.00	20.00	0	0	0	0	0	0					
104	12.00	0	0	0	0	0	0	100	400	16	64	12.00		11	11	12.00	12.00	11	11	3	3	12.00	12.00	3	3	2	2	0	0				
9/11 No Fishing																																	
9/12 106	11.75	1	1	8	8	0	0	15	15	23	23	11.75		5	5	11.75	11.75	5	5	2	2	11.75	11.75	2	2	1	1	0	0				
108	8.22	0	0	0	0	0	0	75	75	4	4	8.22		15	15	8.22	8.22	15	15	0	0	8.22	8.22	0	0	3	3	0	0				
Weeks Total	67.97		1		8		1119		1119		119				34	1093.39				8						6							

REPORTING OBSERVER CATCH MESSAGES

This section of the instructions describes how to fill out the Catch Message Form using the worksheets and other information for transmission of the weekly catch message via telex, fax or phone. Remember that the weekly catch report is a high priority responsibility. Do not neglect to send these figuring, "When I get back to port will be soon enough." Only if you are on a catcher boat or you are returning to port before the end of the report week, should you wait until you are in port to send the catch message.

The first section is your heading or address. In the appropriate blanks, enter your name, vessel name and your fax or telex number so we will know how to get back to you if necessary. With telex numbers we will also need the vessel's radio call sign and relay station. The ORC (Observer Routing Code) number is a security code entry which will be explained to you in training.

On the next line is the vessel's federal groundfish fishing permit number. The permit number has the format AK-90-0001; where "AK" abbreviates Alaska, "90" indicates the year, and the last four digits are a specific identifier of that vessel. Then, in your first two catch messages for a vessel you must report the "Initial Date of Sampling" (IDS). You must inform us of your first day of sampling whenever you start work aboard a different ship or plant. The IDS date is important to this program's data organization so please repeat the IDS date in your second catch message to insure that it is received correctly and so we will know whether or not we received your first message. (Note: the "days on grounds" for the first week begins with this day. For example, if you start sampling on a Thursday, observer days on grounds will total 3 days for that week and Thursday's date is the IDS date.)

Processor Codes

Processor codes consist of a four digit numerical code beginning with the letter "F". The processor code can be obtained from the list of processor codes that follows these instructions. This list includes both shore-side processing plants and ocean-going processing vessels. The last column on the right-hand side of the list identifies the processor as either a shore-side plant (P) or an ocean-going ship (S). Follow the directions below when deciding which processor code to use in a catch message. (Not all catch messages require a processor code)

1. Observers on vessels that deliver their sorted catch to another vessel (mothership) for processing, need to include the permit number for the catcher vessel and the processor code of the mothership in the catch message from the catcher vessel. If the catcher vessel divides it's delivery among more than one floating processor, the observer should only use the processor code of the last mothership and attribute the entire delivery to the last mothership visited. (Since the catch is being sorted, we place the observer on the catcher boat and not on the mothership.)

2. Observers on vessels that catch and process their own fish but do not process another vessel's catch, should include only their vessel's permit number, and not the vessel's processing code. This is the only situation in which a processor code is not required in a catch message from a vessel.

3. Observers on vessels that catch and process their own fish and also process another vessel's catch (they also serve as a mothership), need to include two PARA 1's, two PARA 2's and two PARA3's in their catch message (refer to example at the end). One portion of the message containing only their own vessel's catch (permit number, but no processing code); and a second portion (with permit number and processor code) containing only the information from the delivered catches (as in #1 above).

4. Observers at shoreside plants do not have a permit number and don't need to include the plant's processing code in their catch messages. Refer to "Special Directions for Observers at Shore-side Processing Plants" below.

5. Observers on vessels that deliver their catch to shoreside plants for processing need to report the permit number for their catcher vessel and the processor code for the processing plant in their catch message from the catcher vessel. If the catcher vessel divides a delivery among more than one plant, the observer should only use the processor code for the last plant and attribute the entire delivery to that last plant visited.

6. Observers on motherships (floating processors) that process unsorted catch from catcher boats should include their permit number and the processor code for the mothership when reporting catch in their weekly catch messages. (Since the catch is not being sorted, we place the observer on the mothership and not on the catcher boat.)

Next, the "Week Ending" or Saturday date of the report week should be entered. Each report week is referenced by the week's ending date even if, say, you were only reporting data for Sunday and Monday of that week. For any dates reported in catch messages, use these three letter abbreviations for the month: JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC.

On the next line the federal statistical area, gear type and the **number** of observer days on grounds are entered. As stated before, if a vessel should fish two gear types within an area/week, the observer must extrapolate and report the catch composition data separately by gear type as well as by area/week. Gear codes may be reported by the letters designation below or by the numerical code as used on the haul or set forms. The gear codes are as follows:

Code No.
1 BTR bottom trawl
2 PTR pelagic trawl
8 LGL longliner
6 POT pot vessel

The number of observer "Days on Grounds" 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, transferring cargo, or sitting out rough weather are considered normal days on the grounds. Do not include phrases informing us of these normal activities.**

The only time a day is not an observer day on grounds is when the ship is fishing and you don't sample, or when the ship is in port.

If the ship traverses an area in which it does not fish, then add to your catch message the date, area, days on grounds, and reason. (Example: Aug 18, Area 620, Days on Grounds 1.0 - traversing). 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 521 and 60% in Area 522, then 0.4 of the day is attributed to Area 521, and 0.6 of the day to Area 522.

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 at sea 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 recording the time of the area change. In a proper catch message, all seven days will be accounted for and each area entered will only be listed once.

After this information, list the codes and the weights of each species report group (by area and gear type) in the same order as is given in the list of report group abbreviations for that region. Species with zero catch do not need to be reported. Include on the first line the total tonnage by area. Weights may be reported to two or to three decimal places. Whichever you choose, (two or three decimal places), be consistent in your report for the week. Remember that the sum of the report group weights must equal the total weight for that area/gear type exactly.

Section 3 is a summary of the incidental catch of prohibited species information for the week. Write the sum of the haul weights sampled for prohibited species (HW). This is obtained from Column A on Form RM-3. Then list the species report groups and their calculated numbers to tenths and halibut weights to hundredths. As there are many groups, report a prohibited species group only if you observed some.

For Trawlers: Section 4 contains effort and marine mammal information by subarea. Observers should enter the number of hauls taken (tows landed) by each area/gear type for the week. Then, sum the minutes of fishing duration of these tows from Form 2US. Leave the duration in minutes; do not convert it to hours and minutes. Observers on trawlers next enter the number of randomly chosen tows which were monitored for incidental catch of marine mammals. MMTOWS is the sum of the number of tows on the front side of form 10US for each week. MMTONS is the weight (Official Total Catch) of the MMTOWS in metric tons. For any incidental catch of a marine mammal, designate the species with the two letter species code given in the instructions for Form 10US. Only freshly dead or "lethally removed" mammals that are landed are to be reported. If no marine mammals were caught, use the notation "MAMM 0" as shown in the example.

For Longline and Pot Fishing Vessels: As longline and pot fishing vessels virtually never catch

marine mammals, section 5 is filled out instead of section 4 and contains only fishing effort information. (Be careful in dividing by 60 to obtain total hours and minutes!) Pot fishing vessels should substitute number of pots for number of hooks.

Along with catch reports observers can include any questions or information relating to observer work. For example, observers on 30% coverage vessels need to include a note about which of their assigned vessels they did and did not sample on that week. If there is no catch report for a week, send us a message about that. Questions about observer sampling or responsibilities, information about health problems, or logistical information are common along with catch messages. It is helpful to include a mention of the catch composition when asking sampling questions. A question or information should be written carefully so it is unmistakably clear, not too wordy, and appropriate and professional.

If you are transferred to a new ship during a report week, you must report the catch and effort data for the period spent on each ship separately. Preferably, you will be able to pass the catch information to us from port before boarding your next vessel. If this is not possible, and your next port call is more than a week away, you must transmit the area, report group code and catch weight information by alphabetic code which will protect its confidentiality.

Special Directions for Observers at Shore-side Processing Plants

Messages from shoreside processing plant observers need not follow the same format as those from observers aboard domestic vessels. They can be self-designed, but must include brief explanations of the work accomplished that week. Messages should include the following (at a minimum) for each plant that the observer worked at during the week:

- 1) Number of deliveries (and total weight of deliveries).
- 2) Number of deliveries sampled (also number of deliveries sampled for prohibited species).
- 3) Total delivery weight by species group.
- 4) Number of prohibited species and weight of halibut (if prohibited species sampling was done).
- 5) Rough estimate of number of lengths taken, and age structures collected.
- 6) Report product recovery rate work and density determinations accomplished, as well as progress on other special project assignments.

SPECIAL DAILY CATCH MESSAGE

While you are out at sea, you may receive a message that asks you to begin sending daily catch messages. This is most apt to occur when a report group species is approaching its quota limit. These messages are to be sent in addition to your normal weekly catch message, and are to be sent on a daily basis. This daily message is similar to the weekly catch report, except instead of giving the week-ending-date, give the date of the catch being reported and re-label the message as "Daily Catch". Instead of listing each report group in the days catch, include only the report group and it's weight asked for and the total catch weight (all species) for that day.

USING THE SUBAREA TABLES FOR THE BERING SEA AND ALEUTIANS

When you are given a position that is close to the diagonal boundary lines that separate areas 513 and 515 or areas 521 and 522, it may be difficult to determine exactly which subarea the delivery should be attributed to. These tables will aid you in that determination.

The 1st table: Table 1, is a plot of the line intersecting areas 513 and 515. The line gives the corresponding latitude position for each minute of longitude.

The 2nd table: Table 2, is a plot of the line intersecting areas 521 and 522.

How To Use The Tables

First find the longitude of your delivery position in Column B of the table. The corresponding latitude in Column A marks the point on the line which intersects the two subareas. If the latitude of your delivery position is greater than the table latitude, your position falls in the subarea to the north of the line. If the latitude of your delivery position is less than the table latitude then your position falls in the subarea to the south of the line.

Special Cases

For delivery positions that fall exactly on the line, or if the delivery position falls on "Four Corners", the intersecting point of 55-46 N 170-00 W, use the trawl data you have for the delivery to decide which subarea the fish were caught in and assign the delivery to that subarea.

Example of Use

To demonstrate the use of the tables: suppose your ship had received a codend and records the delivery position as 54-39 N 68-07 W. Determine what subarea this delivery position falls in.

1. First, find longitude 168-07 W in Column B of the tables:
(longitude 168-07 is found in Table 1)

<u>Col. A</u>	<u>Col. B</u>	
5457. 72	16805. 00	
5458. 15	16806. 00	
5458. 57	16807. 00	<----- delivery longitude
5458. 99	16808. 00	
5459. 42	16809. 00	

2. Read the corresponding latitude from Column A:

	<u>Col. A</u>	<u>Col. B</u>
	5457. 72	16805. 00
	5458. 15	16806. 00
----->	5458. 57	16807. 00
	5458. 99	16808. 00
	5459. 42	16809. 00

3. Determine whether your delivery latitude is greater than or less than the latitude in Column A:

delivery latitude 54-39 (5439. 00) is lower than Intersecting latitude 5458. 57

4. Determine the subarea:

Remember that Table 1, where the delivery longitude was found, represents points on the line between subareas 513 and 515. Table B represents points on the line between subareas 521 and 522.

Since the delivery latitude was lower than the line latitude, the delivery position falls into subarea 515, the subarea south of the line.

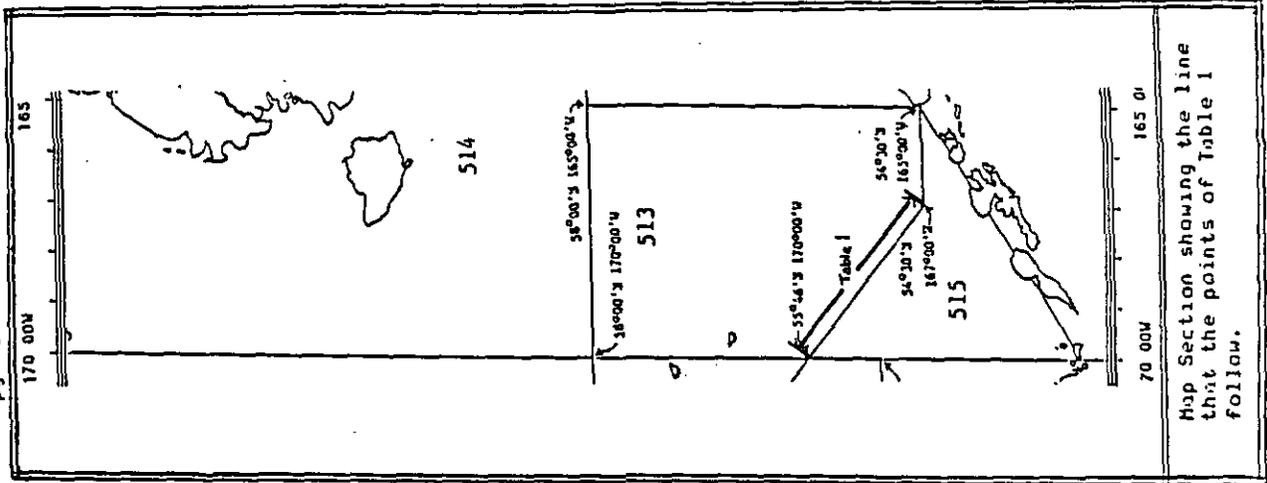
Summary Table

	Table 1	Table 2
Delivery latitude less than line latitude	SUBAREA 515	SUBAREA 522
Delivery latitude greater than line latitude	SUBAREA 513	SUBAREA 521

TABLE I

plot of the points on the line intersecting between subarens 513 and 515.

pg. 1



LAT COL. A LONG COL. B
 3343.17 16938.00
 3343.38 16939.00
 3346.00 17000.00

LAT COL. A LONG COL. B
 3320.09 16858.00
 3320.51 16859.00
 3320.93 16900.00
 3321.35 16901.00
 3321.77 16902.00
 3322.19 16903.00
 3322.61 16904.00
 3323.03 16905.00
 3323.45 16906.00
 3323.87 16907.00
 3324.29 16908.00
 3324.71 16909.00
 3325.13 16910.00
 3325.55 16911.00
 3325.97 16912.00
 3326.39 16913.00
 3326.81 16914.00
 3327.23 16915.00
 3327.65 16916.00
 3328.07 16917.00
 3328.49 16918.00
 3328.91 16919.00
 3329.33 16920.00
 3329.75 16921.00
 3330.17 16922.00
 3330.59 16923.00
 3331.01 16924.00
 3331.43 16925.00
 3331.85 16926.00
 3332.27 16927.00
 3332.69 16928.00
 3333.11 16929.00
 3333.53 16930.00
 3333.95 16931.00
 3334.37 16932.00
 3334.79 16933.00
 3335.21 16934.00
 3335.63 16935.00
 3336.05 16936.00
 3336.47 16937.00
 3336.89 16938.00
 3337.31 16939.00
 3337.73 16940.00
 3338.15 16941.00
 3338.57 16942.00
 3338.99 16943.00
 3339.41 16944.00
 3339.83 16945.00
 3340.25 16946.00
 3340.67 16947.00
 3341.09 16948.00
 3341.51 16949.00
 3341.93 16950.00
 3342.35 16951.00
 3342.77 16952.00
 3343.19 16953.00
 3343.61 16954.00
 3344.03 16955.00
 3344.45 16956.00
 3344.87 16957.00

LAT COL. A LONG COL. B
 3354.75 16738.00
 3355.18 16739.00
 3355.60 16800.00
 3356.03 16801.00
 3356.45 16802.00
 3356.87 16803.00
 3357.30 16804.00
 3357.72 16805.00
 3358.15 16806.00
 3358.57 16807.00
 3358.99 16808.00
 3359.42 16809.00
 3359.84 16810.00
 3360.27 16811.00
 3360.69 16812.00
 3361.11 16813.00
 3361.54 16814.00
 3361.96 16815.00
 3362.38 16816.00
 3362.81 16817.00
 3363.23 16818.00
 3363.65 16819.00
 3364.08 16820.00
 3364.50 16821.00
 3364.92 16822.00
 3365.34 16823.00
 3365.77 16824.00
 3366.19 16825.00
 3366.61 16826.00
 3367.03 16827.00
 3367.46 16828.00
 3367.88 16829.00
 3368.30 16830.00
 3368.72 16831.00
 3369.15 16832.00
 3369.57 16833.00
 3369.99 16834.00
 3370.41 16835.00
 3370.83 16836.00
 3371.26 16837.00
 3371.68 16838.00
 3372.10 16839.00
 3372.52 16840.00
 3372.94 16841.00
 3373.36 16842.00
 3373.78 16843.00
 3374.21 16844.00
 3374.63 16845.00
 3375.05 16846.00
 3375.47 16847.00
 3375.89 16848.00
 3376.31 16849.00
 3376.73 16850.00
 3377.15 16851.00
 3377.57 16852.00
 3377.99 16853.00
 3378.41 16854.00
 3378.83 16855.00
 3379.25 16856.00
 3379.67 16857.00

LAT COL. A LONG COL. B
 3430.00 16700.00
 3430.43 16701.00
 3430.86 16702.00
 3431.29 16703.00
 3431.72 16704.00
 3432.15 16705.00
 3432.57 16706.00
 3433.00 16707.00
 3433.43 16708.00
 3433.86 16709.00
 3434.29 16710.00
 3434.71 16711.00
 3435.14 16712.00
 3435.57 16713.00
 3436.00 16714.00
 3436.43 16715.00
 3436.85 16716.00
 3437.28 16717.00
 3437.71 16718.00
 3438.14 16719.00
 3438.56 16720.00
 3438.99 16721.00
 3439.42 16722.00
 3439.85 16723.00
 3440.27 16724.00
 3440.70 16725.00
 3441.13 16726.00
 3441.55 16727.00
 3441.98 16728.00
 3442.41 16729.00
 3442.83 16730.00
 3443.26 16731.00
 3443.69 16732.00
 3444.11 16733.00
 3444.54 16734.00
 3444.97 16735.00
 3445.39 16736.00
 3445.82 16737.00
 3446.25 16738.00
 3446.67 16739.00
 3447.10 16740.00
 3447.52 16741.00
 3447.95 16742.00
 3448.38 16743.00
 3448.80 16744.00
 3449.23 16745.00
 3449.65 16746.00
 3450.08 16747.00
 3450.50 16748.00
 3450.93 16749.00
 3451.35 16750.00
 3451.78 16751.00
 3452.20 16752.00
 3452.63 16753.00
 3453.05 16754.00
 3453.48 16755.00
 3453.90 16756.00

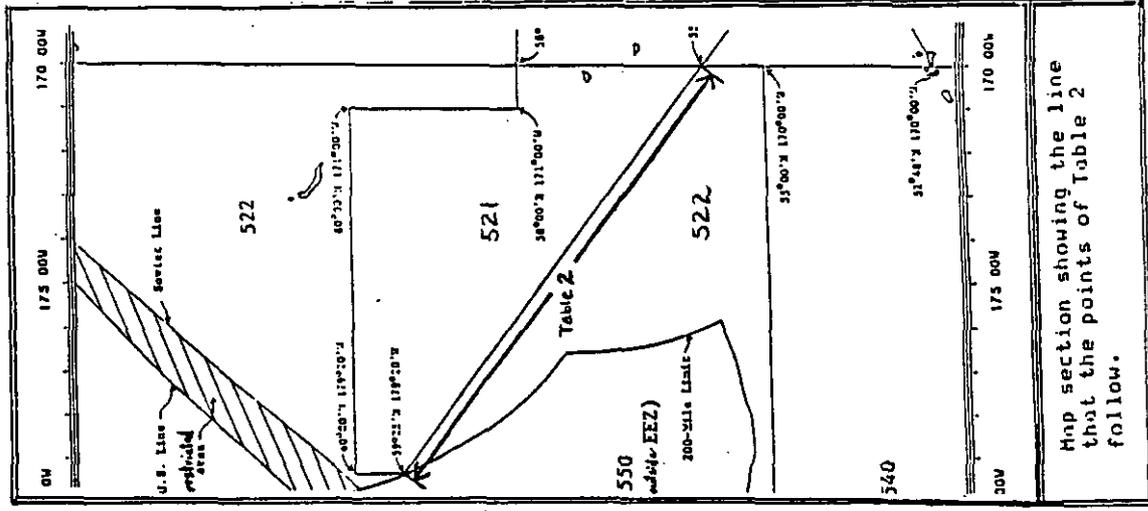
Map Section showing the line that the points of Table I follow.

TABLE 2

Plot of the points on the line intersecting between subareas 521 and 522.

ppgs. 2-3

LAT COL. A	LONG COL. B	LAT COL. A	LONG COL. B	LAT COL. A	LONG COL. B	LAT COL. A	LONG COL. B	LAT COL. A	LONG COL. B
5545.41	17001.00	5609.71	17058.00	5633.99	17158.00	5658.00	17258.00	5698.00	17358.00
5546.82	17002.00	5610.12	17059.00	5634.39	17159.00	5658.40	17259.00	5698.16	17359.00
5547.23	17003.00	5610.52	17100.00	5634.79	17200.00	5658.80	17300.00	5698.55	17400.00
5547.64	17004.00	5611.34	17102.00	5635.60	17202.00	5659.20	17302.00	5698.95	17402.00
5548.05	17005.00	5611.74	17103.00	5636.00	17203.00	5659.60	17303.00	5699.34	17403.00
5548.46	17006.00	5612.15	17104.00	5636.40	17204.00	5660.00	17304.00	5699.74	17404.00
5548.87	17007.00	5612.56	17105.00	5636.80	17205.00	5660.40	17305.00	5700.14	17405.00
5549.28	17008.00	5612.96	17106.00	5637.20	17206.00	5660.80	17306.00	5700.54	17406.00
5549.69	17009.00	5613.37	17107.00	5637.61	17207.00	5661.20	17307.00	5700.94	17407.00
5550.10	17010.00	5613.78	17108.00	5638.01	17208.00	5661.60	17308.00	5701.34	17408.00
5550.51	17011.00	5614.18	17109.00	5638.41	17209.00	5662.00	17309.00	5701.74	17409.00
5550.92	17012.00	5614.59	17110.00	5638.81	17210.00	5662.40	17310.00	5702.14	17410.00
5551.33	17013.00	5614.99	17111.00	5639.21	17211.00	5662.80	17311.00	5702.54	17411.00
5551.74	17014.00	5615.40	17112.00	5639.61	17212.00	5663.20	17312.00	5702.94	17412.00
5552.15	17015.00	5615.80	17113.00	5640.01	17213.00	5663.60	17313.00	5703.34	17413.00
5552.56	17016.00	5616.21	17114.00	5640.42	17214.00	5664.00	17314.00	5703.74	17414.00
5552.97	17017.00	5616.62	17115.00	5640.82	17215.00	5664.40	17315.00	5704.14	17415.00
5553.38	17018.00	5617.02	17116.00	5641.22	17216.00	5664.80	17316.00	5704.54	17416.00
5553.79	17019.00	5617.43	17117.00	5641.62	17217.00	5665.20	17317.00	5704.94	17417.00
5554.20	17020.00	5617.83	17118.00	5642.02	17218.00	5665.60	17318.00	5705.34	17418.00
5554.61	17021.00	5618.24	17119.00	5642.42	17219.00	5666.00	17319.00	5705.74	17419.00
5555.02	17022.00	5618.64	17120.00	5642.82	17220.00	5666.40	17320.00	5706.14	17420.00
5555.43	17023.00	5619.05	17121.00	5643.22	17221.00	5666.80	17321.00	5706.54	17421.00
5555.84	17024.00	5619.45	17122.00	5643.62	17222.00	5667.20	17322.00	5706.94	17422.00
5556.25	17025.00	5619.86	17123.00	5644.02	17223.00	5667.60	17323.00	5707.34	17423.00
5556.66	17026.00	5620.26	17124.00	5644.43	17224.00	5668.00	17324.00	5707.74	17424.00
5557.07	17027.00	5620.67	17125.00	5644.83	17225.00	5668.40	17325.00	5708.14	17425.00
5557.48	17028.00	5621.07	17126.00	5645.23	17226.00	5668.80	17326.00	5708.54	17426.00
5557.89	17029.00	5621.48	17127.00	5645.63	17227.00	5669.20	17327.00	5708.94	17427.00
5558.30	17030.00	5621.88	17128.00	5646.03	17228.00	5669.60	17328.00	5709.34	17428.00
5558.71	17031.00	5622.29	17129.00	5646.43	17229.00	5670.00	17329.00	5709.74	17429.00
5559.12	17032.00	5622.69	17130.00	5646.83	17230.00	5670.40	17330.00	5710.14	17430.00
5559.53	17033.00	5623.09	17131.00	5647.23	17231.00	5670.80	17331.00	5710.54	17431.00
5559.94	17034.00	5623.50	17132.00	5647.63	17232.00	5671.20	17332.00	5710.94	17432.00
5600.34	17035.00	5623.90	17133.00	5648.03	17233.00	5671.60	17333.00	5711.34	17433.00
5600.75	17036.00	5624.31	17134.00	5648.43	17234.00	5672.00	17334.00	5711.74	17434.00
5601.15	17037.00	5624.71	17135.00	5648.83	17235.00	5672.40	17335.00	5712.14	17435.00
5601.56	17038.00	5625.12	17136.00	5649.23	17236.00	5672.80	17336.00	5712.54	17436.00
5601.97	17039.00	5625.52	17137.00	5649.63	17237.00	5673.20	17337.00	5712.94	17437.00
5602.38	17040.00	5625.92	17138.00	5650.03	17238.00	5673.60	17338.00	5713.34	17438.00
5602.79	17041.00	5626.33	17139.00	5650.43	17239.00	5674.00	17339.00	5713.74	17439.00
5603.19	17042.00	5626.73	17140.00	5650.83	17240.00	5674.40	17340.00	5714.14	17440.00
5603.60	17043.00	5627.13	17141.00	5651.23	17241.00	5674.80	17341.00	5714.54	17441.00
5604.01	17044.00	5627.54	17142.00	5651.62	17242.00	5675.20	17342.00	5714.94	17442.00
5604.42	17045.00	5627.94	17143.00	5652.02	17243.00	5675.60	17343.00	5715.34	17443.00
5604.83	17046.00	5628.35	17144.00	5652.42	17244.00	5676.00	17344.00	5715.74	17444.00
5605.23	17047.00	5628.75	17145.00	5652.82	17245.00	5676.40	17345.00	5716.14	17445.00
5605.64	17048.00	5629.15	17146.00	5653.22	17246.00	5676.80	17346.00	5716.54	17446.00
5606.05	17049.00	5629.56	17147.00	5653.62	17247.00	5677.20	17347.00	5716.94	17447.00
5606.46	17050.00	5629.96	17148.00	5654.02	17248.00	5677.60	17348.00	5717.34	17448.00
5606.86	17051.00	5630.36	17149.00	5654.42	17249.00	5678.00	17349.00	5717.74	17449.00
5607.27	17052.00	5630.76	17150.00	5654.82	17250.00	5678.40	17350.00	5718.14	17450.00
5607.68	17053.00	5631.17	17151.00	5655.22	17251.00	5678.80	17351.00	5718.54	17451.00
5608.08	17054.00	5631.57	17152.00	5655.61	17252.00	5679.20	17352.00	5718.94	17452.00
5608.49	17055.00	5631.97	17153.00	5656.01	17253.00	5679.60	17353.00	5719.34	17453.00
5608.90	17056.00	5632.38	17154.00	5656.41	17254.00	5680.00	17354.00	5719.74	17454.00
5609.30	17057.00	5632.78	17155.00	5656.81	17255.00	5680.40	17355.00	5720.14	17455.00
5609.71	17058.00	5633.18	17156.00	5657.21	17256.00	5680.80	17356.00	5720.54	17456.00
5610.12	17059.00	5633.58	17157.00	5657.61	17257.00	5681.20	17357.00	5720.94	17457.00



Map section showing the line that the points of Table 2 follow.

LAT COL. A	LONG COL. B
5916.81	17858.00
5917.18	17859.00
5917.55	17900.00
5917.93	17901.00
5918.30	17902.00
5918.67	17903.00
5919.05	17904.00
5919.42	17905.00
5920.16	17907.00
5920.54	17908.00
5920.91	17909.00
5921.28	17910.00
5921.63	17911.00
5922.02	17912.00
5922.40	17913.00
5922.77	17914.00
5923.14	17915.00
5923.88	17917.00
5924.26	17919.00
5924.63	17919.00
5925.00	17920.00

LAT COL. A	LONG COL. B
5834.30	17738.00
5834.47	17739.00
5835.03	17800.00
5835.43	17801.00
5835.81	17802.00
5836.18	17803.00
5836.56	17804.00
5836.94	17805.00
5837.31	17806.00
5837.69	17807.00
5838.07	17808.00
5838.44	17809.00
5838.82	17810.00
5839.20	17811.00
5839.57	17812.00
5839.95	17813.00
5900.32	17814.00
5900.70	17815.00
5901.08	17816.00
5901.45	17817.00
5901.83	17818.00
5902.20	17819.00
5902.58	17820.00
5902.96	17821.00
5903.33	17822.00
5903.71	17823.00
5904.08	17824.00
5904.46	17825.00
5904.83	17826.00
5905.21	17827.00
5905.58	17828.00
5905.96	17829.00
5906.33	17830.00
5906.71	17831.00
5907.08	17832.00
5907.46	17833.00
5907.83	17834.00
5908.21	17835.00
5908.58	17836.00
5908.96	17837.00
5909.33	17838.00
5909.71	17839.00
5910.08	17840.00
5910.45	17841.00
5910.83	17842.00
5911.20	17843.00
5911.58	17844.00
5911.95	17845.00
5912.33	17846.00
5912.70	17847.00
5913.07	17848.00
5913.45	17849.00
5913.82	17850.00
5914.19	17851.00
5914.57	17852.00
5914.94	17853.00
5915.31	17854.00
5915.69	17855.00
5916.06	17856.00
5916.43	17857.00

LAT COL. A	LONG COL. B
5831.54	17658.00
5831.92	17659.00
5832.30	17700.00
5832.68	17701.00
5833.06	17702.00
5833.43	17703.00
5833.83	17704.00
5834.21	17705.00
5834.59	17706.00
5834.97	17707.00
5835.35	17708.00
5835.73	17709.00
5836.11	17710.00
5836.49	17711.00
5836.87	17712.00
5837.25	17713.00
5837.63	17714.00
5838.01	17715.00
5838.39	17716.00
5838.77	17717.00
5839.15	17718.00
5839.53	17719.00
5839.91	17720.00
5840.29	17721.00
5840.67	17722.00
5841.05	17723.00
5841.43	17724.00
5841.81	17725.00
5842.19	17726.00
5842.57	17727.00
5842.95	17728.00
5843.33	17729.00
5843.71	17730.00
5844.09	17731.00
5844.47	17732.00
5844.84	17733.00
5845.22	17734.00
5845.60	17735.00
5845.98	17736.00
5846.36	17737.00
5846.74	17738.00
5847.12	17739.00
5847.50	17740.00
5847.88	17741.00
5848.25	17742.00
5848.63	17743.00
5849.01	17744.00
5849.39	17745.00
5849.77	17746.00
5850.14	17747.00
5850.52	17748.00
5850.90	17749.00
5851.28	17750.00
5851.65	17751.00
5852.03	17752.00
5852.41	17753.00
5852.79	17754.00
5853.17	17755.00
5853.54	17756.00
5853.92	17757.00

LAT COL. A	LONG COL. B
5808.53	17558.00
5808.92	17559.00
5809.30	17600.00
5809.69	17601.00
5810.07	17602.00
5810.46	17603.00
5810.84	17604.00
5811.23	17605.00
5811.61	17606.00
5812.00	17607.00
5812.38	17608.00
5812.77	17609.00
5813.15	17610.00
5813.54	17611.00
5813.92	17612.00
5814.31	17613.00
5814.69	17614.00
5815.08	17615.00
5815.46	17616.00
5815.85	17617.00
5816.23	17618.00
5816.61	17619.00
5817.00	17620.00
5817.38	17621.00
5817.77	17622.00
5818.15	17623.00
5818.53	17624.00
5818.92	17625.00
5819.30	17626.00
5819.68	17627.00
5820.07	17628.00
5820.45	17629.00
5820.83	17630.00
5821.22	17631.00
5821.60	17632.00
5821.98	17633.00
5822.37	17634.00
5822.75	17635.00
5823.13	17636.00
5823.52	17637.00
5823.90	17638.00
5824.28	17639.00
5824.66	17640.00
5825.05	17641.00
5825.43	17642.00
5825.81	17643.00
5826.19	17644.00
5826.58	17645.00
5826.96	17646.00
5827.34	17647.00
5827.72	17648.00
5828.10	17649.00
5828.49	17650.00
5828.87	17651.00
5829.25	17652.00
5829.63	17653.00
5829.01	17654.00
5830.40	17655.00
5830.78	17656.00
5831.16	17657.00

LAT COL. A	LONG COL. B
5743.28	17458.00
5743.67	17459.00
5744.06	17500.00
5744.44	17501.00
5744.83	17502.00
5745.22	17503.00
5745.61	17504.00
5746.00	17505.00
5746.39	17506.00
5746.78	17507.00
5747.17	17508.00
5747.56	17509.00
5747.95	17510.00
5750.34	17511.00
5751.11	17513.00
5751.50	17514.00
5751.89	17515.00
5752.28	17516.00
5752.67	17517.00
5753.06	17518.00
5753.44	17519.00
5753.83	17520.00
5754.22	17521.00
5754.61	17522.00
5755.00	17523.00
5755.38	17524.00
5755.77	17525.00
5756.16	17526.00
5756.55	17527.00
5756.94	17528.00
5757.32	17529.00
5757.71	17530.00
5758.10	17531.00
5758.49	17532.00
5758.87	17533.00
5759.26	17534.00
5759.65	17535.00
5800.03	17536.00
5800.42	17537.00
5800.81	17538.00
5801.20	17539.00
5801.58	17540.00
5801.97	17541.00
5802.36	17542.00
5802.74	17543.00
5803.13	17544.00
5803.52	17545.00
5803.90	17546.00
5804.29	17547.00
5804.67	17548.00
5805.06	17549.00
5805.45	17550.00
5805.83	17551.00
5806.22	17552.00
5806.60	17553.00
5806.99	17554.00
5807.38	17555.00
5807.76	17556.00

LOGBOOK ENTRIES

The observer logbook is not to be used as a personal diary but as a record book for notes and data not included on the forms, and a place to document circumstances and information concerning any possible violations of fishing regulations. From observation and conversations you learn what issues and concerns are driving the decisions on fishing strategy and schedules. Notes from conversations can provide valuable insight. Include in the logbook 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. Appropriate entries include: what situations dictated your choice of a sampling method, any changes in sampling procedure, sampling problems, calculation of codend or bin dimensions and densities and any calculations for total catch weight. Descriptions of how catch estimates were obtained should be recorded here. It is also a good place to keep the copies of all messages sent and received. Short comments on hauls sampled can go in the "comments" section of Form 3US, but additional explanations on anything unusual, such as a high percentage of rockfish in a tow, 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. At the end of the cruise, important entries should be summarized and entered in the final report.

It is important to document carefully any suspected violations in the logbook as soon after the occurrence as possible. You cannot rely on your memory of details of events, it is important that these be written down as soon as possible. Although a complete report may be written upon your return, the original notes may be needed as evidence. If a correction must be made, draw a line through the incorrect word(s) instead of erasing or blackening them out. All logbook entries should be in ink, and any events that are recorded should be in chronological order. Please put your name, vessel name(s) and dates aboard each vessel on the first page inside the logbook.

If the vessel you are on is charged with a violation, all parties concerned, will have a legal right to inspect your logbook or any other evidence known to exist. It is thus important to make your entries factual and to avoid unfounded personal opinions. Do not use your logbook to "blow off steam". Statements such as "the captain acts and dresses like a slob" are irrelevant and detrimental to your statement.

Your logbook entries are not to be viewed by vessel personnel. Keep your logbook secured with your personal belongings.

DOMESTIC OBSERVER REPORTS

A report must be made for each vessel and/or plant that the observer worked at. The report format for port samplers is given in a previous section of this manual on plant sampling. All vessel reports should contain the Cruise Itinerary or Cruise Summary sheet, Form 12 - Vessel Data Form, the map of the areas fished, answers to the report questions (following), gear diagram and factory and/or weather deck diagrams, and the signed "Agreement to Share Data with ADF&G" form. If your ship was a mothership, include a "List of Catcher Boats" which delivered catch.

FORM 12 - VESSEL DATA FORM

Vessel Name _____

Permit Number _____ Vessel Type _____

Length _____ Width _____ Draft _____

Gross Tonnage _____ Net Tonnage _____

Engine Type _____ Horsepower _____

Year Commissioned _____ Radio Call Sign _____

Company _____

Home Port _____

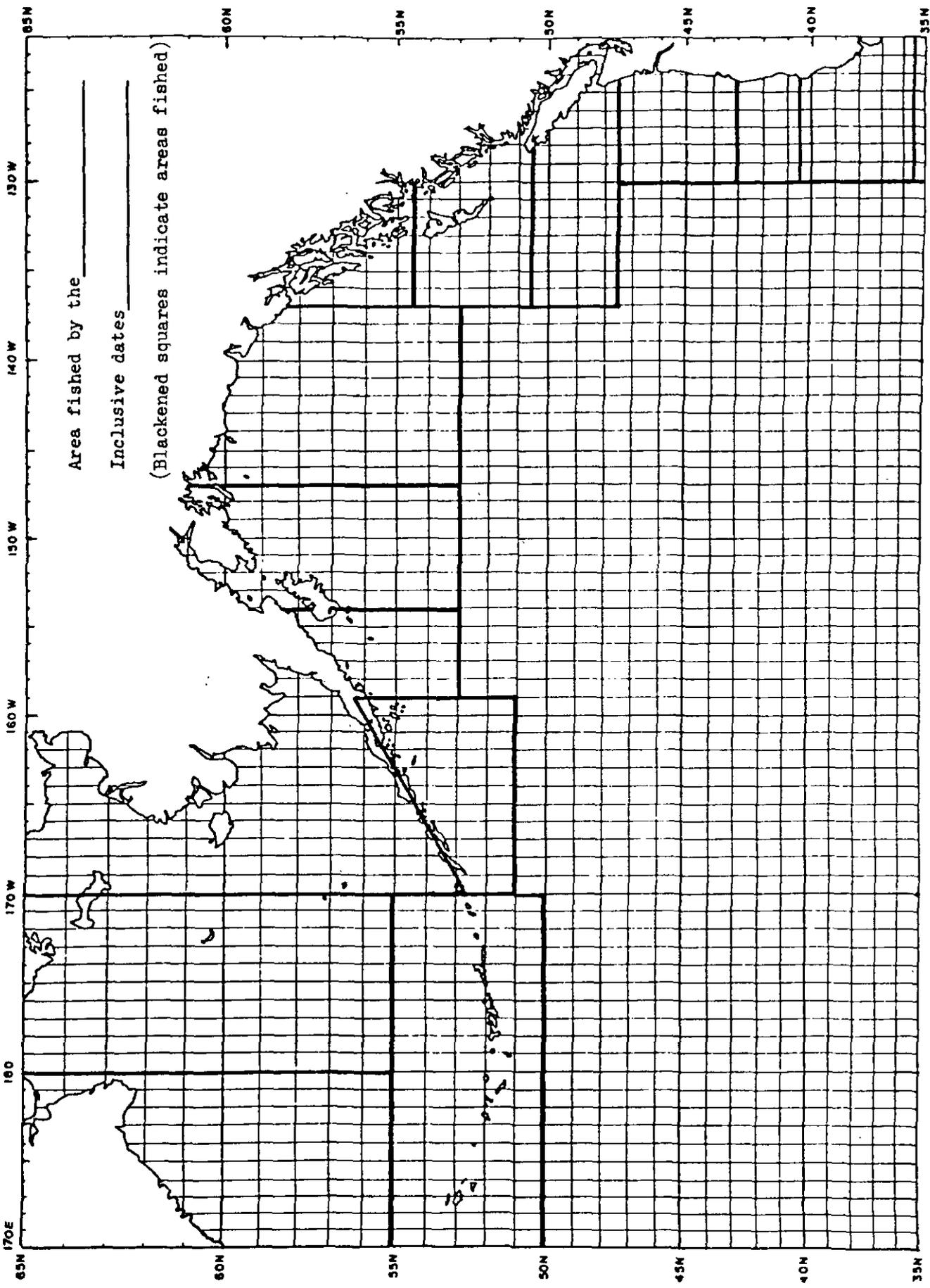
Personnel: Captain _____

Fishing Master _____

Factory Manager _____

Number of Officers _____

Total Ship Complement _____



Report Questions

Answer as completely as possible:

1. How was the "official total catch" obtained? If the ship's estimates were adjusted, how were the adjustments made? If the ship's estimate was not used, why did you decide another estimate was more accurate?
2. How was the observer estimate obtained?
3. How was the retained catch obtained?
4. List the species groups, and size groups that were retained and the species/size groups that were discarded. If this varied from haul to haul, indicate the basis for the variation.
5. How was the species composition sampling (including prohibited species sampling) accomplished? Was it difficult to avoid interfering with shipboard procedures? Include, if possible, a diagram of where you sampled and what you had to do to obtain fish, gather data, and discard the fish/invertebrates. If you had to forego gathering certain data, indicate what and why. Discuss how lengths, otoliths, or special project data were obtained (or not obtained).
6. Did you see any molting or premolt crabs? If so, briefly summarize your data.
7. Summarize any marine mammal observations or incidental catch of marine mammals.
8. Report on the fishing strategy employed, any innovative net design, navigational equipment, or processing machinery.
9. Recount any unusual occurrence such as an accident or injury at sea. Was there anything which made you feel this was an unsafe vessel? Is there anything regarding safety that the next observer should be made aware of?
10. Describe anything unusual regarding the catches.
11. Did your ship ever fish (or receive catches) from inside state waters? If so, give the approximate percentage of the catch was taken inside state waters.
12. What did you do, if anything specific, to help build good working relationships with the captain/crew? How were you treated? What were your quarters like? Indicate the numbers, ship status and sex of those that you shared your quarters with. Where did you do your paperwork? Were there any women in the crew?
13. Report anything you feel the next observer or NMFS should know about this vessel. Were there any noteworthy comments or opinions (regarding the fishery, observers, NMFS, ADF&G, etc.) given by the captain/crew that you feel we should know?

Please fill in the following with information on ship conditions:

Target species _____

Approximate average haul size _____

Observer's room was: private ____; shared with ____ others.

Was bedding available? yes ____; no, observer should bring _____

Ship's bath: private ____ or shared with ____ others.

Bath availability: daily ____ or other (describe) _____

Laundry: by hand ____; by machine ____; by ship's steward _____

Drinking water: good ____; poor ____; requires boiling _____

General cleanliness: clean ____; adequate ____; not clean _____

Presence of cockroaches? _____ Presence of rats or mice? _____

Video player? ____ VHS? ____ BETAMAX? ____ SUPER8? _____

Videocamera available? _____

Typical meals: Breakfast _____

Lunch _____

Dinner _____

Other _____

Was the quantity and quality of the food sufficient ? If not, please explain.

Bottom Trawl Net Dimensions And Characteristics

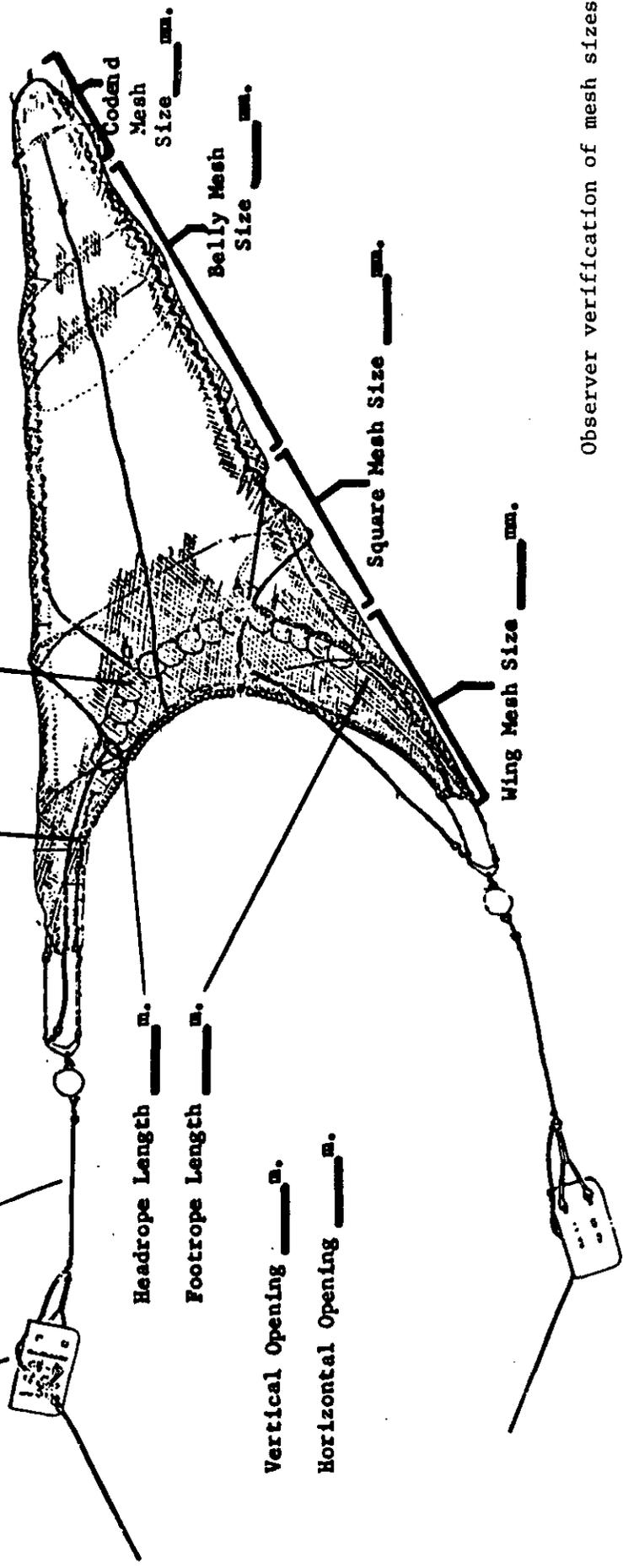
Vessel Type _____ Observation Period _____

Trawl Doors: Shape _____
Material _____
Dimensions _____ m. x _____ m.
Weight _____ kg

Floats: Number _____
Size _____ cm.
Material _____
Shape _____

Dandyline Length _____ m.

Bobbins: Number _____
Size _____ cm.
Material _____
Shape _____



Headrope Length _____ m.

Footrope Length _____ m.

Vertical Opening _____ m.

Horizontal Opening _____ m.

Square Mesh Size _____ mm.

Wing Mesh Size _____ mm.

Codend Mesh Size _____ mm.

Belly Mesh Size _____ mm.

Fish Finder
Name _____
Model Number _____
Frequency _____ kc.
Paper Type (wet or dry) _____
Speed of Advance _____

Net Recorder
Name _____
Model Number _____
Frequency _____ kc.

Observer verification of mesh sizes
Yes _____ No _____

PELAGIC TRAWL NET DIMENSIONS AND CHARACTERISTICS

Vessel Type _____

Observation Period _____

Wing section was composed of: (circle one)

Trawl Doors: Shape _____
 Material _____
 Dimensions _____ m. x _____ m.
 Weight _____ kg.

Rope lines (as illustrated)
 Large mesh

Net Recorder: Name _____
 Model Number _____
 Frequency _____ kc.

Dandyline Length _____ m

Floats: Number _____
 Size _____ cm.
 Material _____
 Shape _____

Headrope Length _____ m.
 Footrope Length _____ m.
 Weight of chain _____ kg.
 Vertical Opening _____ m.
 Horizontal Opening _____ m.
 Siderope Length _____ m.

Weights: _____
 Number _____
 Weight _____ kg

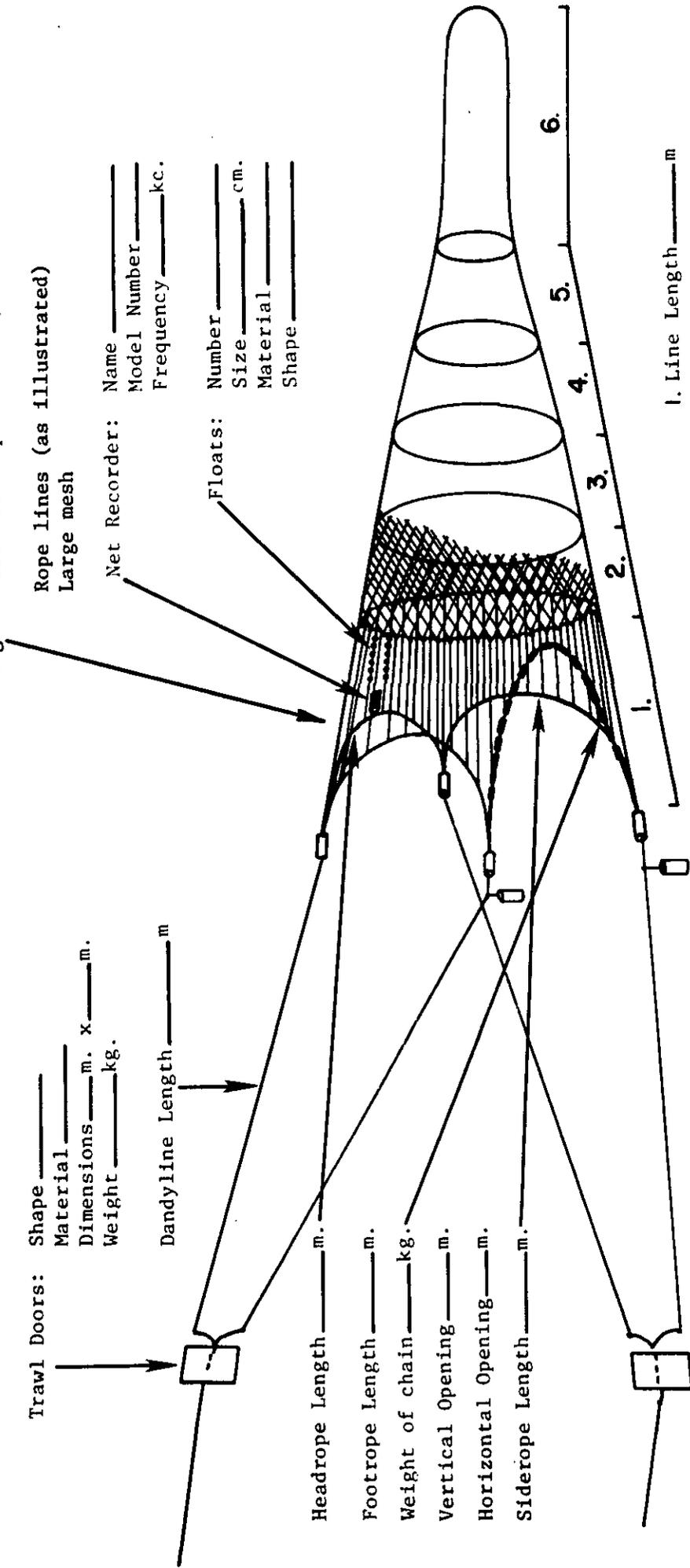
Fish Finder

Name _____
 Model No. _____
 Frequency _____ kc.
 Paper type: wet or dry
 Speed of Paper Advance _____

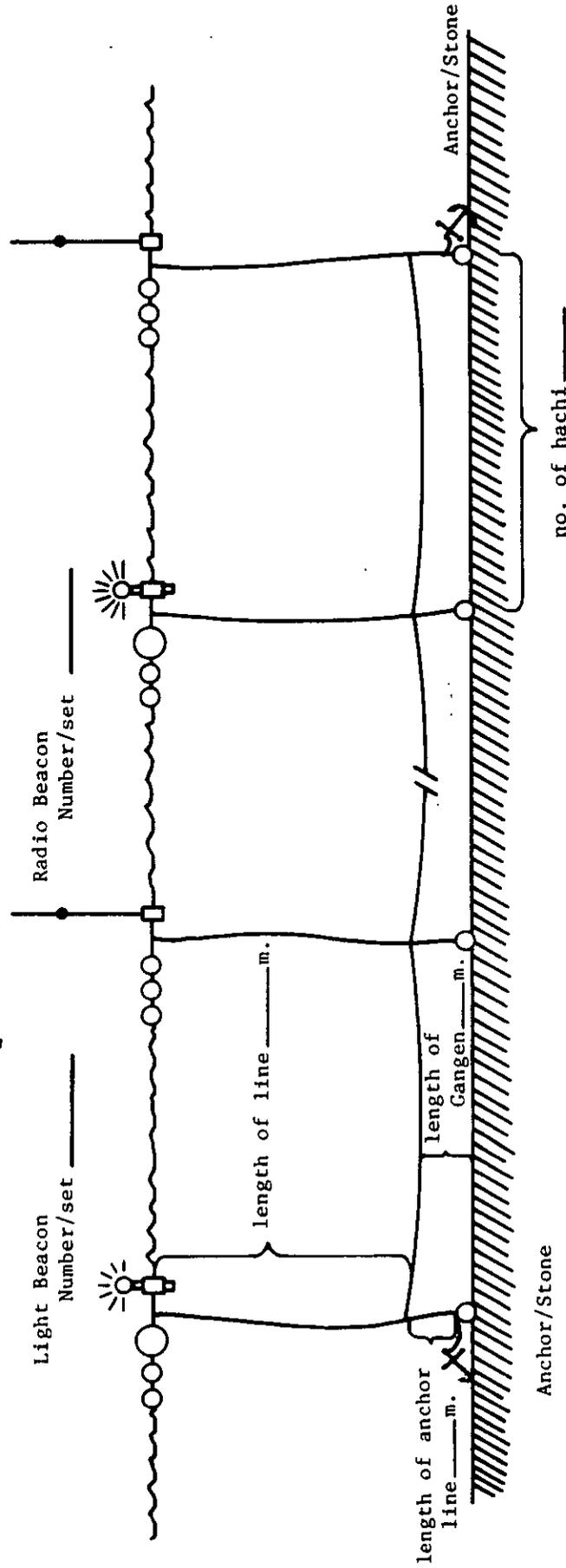
1. Line Length _____ m
 2. Mesh size _____ mm
 3. Mesh size _____ mm
 4. Mesh size _____ mm
 5. Mesh size _____ mm
 6. Codend mesh size _____ mm
- Net Length _____ m.

Observer verification
 of mesh sizes:

Yes _____ Date _____
 No _____



LONGLINE DIMENSIONS



Average number hachi/set _____

Average number hooks/hachi _____

Hook size _____

Hachi Length _____

Average set Length _____ km.

Breaking strength of gangen _____

AGREEMENT TO SHARE OBSERVER DATA WITH ADF&G

National Marine Fisheries Service (NMFS) and the Alaska Department of Fish and Game (ADF&G) both have programs in which fishery observers collect data aboard domestic fishing vessels in Alaska. As both organizations see the value for fisheries management of having as complete a data base as possible, the two organizations have agreed to send observer data that they collect to the other organization whenever the skipper approves of the transfer. Both NMFS and ADF&G have agreed to abide by the rules of confidentiality in handling the data. For your information, ADF&G uses the following standards of confidentiality:

1. No vessels will be referred to by name in written reports unless specific permission is obtained from the vessel skipper and/or owners.
2. Observer results involving the fishing of three or less vessels and/or processing companies will not be discussed in reports in a manner which isolates the landed catch of individual target species nor the precise locations where fishing occurred. Catch areas will be reported in general terms only.
3. Catch rates of prohibited or non-commercial species may be reported for less than three vessels fishing for less than three processing companies, but in these cases catch rates of these species would be reported only in terms whereby individual target species catch could not be determined.
4. Observer results for three or more vessels fishing for three or more processing companies may be reported in terms whereby combined target species catches may be determined (i.e. number or weight of prohibited species catch per metric ton of target species landed.)

In view of the above, the undersigned captain does _____ or does not _____ agree to voluntarily release any data obtained from this trip to the Alaska Department of Fish and Game observer program.

Signature: _____

Date: _____

Vessel name: _____

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THE 42 MOST COMMON MISTAKES ON DATA FORMS

Form 1US, 2US, or 2MUS:

1. Latitude, longitude, or on/off bottom time recorded with greater than 60minutes.
2. Using 2400 for time instead of 0000.
3. A haul retrieved at 0000 attributed to the previous day.
4. Not putting the noon position under "Trawl Position" on non-fishing days.
5. Overlapping haul times; overlapping on and off bottom times of one haul or between hauls.
6. Recording catch weight to more or less than two decimal places.
7. Positions that are too far from the previous position to be plausible during the time recorded--the ship could not travel that fast.
8. Leaving haul number blank on non-fishing days is incorrect; enter a zero.
9. Missing ADF&G area codes on non-fishing days.
10. Location I.D. omitted.
11. No location listed at all -- you should go back to the fishing log and look up the position, or if it's too late for that, interpolate one from the positions before and after the missing one.
12. Fishing depth and/or bottom depth listed without the accompanying F/M identifier and fishing depths deeper than bottom depths.

Form 3US:

13. Numbers and/or weights don't add up correctly, do check your math!
14. Species code listed without data accompanying it.
15. A species code listed twice within a haul.
16. Species code doesn't match written name.
17. Species code 900 with a quantity greater than 1.
18. Decimal point not included in every weight figure.
19. A weight listed without a number.
20. Not having each of the four prohibited groups represented for each sampled haul/set.
21. Recording weights to > two decimal places--the computer won't accept them.
22. Viability entries not summed on the 999 line.
23. Haul number doesn't match the date (as listed on Haul Form).
24. Not skipping a line between sample types.
25. Recording a fish species that is out of it's normal range or normal depth. (Bring back a specimen for verification if this is the case.)

Form 4:

26. Not filling them out because the C. bairdi and/or red king crab were all in hard shell condition.
27. Filling the form out as for a joint venture processor

Form 7US:

28. Summations incorrect! (Recheck and double-check your math!)
29. Reversing the size group and the frequency.
30. Haul numbers and dates don't match the haul form.
31. Putting estimated lengths on Form 7.

32. Lengths off by 10 cm. (Write in the 10's values on the plastic strip!)
33. Crab measurements not to nearest 5 mm, size group entries do not end with digit 3 or 8.

Form 9US:

34. Not writing weights out to two decimal places. Do include trailing zeros!
35. Not grouping sexes together.
36. Numbering pages by area instead of by species.
37. Not separating the otolith collections taken on different boats. (See "General Instructions for Data Forms" section in your manual.)
38. Duplicate otolith or scale number within one species collection.
39. An otolith or scale number is skipped without any note as to why.

Form 10US:

40. Not filling them out.
41. Not filling them out for each haul sampled or viewed.
42. Writing in hauls not actually sampled--using crew information to fill out the form. (The entries on the front of Form 10 should only be of hauls the observer actually viewed or sampled.)

For All Forms:

43. Haul and/or set numbers not matching dates.

Cross-Checks For Data Forms

2US - Official Total Catch

Must equal Haul Weight on 3US and sample weight when whole haul sampling.

Is entered in column A on Form RM for sampled hauls

Is entered in column A on Form RM-1: the sum of all the Official Catch Weights for the day

Is entered in column A on Form RM-3 for sampled hauls

Is used for "TOTAL CATCH" entries in catch messages formatted for transmission.

Is used for "Haul Weight" on RM-4 for sampled hauls

3US - Prohibited Species

Salmon

The same number of fish (total number) should appear on forms 7 & 9.

The weight of salmon is included with NON on RM, RM-1 and Para 1 of catch message.

The same number should be entered for extrapolation on Form RM-3.

Salmon totals for the week are in Para 2 and on RM-4.

Halibut

The same number of fish (total number) should appear on Form 7.

The weight of halibut is included with NON on RM, RM-1 and Para 1 of catch message.

The same number and weight should be entered for extrapolation on RM-3.

Halibut totals for the week are in Para 2 and on RM-4.

Tanner and King Crab

Totals for viability should be equal or a subset of the number of crab in columns 24 - 29 except in a viability-only sample.

The same number of crab (total number by species) should appear on form 7.

The weight of crab is included with NON on RM, RM-1 and Para 1 of catch message.

All tanner and king crabs in your sample weight must be entered on RM-3 for extrapolation.

Crab totals for the week are in Para 2 and on RM-4.

Sample Weights - there should be one line of entry on RM for each type of sampling on 3US.

CONVERSION OF POUNDS TO KILOGRAMS (0.5 - 100 lb.)

lb	kg	lb	kg	lb	kg	lb	kg
.5	.2	19.0	8.6	47.0	21.3	75.0	34.1
1.0	.5	20.0	9.1	48.0	21.8	76.0	34.5
1.5	.7	21.0	9.5	49.0	22.2	77.0	35.0
2.0	.9	22.0	10.0	50.0	22.7	78.0	35.4
2.5	1.1	23.0	10.4	51.0	23.2	79.0	35.9
3.0	1.4	24.0	10.9	52.0	23.6	80.0	36.3
3.5	1.6	25.0	11.4	53.0	24.1	81.0	36.8
4.0	1.8	26.0	11.8	54.0	24.5	82.0	37.2
4.5	2.0	27.0	12.3	55.0	25.0	83.0	37.7
5.0	2.3	28.0	12.7	56.0	25.4	84.0	38.1
5.5	2.5	29.0	13.2	57.0	25.9	85.0	38.6
6.0	2.7	30.0	13.6	58.0	26.3	86.0	39.0
6.5	3.0	31.0	14.1	59.0	26.8	87.0	39.5
7.0	3.2	32.0	14.5	60.0	27.2	88.0	40.0
7.5	3.4	33.0	15.0	61.0	27.7	89.0	40.4
8.0	3.6	34.0	15.4	62.0	28.1	90.0	40.9
8.5	3.9	35.0	15.9	63.0	28.6	91.0	41.4
9.0	4.1	36.0	16.3	64.0	29.1	92.0	41.8
9.5	4.3	37.0	16.8	65.0	29.5	93.0	42.3
10.0	4.5	38.0	17.3	66.0	30.0	94.0	42.7
11.0	5.0	39.0	17.7	67.0	30.4	95.0	43.2
12.0	5.4	40.0	18.2	68.0	30.9	96.0	43.6
13.0	5.9	41.0	18.6	69.0	31.3	97.0	44.1
14.0	6.4	42.0	19.1	70.0	31.8	98.0	44.5
15.0	6.8	43.0	19.5	71.0	32.2	99.0	45.0
16.0	7.3	44.0	20.0	72.0	32.7	100.0	45.5
17.0	7.7	45.0	20.4	73.0	33.1		
18.0	8.2	46.0	20.9	74.0	33.6		

Table of Equivalentents

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

1000 meters = 1 km

1 liter = 1.0567 U.S. quarts

OBTAINING INFORMATION ON PRODUCT RECOVERY RATES

A recovery rate represents the proportion of the organism that is used in the factory products. The recovery rate is also referred to as the "product recovery rate (PRR)" or the "recovery ratio". Vessel officers usually make use of recovery rates to estimate the weight of a catch from the tonnage of products produced from that catch by using the following equation:

$$\frac{\text{Product Weight}}{\text{Recovery Rate}} = \text{Whole Weight (before processing)}$$

Recovery rates are commonly expressed as a percent or as a ratio. Headed and gutted cod may have a recovery ratio of .62 to 1, or 62% recovery, while fish frozen whole would have a recovery ratio of 1.00 to 1, or 100% 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). To convert a conversion factor to a recovery rate, divide the number 1 by the conversion factor.

A wide range of recovery rates are 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, the experience of the processing crew, and the vessel type may all have a bearing on the recovery rate of a particular species. Since there is a need to update the recovery rates are currently being used by data managers, observers may be asked to record the rates used on their vessels, and/or to run tests to determine recovery rates on their own.

To determine your own recovery rates for particular products, you must observe the following procedures: First of all, you would 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 pollock, select a basket of roe-bearing, female pollock of the sizes normally used.) Weigh the sample of whole fish before processing, this would be called the "whole weight", "fresh weight" or "round weight". Have these fish processed by the factory crew as usual, then weigh the resulting product (the roe). The weight of the product divided by the weight of the fish before processing is the recovery ratio.

$$\frac{\text{Product Weight}}{\text{Fresh Weight}} = \text{Product Recovery Rate}$$

Actually there are two sampling approaches possible. In method A, as explained above, the observer collects a sample of fish, has those same fish processed and weighs the resultant product of those fish. This method is preferred over method B, particularly where the number of samples and their size are limited. In method B, the observer weighs a sample of fish waiting to be processed for a particular product as before. The observer then collects products from the same **number** of fish but not necessarily the **same** fish. For example, if you weighed 60 fish in the round, destined for fillets, 120 fillets would need to be weighed. (The products weighed should be from the same catch of fish.) Method B approaches the accuracy of method A when samples are large and there are many repetitions. Method B has the advantage of

being easier to sample (less interference with the processing line) and as product to be sampled cannot be predicted by the processors, intentional bias can be avoided.

It would be very difficult for an observer to determine the PRR of such products as surimi and fish meal, so it is not expected. However, if the observer were able to run a test on the recovery rate of surimi, it would be very important to fully document the procedure in the logbook. The guidelines for conducting PRR tests are outlined on the worksheet below. Record only the "lowest" PRR test value and the "highest" PRR test value and the lowest and highest unit weight test values on the Form 8 itself. This will provide a range of PRR and unit weight values for each product by area/month/vessel-type designation. (For more complete information, refer to the Form 8 instructions that follow.)

Worksheet For Product Recovery Rate and Unit Weight Tests

Product Recovery Rate Tests:

1. Run PRR tests primarily on target species
2. Run PRR tests on secondary products as possible
3. Each PRR test will consist of three replications of 50 fish each.

Species: _____ Product: _____

Sorting Criteria: _____

Date: ____/____/____/ Haul No.: _____
Mo. Day Yr.

Test # No. of fish Product wt. ÷ Whole wt. = PRR

Date: ____/____/____/ Haul No.: _____
Mo. Day Yr.

Test # No. of fish Product wt. ÷ Whole wt. = PRR

Date: ____/____/____/ Haul No.: _____
Mo. Day Yr.

Test # No. of fish Product wt. ÷ Whole wt. = PRR

UNIT WEIGHT TESTS:

1. Run unit weight tests at least twice per cruise for the major products and once per cruise for minor products.
2. Each test should consist of weighing at least 10 units.

Unit Type No. of Units Sampled Total Wt. - Container Wt. = Unit Wt.

Average =

FORM 8 - PRODUCT RECOVERY RATES

This form is to be filled out with the product recovery rates that the ship or processing plant personnel are using, and the recovery rates that the observer has obtained through their own tests. Points to note about Form 8:

1. Enter the year and month (columns 8-11) in which the information was obtained and for which the data applied.
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. There are only two columns, 12 and 13, at this time to record area in. Write the third digit of the federal statistical report area beside column 13.
3. Use a separate sheet for each area, month, vessel or plant sampled.
4. Write the name of the species or species group which is processed and its appropriate code (columns 14-16) 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), and rockfish unidentified (300).
5. Describe the product and enter the matching product code in columns 17-18 (see "Codes used for Product Recovery Form 8" on the following pages.) If in doubt of the appropriate code, draw a picture and take detailed notes describing the product. Discuss the unidentified product with the debriefer upon your return. 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 through cutting by hand (H).
7. Enter, to 2 decimal places, the recovery ratio used by the vessel or plant in columns 20-22 and observer's recovery rates in columns 28 - 30. If there is a range of values, then enter the data on two lines, first line for the lowest value and second line for the highest value. Use "Example Form 8" on the next page, as a guide.
8. The unit weight asked for in columns 24-27 and 32-35 is the weight of processed fish (before freezing or addition of water) 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. If you discover a range of unit weights for that product, in that area, during a particular month, enter the data on two lines, one for the lowest figure and one for the highest figure.
10. At the bottom of the form there is room for comments.

FORM 8 PRODUCT RECOVERY RATES

Page 1 of 1

Cruise Number

1	2	3
5	3	2

Vessel Code

4	5	6	7
N	S	5	4

Year

8	9
8	4

Month

10	11
0	7

Area

12	13
5	2

2

Species Name	Species Code			Description of Product	Product Code	H/M	Vessel Data					Observer Data			
	14	15	16				17	18	19	Percent Recovery			Unit wt. to .1 kg		
										20	21	22	24 - 27	28	29	30	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 flat.fish	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.

APPENDIX

Appendix Table 1.--List of Alaska product types.

Product code	Description
1	Whole fish/food fish
2	Whole bait
3	Bled only
4	Gutted only
5	Headed and gutted (H & G)
6	Headed, gutted, with roe
7	H & G, Western cut
8	H & G, Eastern cut
9	H & G, with pectoral girdle
10	H & G, tail removed
11	Kirimi
12	Salted and split
13	"Wings"
14	Roe only
15	Pectoral girdle only
16	Heads
17	Cheeks or chins
20	Fillets with skin and ribs
21	Fillets with skin, no ribs
22	Fillets with ribs, no skin
23	Fillets, no skin or ribs
30	Surimi
31	Minced fish
32	Fish meal
33	Fish oil
97	Other - specify
98	Discarded at sea
99	Landed discard

Appendix Table 2.--Recovery rates for Alaska groundfish products.

Species code	Name of species	Product code	Conversion rate
100	Unspecified groundfish	1	1.00
100	Unspecified groundfish	2	1.00
100	Unspecified groundfish	3	0.98
100	Unspecified groundfish	8	1.00
100	Unspecified groundfish	32	0.17
100	Unspecified groundfish	98	1.00
100	Unspecified groundfish	99	1.00
110	Pacific cod	1	1.00
110	Pacific cod	2	1.00
110	Pacific cod	3	0.98
110	Pacific cod	4	0.85
110	Pacific cod	5	0.63
110	Pacific cod	7	0.64
110	Pacific cod	8	0.58
110	Pacific cod	9	0.60
110	Pacific cod	12	0.45
110	Pacific cod	14	0.05
110	Pacific cod	22	0.20
110	Pacific cod	23	0.20
110	Pacific cod	98	1.00
110	Pacific cod	99	1.00
120	Flounder	1	1.00
120	Flounder	2	1.00
120	Flounder	3	0.98
120	Flounder	4	0.90
120	Flounder	5	0.65
120	Flounder	8	0.65
120	Flounder	22	0.22
120	Flounder	32	0.17
120	Flounder	98	1.00
120	Flounder	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
121	Arrowtooth flounder	1	1.00
121	Arrowtooth flounder	2	1.00
121	Arrowtooth flounder	3	0.98
121	Arrowtooth flounder	4	0.90
121	Arrowtooth flounder	5	0.74
121	Arrowtooth flounder	8	0.65
121	Arrowtooth flounder	10	0.62
121	Arrowtooth flounder	22	0.22
121	Arrowtooth flounder	23	0.34
121	Arrowtooth flounder	98	1.00
121	Arrowtooth flounder	99	1.00
122	Flathead sole	1	1.00
122	Flathead sole	2	1.00
122	Flathead sole	3	0.98
122	Flathead sole	4	0.90
122	Flathead sole	5	0.65
122	Flathead sole	8	0.65
122	Flathead sole	22	0.22
122	Flathead sole	98	1.00
122	Flathead sole	99	1.00
123	Rock sole	1	1.00
123	Rock sole	2	1.00
123	Rock sole	3	0.98
123	Rock sole	4	0.87
123	Rock sole	5	0.65
123	Rock sole	6	0.78
123	Rock sole	8	0.65
123	Rock sole	20	0.28
123	Rock sole	22	0.22
123	Rock sole	98	1.00
123	Rock sole	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
124	Dover sole	1	1.00
124	Dover sole	2	1.00
124	Dover sole	3	0.98
124	Dover sole	4	0.90
124	Dover sole	5	0.65
124	Dover sole	8	0.65
124	Dover sole	22	0.22
124	Dover sole	98	1.00
124	Dover sole	99	1.00
125	Rex sole	1	1.00
125	Rex sole	2	1.00
125	Rex sole	3	0.98
125	Rex sole	4	0.90
125	Rex sole	5	0.65
125	Rex sole	8	0.65
125	Rex sole	22	0.22
125	Rex sole	98	1.00
125	Rex sole	99	1.00
126	Butter sole	1	1.00
126	Butter sole	2	1.00
126	Butter sole	3	0.98
126	Butter sole	4	0.90
126	Butter sole	5	0.65
126	Butter sole	22	0.22
126	Butter sole	98	1.00
126	Butter sole	99	1.00
127	Yellowfin sole	1	1.00
127	Yellowfin sole	2	1.00
127	Yellowfin sole	3	0.98
127	Yellowfin sole	4	0.90
127	Yellowfin sole	5	0.65
127	Yellowfin sole	11	0.48
127	Yellowfin sole	20	0.25
127	Yellowfin sole	22	0.22
127	Yellowfin sole	98	1.00
127	Yellowfin sole	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
128	English sole	1	1.00
128	English sole	2	1.00
128	English sole	3	0.98
128	English sole	4	0.90
128	English sole	5	0.65
128	English sole	22	0.22
128	English sole	99	1.00
129	Starry flounder	1	1.00
129	Starry flounder	2	1.00
129	Starry flounder	3	0.98
129	Starry flounder	4	0.90
129	Starry flounder	98	1.00
129	Starry flounder	99	1.00
131	Petrale sole	1	1.00
131	Petrale sole	2	1.00
131	Petrale sole	3	0.98
131	Petrale sole	8	0.65
131	Petrale sole	98	1.00
131	Petrale sole	99	1.00
132	Sand sole	1	1.00
132	Sand sole	2	1.00
132	Sand sole	3	0.98
132	Sand sole	98	1.00
132	Sand sole	99	1.00
133	Alaska plaice	1	1.00
133	Alaska plaice	2	1.00
133	Alaska plaice	3	0.98
133	Alaska plaice	5	0.65
133	Alaska plaice	12	0.48
133	Alaska plaice	98	1.00
133	Alaska plaice	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
134	Greenland turbot	1	1.00
134	Greenland turbot	2	1.00
134	Greenland turbot	3	0.98
134	Greenland turbot	4	0.90
134	Greenland turbot	5	0.74
134	Greenland turbot	8	0.65
134	Greenland turbot	10	0.65
134	Greenland turbot	20	0.30
134	Greenland turbot	22	0.40
134	Greenland turbot	98	1.00
134	Greenland turbot	99	1.00
135	Greenstripe rockfish	1	1.00
135	Greenstripe rockfish	2	1.00
135	Greenstripe rockfish	3	0.98
135	Greenstripe rockfish	4	0.82
135	Greenstripe rockfish	5	0.60
135	Greenstripe rockfish	7	0.60
135	Greenstripe rockfish	8	0.50
135	Greenstripe rockfish	22	0.25
135	Greenstripe rockfish	98	1.00
135	Greenstripe rockfish	99	1.00
136	Northern rockfish	3	0.98
137	Boccacio rockfish	3	0.98
138	Copper rockfish	3	0.98
139	Other rockfish	1	1.00
139	Other rockfish	2	1.00
139	Other rockfish	3	0.98
139	Other rockfish	4	0.82
139	Other rockfish	5	0.60
139	Other rockfish	7	0.60
139	Other rockfish	8	0.50
139	Other rockfish	20	0.42
139	Other rockfish	22	0.25
139	Other rockfish	98	1.00
139	Other rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
140	Red rockfish (red snapper)	1	1.00
140	Red rockfish (red snapper)	2	1.00
140	Red rockfish (red snapper)	3	0.98
140	Red rockfish (red snapper)	4	0.82
140	Red rockfish (red snapper)	5	0.60
140	Red rockfish (red snapper)	7	0.60
140	Red rockfish (red snapper)	8	0.50
140	Red rockfish (red snapper)	22	0.25
140	Red rockfish (red snapper)	98	1.00
140	Red rockfish (red snapper)	99	1.00
141	Pacific ocean perch	1	1.00
141	Pacific ocean perch	2	1.00
141	Pacific ocean perch	3	0.98
141	Pacific ocean perch	4	0.82
141	Pacific ocean perch	5	0.60
141	Pacific ocean perch	7	0.60
141	Pacific ocean perch	8	0.50
141	Pacific ocean perch	22	0.25
141	Pacific ocean perch	98	1.00
141	Pacific ocean perch	99	1.00
142	Black rockfish	1	1.00
142	Black rockfish	2	1.00
142	Black rockfish	3	0.98
142	Black rockfish	4	0.82
142	Black rockfish	5	0.60
142	Black rockfish	7	0.60
142	Black rockfish	8	0.61
142	Black rockfish	22	0.25
142	Black rockfish	98	1.00
142	Black rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
143	Thornyhead rockfish	1	1.00
143	Thornyhead rockfish	2	1.00
143	Thornyhead rockfish	3	0.98
143	Thornyhead rockfish	4	0.82
143	Thornyhead rockfish	5	0.60
143	Thornyhead rockfish	7	0.60
143	Thornyhead rockfish	8	0.50
143	Thornyhead rockfish	15	0.00
143	Thornyhead rockfish	22	0.25
143	Thornyhead rockfish	98	1.00
143	Thornyhead rockfish	99	1.00
144	Unspecified slope rockfish	1	1.00
144	Unspecified slope rockfish	3	0.98
144	Unspecified slope rockfish	4	0.82
144	Unspecified slope rockfish	5	0.60
144	Unspecified slope rockfish	7	0.60
144	Unspecified slope rockfish	8	0.50
144	Unspecified slope rockfish	98	1.00
144	Unspecified slope rockfish	99	1.00
145	Yelloweye rockfish	1	1.00
145	Yelloweye rockfish	2	1.00
145	Yelloweye rockfish	3	0.98
145	Yelloweye rockfish	4	0.82
145	Yelloweye rockfish	5	0.60
145	Yelloweye rockfish	7	0.60
145	Yelloweye rockfish	8	0.50
145	Yelloweye rockfish	12	0.65
145	Yelloweye rockfish	22	0.22
145	Yelloweye rockfish	98	1.00
145	Yelloweye rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
146	Canary rockfish	1	1.00
146	Canary rockfish	2	1.00
146	Canary rockfish	3	0.98
146	Canary rockfish	4	0.82
146	Canary rockfish	5	0.60
146	Canary rockfish	7	0.60
146	Canary rockfish	8	0.50
146	Canary rockfish	22	0.22
146	Canary rockfish	98	1.00
146	Canary rockfish	99	1.00
147	Quillback rockfish	1	1.00
147	Quillback rockfish	2	1.00
147	Quillback rockfish	3	0.98
147	Quillback rockfish	4	0.82
147	Quillback rockfish	5	0.60
147	Quillback rockfish	8	0.50
147	Quillback rockfish	22	0.22
147	Quillback rockfish	98	1.00
147	Quillback rockfish	99	1.00
148	Tiger rockfish	1	1.00
148	Tiger rockfish	2	1.00
148	Tiger rockfish	3	0.98
148	Tiger rockfish	5	0.60
148	Tiger rockfish	22	0.22
148	Tiger rockfish	98	1.00
148	Tiger rockfish	99	1.00
149	China rockfish	1	1.00
149	China rockfish	2	1.00
149	China rockfish	3	0.98
149	China rockfish	5	0.60
149	China rockfish	8	0.50
149	China rockfish	9	0.60
149	China rockfish	22	0.22
149	China rockfish	98	1.00
149	China rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
150	Rosethorn rockfish	1	1.00
150	Rosethorn rockfish	2	1.00
150	Rosethorn rockfish	3	0.98
150	Rosethorn rockfish	12	0.65
150	Rosethorn rockfish	22	0.22
150	Rosethorn rockfish	98	1.00
150	Rosethorn rockfish	99	1.00
151	Rougheye rockfish	1	1.00
151	Rougheye rockfish	2	1.00
151	Rougheye rockfish	3	0.98
151	Rougheye rockfish	4	0.82
151	Rougheye rockfish	5	0.60
151	Rougheye rockfish	7	0.60
151	Rougheye rockfish	8	0.50
151	Rougheye rockfish	22	0.22
151	Rougheye rockfish	98	1.00
151	Rougheye rockfish	99	1.00
152	Shortraker rockfish	1	1.00
152	Shortraker rockfish	2	1.00
152	Shortraker rockfish	3	0.98
152	Shortraker rockfish	4	0.82
152	Shortraker rockfish	5	0.60
152	Shortraker rockfish	7	0.60
152	Shortraker rockfish	8	0.50
152	Shortraker rockfish	17	0.00
152	Shortraker rockfish	22	0.22
152	Shortraker rockfish	23	0.25
152	Shortraker rockfish	98	1.00
152	Shortraker rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
153	Redbanded rockfish	1	1.00
153	Redbanded rockfish	2	1.00
153	Redbanded rockfish	3	0.98
153	Redbanded rockfish	4	0.82
153	Redbanded rockfish	5	0.60
153	Redbanded rockfish	7	0.60
153	Redbanded rockfish	8	0.50
153	Redbanded rockfish	22	0.22
153	Redbanded rockfish	98	1.00
153	Redbanded rockfish	99	1.00
154	Dusky rockfish	1	1.00
154	Dusky rockfish	2	1.00
154	Dusky rockfish	3	0.98
154	Dusky rockfish	4	0.82
154	Dusky rockfish	5	0.60
154	Dusky rockfish	7	0.60
154	Dusky rockfish	8	0.50
154	Dusky rockfish	22	0.22
154	Dusky rockfish	98	1.00
154	Dusky rockfish	99	1.00
155	Yellowtail rockfish	1	1.00
155	Yellowtail rockfish	2	1.00
155	Yellowtail rockfish	3	0.98
155	Yellowtail rockfish	8	0.50
155	Yellowtail rockfish	22	0.22
155	Yellowtail rockfish	98	1.00
155	Yellowtail rockfish	99	1.00
156	Widow rockfish	1	1.00
156	Widow rockfish	2	1.00
156	Widow rockfish	3	0.98
156	Widow rockfish	22	0.22
156	Widow rockfish	98	1.00
156	Widow rockfish	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
157	Silvergray rockfish	1	1.00
157	Silvergray rockfish	2	1.00
157	Silvergray rockfish	3	0.98
157	Silvergray rockfish	5	0.60
157	Silvergray rockfish	8	0.50
157	Silvergray rockfish	22	0.22
157	Silvergray rockfish	98	1.00
157	Silvergray rockfish	99	1.00
158	Redstripe rockfish	1	1.00
158	Redstripe rockfish	2	1.00
158	Redstripe rockfish	3	0.98
158	Redstripe rockfish	8	0.50
158	Redstripe rockfish	22	0.22
158	Redstripe rockfish	98	1.00
158	Redstripe rockfish	99	1.00
159	Darkblotched rockfish	1	1.00
159	Darkblotched rockfish	2	1.00
159	Darkblotched rockfish	3	0.98
159	Darkblotched rockfish	4	0.82
159	Darkblotched rockfish	5	0.60
159	Darkblotched rockfish	8	0.50
159	Darkblotched rockfish	98	1.00
159	Darkblotched rockfish	99	1.00
160	Bullhead sculpin	1	1.00
160	Bullhead sculpin	2	1.00
160	Bullhead sculpin	3	0.98
160	Bullhead sculpin	5	0.65
160	Bullhead sculpin	98	1.00
160	Bullhead sculpin	99	1.00
165	Riffle sculpin	3	0.98
168	Unsp. Demersel shelf rockfish	1	1.00
168	Unsp. Demersel shelf rockfish	2	1.00
168	Unsp. Demersel shelf rockfish	3	0.98
168	Unsp. Demersel shelf rockfish	5	0.60
168	Unsp. Demersel shelf rockfish	8	0.50

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
169	Unsp. Pelagic shelf rockfish	1	1.00
169	Unsp. Pelagic shelf rockfish	3	0.98
169	Unsp. Pelagic shelf rockfish	5	0.60
193	Atka mackerel	1	1.00
193	Atka mackerel	2	1.00
193	Atka mackerel	3	0.98
193	Atka mackerel	4	0.87
193	Atka mackerel	5	0.61
193	Atka mackerel	98	1.00
193	Atka mackerel	99	1.00
270	Pollock	1	1.00
270	Pollock	2	1.00
270	Pollock	3	0.98
270	Pollock	4	0.80
270	Pollock	5	0.62
270	Pollock	8	0.72
270	Pollock	9	0.56
270	Pollock (total pollock)	14	0.065
270	Pollock (usable female pollock)	14	0.1375
270	Pollock	22	0.30
270	Pollock	23	0.30
270	Pollock	30	0.22 ¹⁸
270	Pollock	31	1.00
270	Pollock	32	0.17
270	Pollock	98	1.00
270	Pollock	99	1.00
510	Smelt (general)	98	1.00
510	Smelt (general)	99	1.00
511	Eulachon smelt	1	1.00
511	Eulachon smelt	98	1.00
511	Eulachon smelt	99	1.00
689	Shark (general)	1	1.00
689	Shark (general)	2	1.00
689	Shark (general)	3	0.98
689	Shark (general)	4	0.85
689	Shark (general)	5	0.72
689	Shark (general)	98	1.00
689	Shark (general)	99	1.00

Appendix Table 2.--Continued.

Species code	Name of species	Product code	Conversion rate
690	Salmon shark	1	1.00
690	Salmon shark	2	1.00
690	Salmon shark	3	0.98
690	Salmon shark	5	0.72
690	Salmon shark	98	1.00
690	Salmon shark	99	1.00
691	Spiny dogfish	1	1.00
691	Spiny dogfish	2	1.00
691	Spiny dogfish	3	0.98
691	Spiny dogfish	4	0.70
691	Spiny dogfish	98	1.00
691	Spiny dogfish	99	1.00
700	Skate	1	1.00
700	Skate	2	1.00
700	Skate	3	0.98
700	Skate	5	0.72
700	Skate	22	0.25
700	Skate	98	1.00
700	Skate	99	1.00
710	Sablefish (black cod)	1	1.00
710	Sablefish (black cod)	2	1.00
710	Sablefish (black cod)	3	0.98
710	Sablefish (black cod)	4	0.70
710	Sablefish (black cod)	5	0.60
710	Sablefish (black cod)	7	0.68
710	Sablefish (black cod)	8	0.62
710	Sablefish (black cod)	22	0.25
710	Sablefish (black cod)	23	0.25
710	Sablefish (black cod)	98	1.00
710	Sablefish (black cod)	99	1.00
870	Octopus	1	1.00
870	Octopus	3	0.98
870	Octopus	4	0.90
870	Octopus	5	0.85
870	Octopus	98	1.00
870	Octopus	99	1.00
875	Squid	1	1.00
875	Squid	2	1.00
875	Squid	98	1.00
875	Squid	99	1.00

TAGGED FISH AND CRAB

If you should find a tagged fish or crab while you are sampling, or if a crew member brings you a tagged fish or crab, return the tag, along with all pertinent information, to the debriefers at the end of your cruise. Such information should normally include the date, location, and circumstances of capture, and the length, weight, sex, and stage of maturity of the fish. Tags from yellowfin sole, halibut, cod, pollock, and other fish will be forwarded to the appropriate tagging agency. 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 dry 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 are usually located on the dorsal surface of the fish, or on the gill cover. Tags can be of the anchor, spaghetti, or modified disk variety. Some fish may be tagged twice. 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 well behind the eye, salt the snout, 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.

The Alaska Department of Fish and Game along with other agencies have tagged crab with bright yellow or orange plastic, "spaghetti" tags. If one of these tagged crabs are found, record the needed information and measure the crab as best you can to the nearest millimeter, even if you were not assigned calipers or dividers to measure crab. (Refer to "Length Measurements For Various Species" in the Appendix). Sometimes tagged crabs that have been caught are alive and in good condition. If this is the case, record the pertinent information along with the tag number and release the crab as quickly as possible.

Collecting and returning tags is an important way to help fishery research. Please remember to bring back tags with as much of the following information as possible:

1. Tag or tag serial number.
2. Scale and/or otoliths for aging.
3. Fish length (in mm if possible).
4. Fish weight (in gm if possible).
5. Sex and maturity of gonads (immature, mature, spawning).

6. General appearance (poor body condition, good body condition).
7. Condition of tagging wound (healthy healed tissue, open wound, etc.).
8. Time and date of capture.
9. Capture location (latitude and longitude).
10. Capture depth.

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 sampling 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. In determining sex, it is generally easiest to start with large, mature fish and work down in size to small, immature specimens. 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 not 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 should not be sexed, but all other pertinent data should be obtained before releasing the fish. 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 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 white tubes running right along the back bone.

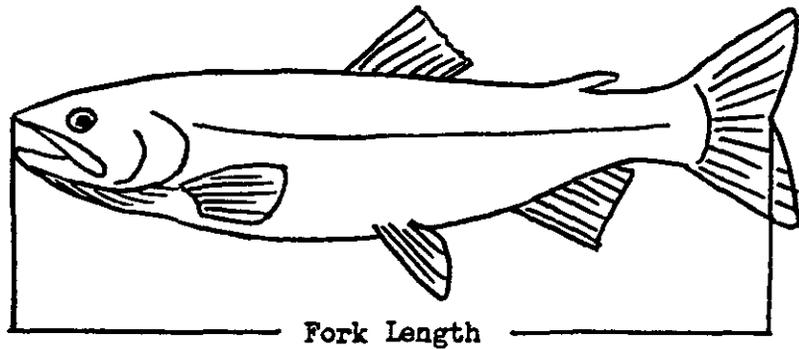
SEX DETERMINATION FOR SELECT TARGET AND INCIDENTAL SPECIES

	Walleye Pollock (Roundfish)	Pacific Halibut (Flatfish)	Pacific Ocean Perch (Rockfish)	Pacific Hake (Roundfish)
<u>FEMALE</u>				
Immature ovary	smooth, pink egg sacks; small, opaque eggs	triangular with a long tail lobe ex- tending posteriorly	firm and yellow to flabby and red and gray	pinkish, small eggs not yolked
Gravid ovary	smooth, pink egg sacks, greatly en- larged; they fill cavity	same, white, eggs usually visible	firm and yellow; embryos present	pink, eggs yolked, some eggs translucent to all eggs trans- lucent
<u>MALE</u>				
Immature testes	white, rippled membrane	same as female with- out 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 extend- ing to posterior; white	same as pollock
Spent testes	white to pink ribbon-like folds	same as immature male		same as pollock

LENGTH MEASUREMENTS FOR VARIOUS SPECIES

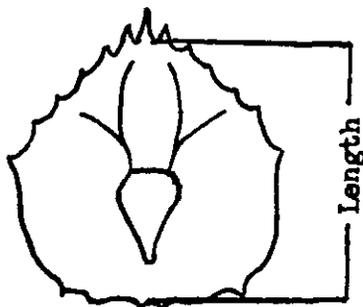
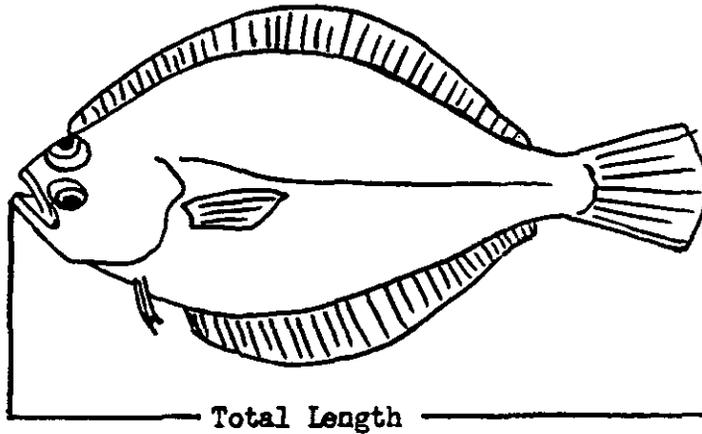
Fork Length Measure:

Roundfish
Rockfish
Salmon

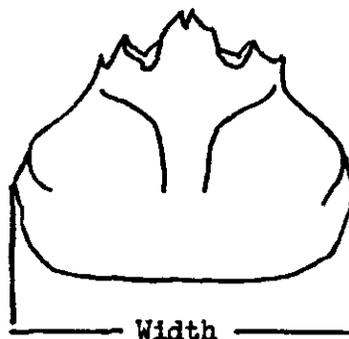


Total Overall Length:

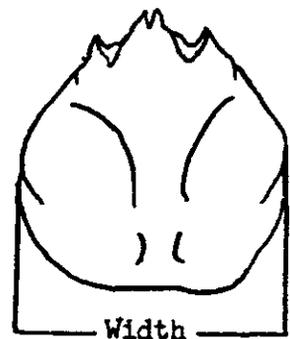
Flatfish
From snout to middle
of tail.



King Crab
Right eye socket to middle
of posterior margin.



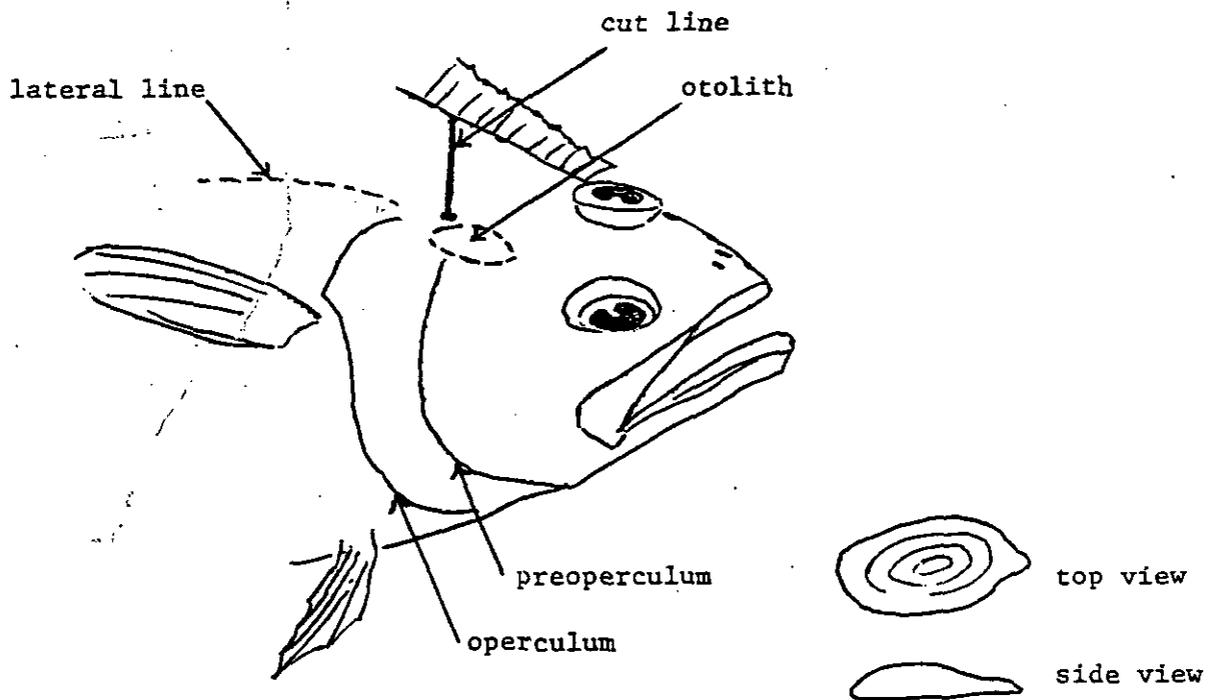
Tanner (Snow) Crab
C. bairdi



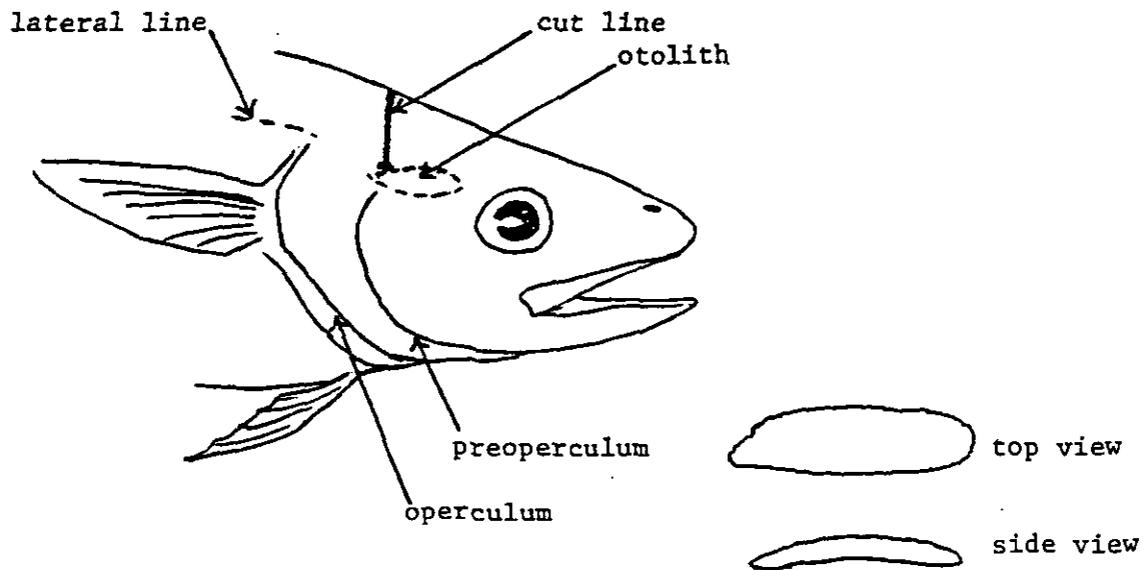
C. opilio

OTOLITH AND SCALE COLLECTION FOR SELECT SPECIES

<u>Species</u>	<u>Sample Type</u>	<u>Storage Container</u>	<u>Storage Media</u>
Walleye pollock	Otolith	Plastic vial	50% alcohol 50% water
Yellowfin sole (or other flatfish)	Otolith	Plastic vial	Glycerol/Thymol Solution
Atka mackerel	Otolith	Plastic vial	50% alcohol 50% water
Pacific cod	Otolith & Scale (both in same vial)	Plastic vial	50% alcohol 50% water
Pacific hake	Otolith	Plastic vial	50% alcohol 50% water
Jack mackerel	Otolith	Plastic vial	Dry
Sablefish	Otolith & Scale (both in same vial)	Plastic vial	50% alcohol 50% water
Salmon	Scale	Paper envelope	Dry
Rockfish	Otolith	Plastic vial	50% alcohol 50% water



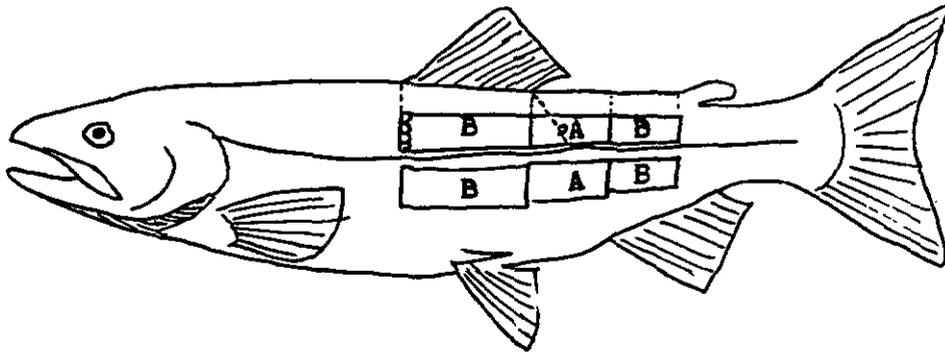
Arrowtooth Flounder
Atheresthes stomias



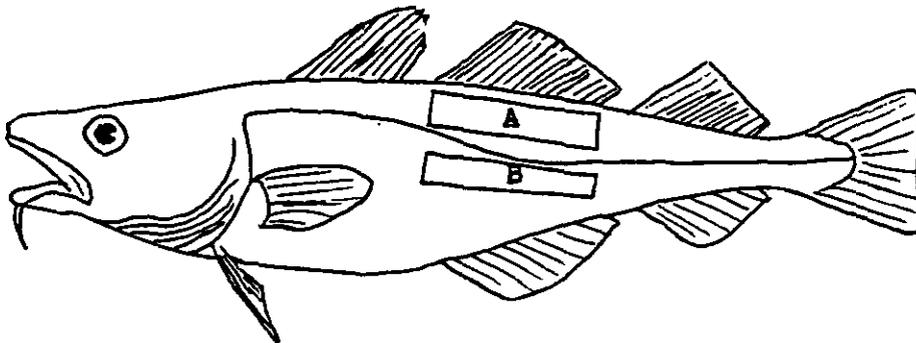
Walleye Pollock
Theragra chalcogramma

Approximate location of the otoliths (sagittal) and the cut for the removal of otoliths from flatfish and roundfish

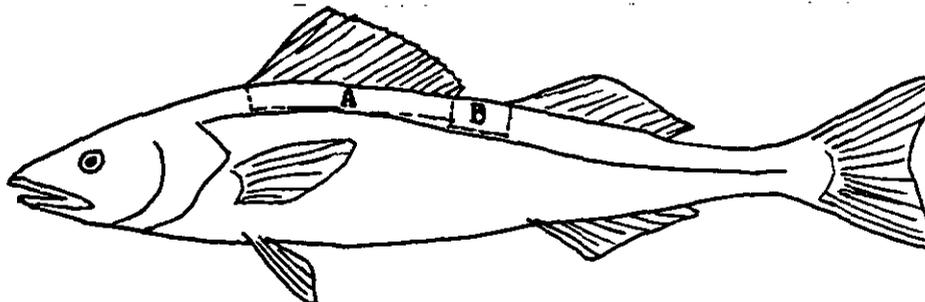
LOCATION OF PREFERRED SCALE SAMPLING ZONES
(Do not take lateral line scales)



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.



SABLEFISH (BLACK COD) - If assigned to collect scales, scrape the scales from the dorsal surface directly below the first dorsal fin.

HOW TO COLLECT FISH

Keep in mind that a large frozen specimen or a specimen collection becomes a piece of luggage so limit the size to what you can handle. Freeze the fish quickly after deciding to collect it. Lay the fish flat and straight to freeze it. Make an identifying label and put it with (in) the fish before freezing. Fill out a Specimen Collection Form and keep that with your paperwork. When the fish is frozen, glaze and reglaze it a couple times. When debarkation is near, pad and package it well. While in transit do your best to keep it frozen.

You can:

- A) In Dutch Harbor let your contact person, if any, know you have a frozen specimen to maintain. Maybe your place of lodging will hold it for you in their kitchen freezers.
- B) Tell the airlines at check-in that you have a package to keep frozen.
- C) In Seattle on a weekend, take it to the Seattle Aquarium if you can't keep it at your lodgings. Their weekend, daytime phone number is: 625-5018 or 625-5019 and their 24-hour phone number is: 625-4359. Tell the aquarium staff you are a NMFS observer, get directions and ask them to hold it for you until Monday. On weekdays bring frozen specimens into our freezer in the wetlab. Tell your debriefer you have a specimen and turn in your form.

Specimens Needed For Teaching Collection
(small (20-35 cm) specimens preferred)

I. Gadidae

Pacific Cod, Gadus macrocephalus

II. Flatfishes

Rough-scale Sole, Clidoderma asperrimum
Alaska Plaice, Pleuronectes quadrituberculatus
Longhead Dab, Limanda proboscidea
Rex Sole, Glyptocephalus zachirus
Curlfin Sole, Pleuronichthys decurrens *
C-O Sole, Pleuronichthys coenosus
Greenland Turbot, Reinhardtius hippoglossoides
Arrowtooth Flounder, Atheresthes stomias
Kamchatka Flounder, Atheresthes evermanni
Deepsea Sole, Embassichthys bathybius *
Dover Sole, Microstomus pacificus
Hybrid Sole, Inopsetta ischyra
English Sole, Parophrys vetulus
Butter Sole, Isopsetta isolepis
Slender Sole, Lyopsetta exilis
Petrale Sole, Eopsetta jordani
Flathead Sole, Hippoglossoides elassodon
Bering Flounder, Hippoglossoides robustus *
Arctic Flounder, Liopsetta gracialis *

III. Rockfishes

Longspine Thornyhead, Sebastolobus alascanus *
Darkblotched Rockfish, Sebastes crameri
Harlequin Rockfish, Sebastes variegatus
Redstripe Rockfish, Sebastes proriger
Shortraker Rockfish, Sebastes borealis *
Northern Rockfish, Sebastes polyspinus
Redbanded Rockfish, Sebastes babcocki
Silvergray Rockfish, Sebastes brevispinis
Dusky Rockfish, Sebastes ciliatus
Black Rockfish, Sebastes melanops
Blue Rockfish, Sebastes mystinus

IV. Incidentals

1. Any unusual fish

2. Look especially for:

- ✓ Dragon poacher, Percis japonicus
- ✓ Bering Wolffish, Anarhichas orientalis
- ✓ Sablefish, Anoplopoma fimbria
- Flathead Pomfret, Taractes asper
- Giant Wrymouth, Delolepis gigantea
- ✓ Atka Mackerel, Pleurogrammus monoptyerygius
- Oxeye Oreo, Allocyttus folletti
- Capelin, Mallotus villosus
- Eulachon, Thaleichthys pacificus
- Pacific Sandfish, Trichodon trichodon
- ✓ Prowfish, Zaprora silenus

Prowfish (collect)
Bering Wolffish

* = collect any size

Specimen Collection Form

Collector: _____ Cruise No.: _____ Vessel Code: _____

Date: _____ Vessel Name: _____

Haul No.: _____ Lat. & Long.: _____

Depth: _____ (meters) Water Temp.: _____ (degrees C.)

Collector's Identification: _____

Length: _____ (cm) Weight: _____ (kg)

Notes on in vivo coloration, unusual scale patterns or spines: _____

Sketch if necessary:

When completed, return this form to a debriefer.

Identification confirmed by: _____ Date: _____

Common Name: _____

Scientific Name: _____

Comments: _____

Specimen Collection Form

Collector: _____ Cruise No.: _____ Vessel Code: _____

Date: _____ Vessel Name: _____

Haul No.: _____ Lat. & Long.: _____

Depth: _____ (meters) Water Temp.: _____ (degrees C.)

Collector's Identification: _____

Length: _____ (cm) Weight: _____ (kg)

Notes on in vivo coloration, unusual scale patterns or spines: _____

Sketch if necessary:

When completed, return this form to a debriefer.

Identification confirmed by: _____ Date: _____

Common Name: _____

Scientific Name: _____

Comments: _____

Specimen Collection Form

Collector: _____ Cruise No.: _____ Vessel Code: _____

Date: _____ Vessel Name: _____

Haul No.: _____ Lat. & Long.: _____

Depth: _____ (meters) Water Temp.: _____ (degrees C.)

Collector's Identification: _____

Length: _____ (cm) Weight: _____ (kg)

Notes on in vivo coloration, unusual scale patterns or spines: _____

Sketch if necessary:

When completed, return this form to a debriefer.

Identification confirmed by: _____ Date: _____

Common Name: _____

Scientific Name: _____

Comments: _____

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE

Permit to Import Marine Mammals and Endangered Species
Permit No. 578

The National Marine Mammal Laboratory, Northwest and Alaska Fisheries Center, National Marine Fisheries Service, 7600 Sand Point Way, N.E. BIN C15700, Seattle, Washington 98115, is hereby authorized to import marine mammal specimens, including material from species listed as threatened or endangered, for scientific research and scientific purposes as cited in the Permit Holder's application and 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 (50 CFR Part 216), the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the regulations governing endangered species permits (50 CFR Parts 217-222), and the Conditions hereinafter set out.

A. Number and Kind of Marine Mammals:

An unspecified number of specimen materials may be imported from:

1. All Cetacean species
2. All Pinnipedia species, except walrus (Odobenus rosmarus)

B. Special Conditions:

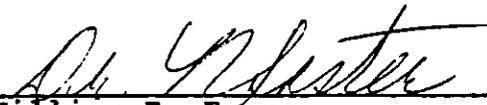
1. The specimen material may be imported from anywhere in the world. The material shall have been collected from animals:
 - a) Taken in fisheries for such animals in situations where such taking is legal;
 - b) killed incidental to fishing or other operations;
 - c) found dead floating at sea or beached; or

d) that have died of natural causes.

2. All specimen materials collected under the authority of this Permit shall be maintained according to accepted curatorial standards in bona-fide scientific collections. In the event that fluid tissue specimens are disposed of upon completion of a project, the disposal shall be reported as required by Section B.
3. The Holder must coordinate activities within the United States with appropriate Federal, state and local resource management agencies.
4. The Holder shall submit written notification to the Protected Species Division and the appropriate Regional Director(s) of names of designated agents and the dates which their designation is valid at least two weeks prior to their activity under the Permit. An annually updated list of agents and NMFS personnel authorized to operate under this Permit shall be provided to the Protected Species Division and appropriate Regional Directors.
5. The Holder shall notify the appropriate Regional Director(s) sufficiently in advance of importation or transfer of specimen material. This notification shall include the destination of the specimen materials.
6. The Holder shall submit a report within 30 days of the importation authorized herein listing the items imported and the dates of importation.
7. The Holder shall submit an annual report by December 31 of each year the Permit is valid. The report shall include but is not limited to, a description of each animal from which a specimen was taken including its species, age, size, sex, reproductive condition; date and location of collection; circumstances causing death if known; the date and location of each importation; and the name and location of each institution maintaining specimen materials collected under this Permit.
8. The Holder shall submit a final report within 90 days of the expiration date of the Permit which includes a summary describing the materials that have been imported and their disposition. All reports shall be submitted to the Office of Protected Species and Habitat Conservation, National Marine Fisheries Service, U.S. Department of Commerce, Washington, D.C. 20235.

9. The provisions of this permit may be amended upon reasonable notice by the Assistant Administrator for Fisheries depending upon the species and circumstances involved.
10. This Permit does not relieve the Holder from the requirement of full compliance with all provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). For those species listed on any of the Appendices to CITES valid and appropriate permit(s) authorizing import must be obtained prior to shipment.
11. The authority to collect and import this material shall extend from the date of issuance through December 31, 1991. The terms and conditions of this permit (Sections B and C) shall remain in effect as long as the material imported hereunder is maintained under the authority and responsibility of the Permit Holder.

C. All General Conditions attached as Section C shall apply and are made a part hereof.



William E. Eyans
Assistant Administrator for Fisheries
National Marine Fisheries Service



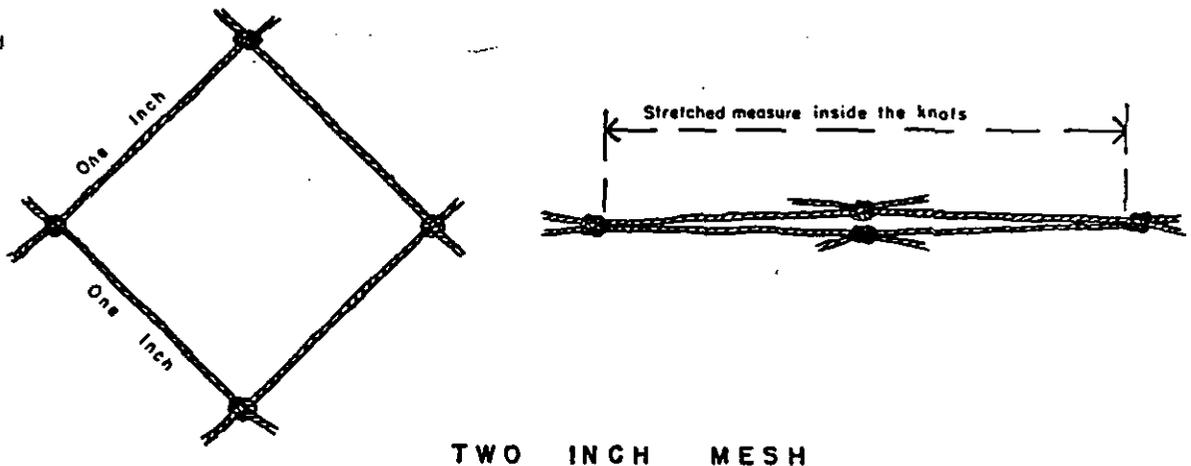
Date

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.

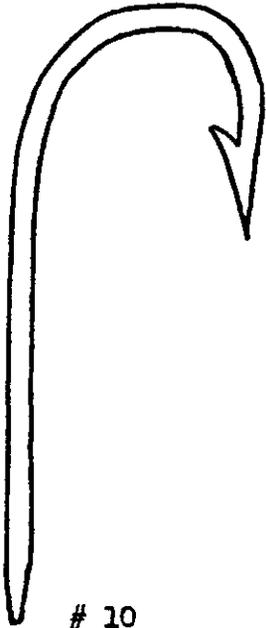
W. L. Scofield



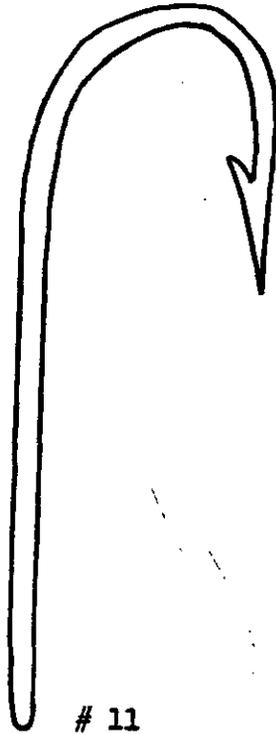
TWO INCH MESH

A two-inch mesh, open (left) and stretched. This points up variables inherent in web measure and consequent difficulties. Common yardstick is "stretch measure."

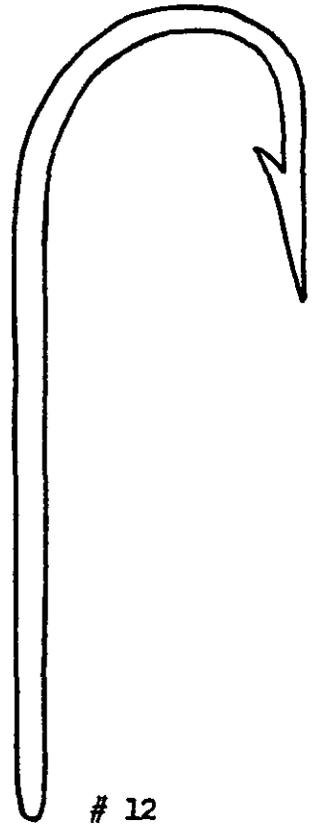
HOOK SIZE CHART FOR LONGLINERS



10



11



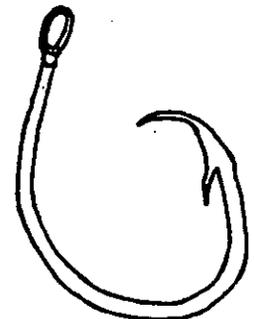
12



8



9



CIRCLE HOOK

RADIO COMMUNICATIONS

The radios that you will encounter most often are VHF-FM (Very High Frequency Modulation), used for short-range vessel-to-vessel and vessel-to-shore communication, and HF-SSB (High Frequency-Single Side Band), used for communication when the stations are out of VHF range with each other. Both types offer certain special advantages, and each requires a specific operating procedure.

VHF-FM RADIOS

In the United States, the VHF Band is broken up into 71 channels, with a frequency range of from 156.000 to 163.000 MHz, including six WX (Weather) channels. By law, all operating VHF stations are required to have at least three of these channels: channel 6, channel 16, and at least one other working channel.

Channel 6 (156.300 MHz) is the Intership Safety Channel, used for intership safety purposes, search-and-rescue (SAR) communications with ships and aircraft of the U.S. Coast Guard, and vessel movement reporting within ports and inland waterways. This channel must not be used for non-safety communications.

Channel 16 (156.800 MHz) is the International Distress, Safety, and Calling Channel (Intership and Ship-to-Coast). This channel must be monitored at all times the station is in operation (except when actually communicating on another channel). This channel is also monitored by the U.S. Coast Guard, Public Coastal Stations, and many Limited Coastal Stations. Calls to vessels are normally initiated on this channel. Then, except in an emergency, you must switch to a working channel. It is against FCC regulations to conduct business on this channel. In addition, vessels calling must use their assigned call sign at the beginning and end of each transmission.

Channel 22A (157.100 MHz) is the U.S. Coast Guard Liaison Channel. This channel is used for communications with U.S. Coast Guard ships, aircraft, and coastal stations after first establishing contact on channel 16. Navigational warnings and, where not available on WX channels, Marine Weather forecasts are also broadcast on this frequency.

Channels 24,25,26,27 and 28 (also 84,85,86 and 87) are the Public Correspondence channels (ship-to-coast). These are available to all vessels to communicate with Public Coastal stations (Marine Operator). Channels 26 and 28 are the primary public correspondence channels.

Channels 1,3,5,12,13,14,15,17,65,66,73,74,77,81,82 and 83 are channels with special designations (port traffic communications, U.S. government communications, locks and bridges, environmental, etc.), and their use close to shore or to ports should be minimized.

Channels 7,8,9,10,11,18,19,67,68,69,70,71,72,78,79,80 and 88 are commercial and non-commercial working channels that are available for conducting business. The abbreviated format (no call signs) is acceptable on these frequencies. It should be noted that some of these channels may be locally restricted (off the Washington Coast, for example, channel 11 is Tofino Coast Guard Traffic Control for the entry into Juan deFuca Strait, used for reporting ship locations), in which case their use for business should be avoided.

HF-SSB RADIOS

Single Side Band radio is a special version of AM (Amplitude Modulation) radio specifically intended for long-range communication. As a consequence of the "skip" phenomenon (the tendency of a transmitted signal to reflect off the barrier created by the ionosphere), High Frequency skywaves can reach stations up to several thousand kilometers away (depending on ionospheric conditions and other environmental factors). The very nature of the transmitted skywave, however, means a signal very much poorer in quality than a typical VHF or UHF (Ultra High Frequency) signal, and one that is very susceptible to slight atmospheric shifts. HF propagation can vary with time of day, month of the year, sunspot activity, etc., so it becomes extremely important to use more than one frequency to ensure communications under differing conditions.

A number of specific characteristics must be considered when discussing skywaves in an HF-SSB system. One of the most important is the operating frequency of the system. In general, the lower frequencies are used for medium distances, and the higher frequencies for greater distances. As a general rule of thumb for daytime operations, multiply the frequency in MHz by 100 to obtain the approximate skywave coverage distance in miles: 4 MHz equals 400 miles, and 12 MHz equals 1200 miles. At night, these ranges are from 2 to 3 times greater. The nature of the ionosphere is such that its effective position varies with the time of day, tending to move higher up after sundown. This means that the same frequency will reach farther at night, and it is therefore common practice to use lower frequency at night for coverage of the same distance.

RADIO PROCEDURE

Inasmuch as the airwaves are in the public domain, it is the responsibility of the radio station operator to conduct business according to established guidelines and procedures. While on the air, the operator should follow the following format outline:

1. Listen before beginning transmission in order to ensure that you are not interfering with other stations or with emergency radio traffic.

2. Identify your station when calling. On the SSB, a calling station must limit the duration of the hail to not more than 30 seconds. If there is no reply, the hail may be repeated at 2 minute intervals up to a maximum of three times, at which time the calling station must sign off and wait a minimum of 15 minutes before making another attempt. This requirement does not apply in emergency situations.

3. Keep transmissions short and concise, giving the other station a chance to respond, ask questions, or reconfirm an unclear message. A long, complicated message can best be effected in short segments, with breaks in between to ensure that the receiving station has copied each portion of the message correctly.

4. Follow correct radio procedure while on the air. The phonetic alphabet should be learned and used -- spelling unclear words with an extemporaneous phonetic alphabet can lead to misunderstood messages. You should also know and use the radio "punctuation" words ("over", "clear", "out", "roger", "words twice", "say again", "standing by", and "break"). Since most radio communication is only one way at a time, these words can be invaluable for signaling your intentions to the receiving station. Make sure to speak directly into the microphone; speaking loudly, slowly, and distinctly -- but not shouting -- can significantly improve the legibility of radio broadcasts. The use of profanity on the public airwaves is strictly forbidden.

5. Upon completing a transmission, you must sign off by identifying your station and using the words "clear" or "out" (or, if you expect to soon resume contact with the same station, by using the phrase "standing by").

RADIO TELEPHONE PROCEDURE CONTINUED

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. 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:

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."

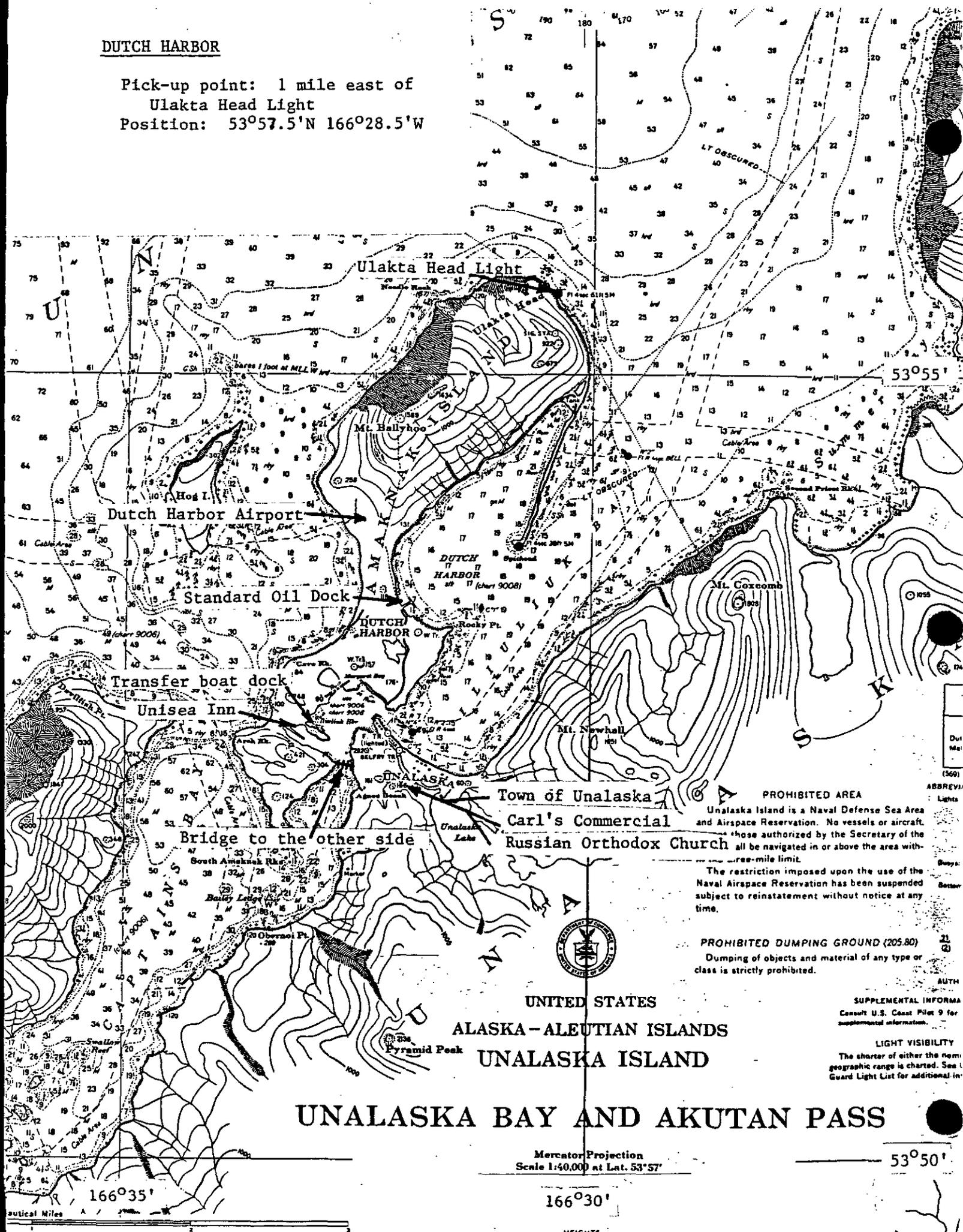
Her - "This is Mrs. Griffin. O.K. I'll have the boat come out to get you. You may have to wait for awhile, over."

You - "This is the Anyo Maru. Roger, we will be waiting. Out."

Her - "This is Mrs. Griffin, out."

DUTCH HARBOR

Pick-up point: 1 mile east of
Ulakta Head Light
Position: 53°57.5'N 166°28.5'W



PROHIBITED AREA
 Unalaska Island is a Naval Defense Sea Area and Airspace Reservation. No vessels or aircraft, those authorized by the Secretary of the Navy, shall be navigated in or above the area within a three-mile limit.
 The restriction imposed upon the use of the Naval Airspace Reservation has been suspended subject to reinstatement without notice at any time.

PROHIBITED DUMPING GROUND (205.80)
 Dumping of objects and material of any type or class is strictly prohibited.



UNITED STATES
 ALASKA - ALEUTIAN ISLANDS
UNALASKA ISLAND

UNALASKA BAY AND AKUTAN PASS

Mercator Projection
 Scale 1:40,000 at Lat. 53°57'

53°50'

166°35'

166°30'

Nautical Miles

Yards

HEIGHTS
 Heights in feet above Mean High Water

Dist. Meas.
 (569)
 ABBREVIATIONS
 Lights
 Buoy
 Bottom
 AUTH.
 SUPPLEMENTAL INFORMATION
 Consult U.S. Coast Pilot 9 for supplemental information.
 LIGHT VISIBILITY
 The shorter of either the normal geographic range is charted. See Light Guard Light List for additional information.

MEDICAL DIAGNOSTIC CHART (MDC)

One of the most important functions an observer can perform during a medical emergency is the collection and maintenance of a medical history. This history and its communication to the Coast Guard is essential to the further treatment of an injured person.

There are two histories to be aware of. The first deals with the patient's bodily make-up and past medical concerns. The second history is a record of the accident or illness and how it is affecting the patient over time. These two pieces of information will give doctors and corpsmen, hundreds of miles away, a greater diagnostic tool of what's happening inside the patient's body and what complications may lie ahead.

The patient's past medical history is the "frame work" for which you will later fill in the "details". The frame work on your "MDC RADIO WORK SHEET AND FLOW CHART", consists specifically of numbers 7 through 13. The information within these numbers begins to paint the picture. For example: 30 yr. old /male/145 lbs./ 5 ft. 7 in. / medium build/ no allergies/ no medications///. [Please note that what is underlined would be in your radio message.] This "framework" information is just as important as the details you are about to fill in.

Without previous training and using what is available, you can observe and record the nature of the accident and the patient's vital signs. Numbers 14 through 18 are observation questions of "what's happened" (#'s 7-13 are to whom), and numbers 19 through 25 are the observation questions of "what's happening now". An example of what's happened might be:

INJURED BY A BROKEN CABLE ON JAN. 24 AT 0300 GMT/PATIENT HAS SUSTAINED A HEAD INJURY/ COMPLAINS OF SEVERE PAIN IN THE UPPER LEFT QUADRANT OF ABDOMEN/ COMPOUND FRACTURE TO RIGHT HAND/ POSSIBLE FRACTURE TO LEFT ARM BELOW ELBOW/ POSSIBLE INTERNAL BLEEDING IN THE ABDOMEN, AREA HARD AND TIGHT, SOME BLOOD IN URINE/ RIGHT HAND AND LEFT ARM SPLINTED, EXTERNAL BLEEDING CONTROLLED///

"What's happening now" is information on the vital signs: level of consciousness, eye reactions, pulse, blood pressure, respiration, skin condition and body temperature. Here is an example of what's happening now:

VITAL SIGNS/ LOC, ALERT/ EYES, E-R/ PULSE, 64 STEADY BUT WEAK/ B-P UNAVAILABLE, DISTAL PULSE PRESENT, CAP REFILL GOOD/ LUNGS, CLEAR AND EQUAL/ RESP, 30 AND SHALLOW/ SKIN PERSPIRATION, NORMAL; COLOR, NORMAL; TEMPERATURE, NORMAL/ BODY TEMPERATURE, 102.2///

Don't forget to have ready, the patient's name, the vessel name and the vessel owner's name and address. All of this extra information is necessary to expedite travel and personnel transfers and to inform family members.

The procedure and interpretation of the worksheet is as follows:

Numbers 1,2 and 3: Contained in the heading of the radio message.

Numbers 4 and 5: Self-explanatory.

Number 6: Very important, don't forget it.

Numbers 7-11: Can be estimated when there is a lack of good communication.

Numbers 12 and 13: Very critical, must be exact!

Number 14: Self-explanatory.

Number 15: Should be self-explanatory, however there are three things to be aware of: 1) the definition of a soft tissue injury; 2) trying to localize abdominal pain; and 3) the various types of bleeding. Soft tissue injuries are injuries related to the organs (ie: eyes, kidneys, testes, etc.). Whenever possible, locate the abdominal pain using the navel as the center point. This will give the doctors and corpsmen a better idea of which organs are traumatized.

Number 16: Fill this out carefully. Bleeding is not only an injury, but also an indicator of further problems and therefore must be observed in greater detail. Identify the type of bleeding as: profuse, shallow, pulsating, steady, and/or internal. Internal bleeding is difficult to identify but can be suspected, if an area such as the abdomen which is normally soft, is now hard and rigid; if that area or another is tender, swollen and/or has a bruised appearance to it. Look for the presence of blood in the eyes, ears, mouth, vomit and urine. Blood in the vomit needs specific identification as to its consistency and color (ie: is the blood fluid-like in appearance or does it appear clumped together like coffee grounds, is it dark red or bright red?). All of these observations are necessary to determine the nature and origin of the bleeding.

Numbers 17 and 18: Self-explanatory, basic observations that shouldn't need further elaboration.

Numbers 19 through 25: The vital signs, these are the indicators of the patient's present physiology. Essentially, to record the vital signs all you need other than your good judgment is a watch with a second hand and a flashlight. Number 19, a patient's Level Of Consciousness (LOC) is generally described in terms of Alert, Vocal, Pain or Unconscious. Determining a patient's LOC is standard. The method used to determine Alertness is "Time, Date, Place Orientation." A person is considered Alert if they can answer simple questions, "What is your name, where are we, what is today's date?" Do not ask questions like, "How many fingers do I have up?" Number skills involve an entirely different set of motor functions in the brain. A person who is incoherent, semi-conscious, or mumbling without direction is considered Vocal. When a patient is unconscious but responsive to Pain (a thin pinch on the bottom of the foot or under the armpit should do the trick) then this should be noted differently than the state of Unconscious, since it denotes a higher state of consciousness.

Number 20: You will need a flashlight for this one. Open both eyes, shine the light into one eye from the side of the face (not directly into the eye from the front of the face), look into the other eye. Both pupils should constrict equally, quickly, and simultaneously. If you have any doubts, repeat this procedure and compare results with those of people around you.

Number 21: Pulse is counted at beats per 30 seconds times 2, and rated per minute. The pulse is best taken at the wrist (follow the thumb down to the beating area...) or at the throat (off to either side of the windpipe, under the jaw). Again, if in doubt, compare. A description of the pulse should follow: strong, weak, bounding, etc.

Number 22: Without a blood pressure cuff, accurate B-P information is unavailable. However, other data you are collecting, the qualitative information on the pulse and skin conditions, will

assist in a general qualitative assessment of the B-P. With that, there are two other direct indicators of B-P quality, they are: Distal Pulse; and Capillary Refill. Distal pulse is a pulse taken at a location distant from the heart. The two most common places are: 1) below and behind the ankle; and 2) top center of the foot. The presence and quality of this pulse is your data. (NOTE: these pulses are difficult to find on a healthy person and if you are unable to find them on your patient try to find them on yourself or on someone around you). Capillary refill is your other index of quality. Pinch a little bit of skin on the fore finger and toe. Note how quickly color is lost and then returns. That speed in which skin color returns is your indicator. Capillary refill is diminished by cold.

Number 23: Filling out the information on lungs and respirations should be self-explanatory. In the event that you don't have a stethoscope, then place your ear on the patient's chest, both sides, high and low. With a stethoscope, check the lungs high middle and low on the chest, and high and low on the back. Respirations should be timed and qualified the same way as the pulse is. One word of caution, don't let the patient know that you are monitoring their breath, they will breath differently.

Number 24: Skin perspiration, color and temperature is monitored by sight and touch. This should not present any problems, do not confuse skin temperature with body temperature.

Number 25: Place a thermometer in the patient's mouth or armpit and record your findings. To convert centigrade to fahrenheit use the equation given on the worksheet.

The flow chart which follows is simply an update of Numbers 19 through 25 every 15 or 30 minutes as necessary. For the first half hour it is good to monitor your patient every 10 minutes, every 15 minutes for the next hour and a half, and every half hour after that.

An example of your first radio message should look something like the following, with subsequent radio messages updating the patients condition as necessary.

NOJ DE vessel call sign MSG MDC

TO: COAST GUARD KODIAK

FROM: your name, vessel name, vessel permit number, present lat. and long., time & date

REQUEST MEDICAL ASSISTANCE/ CREWMAN JOE MISFORTUNATE/ 30 YR./MALE/
145 LBS./ 5 FT. 7 IN./MEDIUM BUILD/NO ALLERGIES/NO MEDICATIONS///

INJURED BY A BROKEN CABLE ON JAN. 24 AT 0300 GMT/ PATIENT HAS
SUSTAINED A HEAD INJURY/ COMPLAINS OF SEVERE PAIN IN THE UPPER LEFT
QUADRANT OF ABDOMEN/ COMPOUND FRACTURE TO THE RIGHT HAND/
POSSIBLE FRACTURE TO THE LEFT ARM BELOW ELBOW/ POSSIBLE INTERNAL
BLEEDING IN THE ABDOMEN, AREA HARD AND TIGHT, SOME BLOOD IN URINE/
RIGHT HAND AND LEFT ARM SPLINTED, EXTERNAL BLEEDING CONTROLLED///

VITAL SIGNS/ LOC, ALERT/ EYES, E-R/ PULSE 64 STEADY BUT WEAK/ B-P
UNAVAILABLE, DISTAL PULSE PRESENT, CAPILLARY REFILL GOOD/ LUNGS
CLEAR AND EQUAL/RESPIRATIONS 30 AND SHALLOW/ SKIN: PERSPIRATION,
NORMAL; COLOR, NORMAL; TEMPERATURE, NORMAL/ BODY TEMPERATURE
102.2///

VESSEL OWNER/ JOE SMITH/ HOMER/ 907 123-4567///PLEASE ADVISE BEST COURSE
OF ACTION///

MDC RADIO WORKSHEET AND FLOW CHART

- (1) VESSEL'S NAME & CALL SIGN _____
- (2) VESSEL'S LAT. & LONG. _____ (3) TIME & DATE _____ (GMT) _____
- (4) VESSEL AGENT'S U.S. NAME & ADDRESS _____
- (5) VESSEL OWNER'S NAME & ADDRESS _____
- (6) PATIENT'S NAME _____ (7) AGE _____ (8) SEX _____
- (9) HT. _____' _____" (10) WT. _____ # (11) BUILD _____ (12) ALLERGIES _____
- (13) PRESENTLY ON MEDICATIONS Y/N _____ WHAT _____
- (14) DATE, TIME & NATURE OF INJURY _____

- (15) TYPE OF INJURIES OR ILLNESS
- | | | | |
|---|---|--------------------------------------|--|
| <input type="checkbox"/> Airway | <input type="checkbox"/> Abdominal Pain (general) | <input type="checkbox"/> Fracture | <input type="checkbox"/> Swelling |
| <input type="checkbox"/> Cardiac Arrest | <input type="checkbox"/> Upper Left Quadrant | <input type="checkbox"/> Burn | <input type="checkbox"/> Bleeding |
| <input type="checkbox"/> Head | <input type="checkbox"/> Upper Right Quadrant | <input type="checkbox"/> Poisoning | <input type="checkbox"/> Alcohol On Breath |
| <input type="checkbox"/> Soft Tissue | <input type="checkbox"/> Lower Left Quadrant | <input type="checkbox"/> Seizure | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Chest Pain | <input type="checkbox"/> Lower Right Quadrant | <input type="checkbox"/> Psychiatric | _____ |

- (16) TYPE OF BLEEDING
- | | | |
|------------------------------------|-----------------------------------|---|
| <input type="checkbox"/> Profuse | <input type="checkbox"/> Internal | Blood in the: |
| <input type="checkbox"/> Shallow | | <input type="checkbox"/> Eyes <input type="checkbox"/> Ears <input type="checkbox"/> Vomit |
| <input type="checkbox"/> Pulsating | | <input type="checkbox"/> Nose <input type="checkbox"/> Mouth <input type="checkbox"/> Urine |
| <input type="checkbox"/> Steady | | |

- | | |
|---|---|
| (17) LOCATION OF INJURIES | (18) TREATMENT |
| <input type="checkbox"/> Head/Face <input type="checkbox"/> Upper Extremities | <input type="checkbox"/> Cleared Airway <input type="checkbox"/> Wound Care |
| <input type="checkbox"/> Neck/Spine <input type="checkbox"/> Abdomen | <input type="checkbox"/> Oxygen <input type="checkbox"/> Splint |
| <input type="checkbox"/> Chest <input type="checkbox"/> Pelvis | <input type="checkbox"/> CPR <input type="checkbox"/> Neck/Spine Immobilized |
| <input type="checkbox"/> Back <input type="checkbox"/> Lower Extremities | <input type="checkbox"/> Controlled Bleeding <input type="checkbox"/> Other _____ |

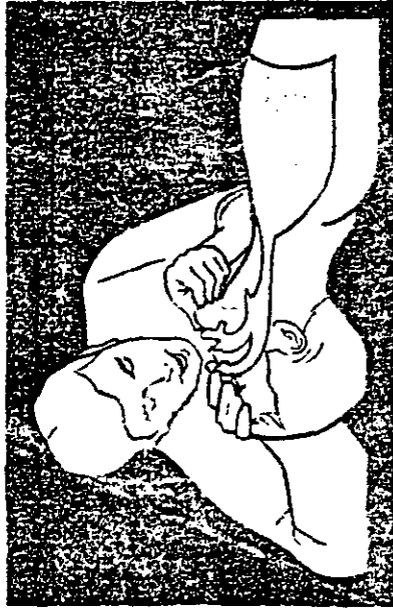
VITAL SIGNS

- | | | |
|--|--|--|
| (19) LEVEL OF CONSCIOUSNESS | (20) EYES | (21) PULSE (#'s & quality) |
| <input type="checkbox"/> Alert | <input type="checkbox"/> Pupils EQUAL & REACTIVE | <input type="checkbox"/> XX Beats per minute |
| <input type="checkbox"/> Vocal (but not alert) | <input type="checkbox"/> UNEQUAL but reactive | <input type="checkbox"/> Strong |
| <input type="checkbox"/> Pain (responsive to) | <input type="checkbox"/> Sluggish | <input type="checkbox"/> Steady |
| <input type="checkbox"/> Unconscious | <input type="checkbox"/> Dialated (Enlarged) | <input type="checkbox"/> Bounding |
| | <input type="checkbox"/> Constricted (Small) | <input type="checkbox"/> Weak |
| | <input type="checkbox"/> NON-REACTIVE | <input type="checkbox"/> Thready |
| | | <input type="checkbox"/> Irregular |

Cardiopulmonary Resuscitation (CPR)

SHAKE OR SHOUT TO DETERMINE UNCONSCIOUSNESS

Airway



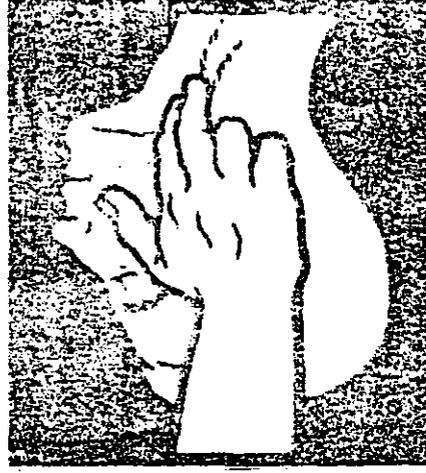
If no response:

TILT head and LIFT chin to clear airway of tongue.

LOOK, LISTEN, and FEEL.

Look to see if chest is rising and falling.

Listen and Feel at mouth with your ear to determine breathing.



If no breathing:

PINCH nostrils.

OPEN your mouth.

TAKE a deep breath.

SEAL patient's mouth with yours.

BLOW four quick, full breaths.

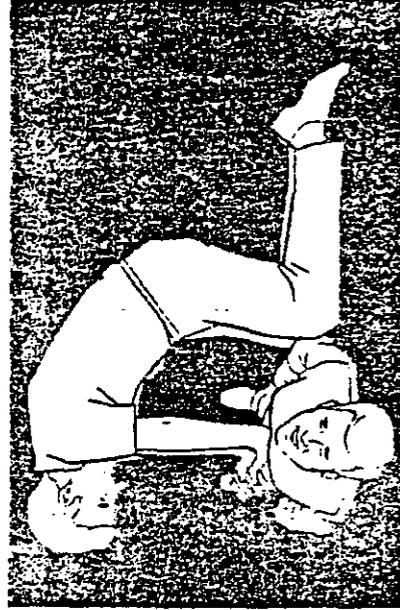
CHECK neck pulse on the side nearest you.

If pulse is present, continue breathing 12 times per minute (1 each 5 seconds).

*Child/Infant rate - 20 times per minute
(1 each 3 seconds)*

Breathing

Circulation



If no pulse:

REMOVE obstructive clothing from chest.

FEEL for lower end of breastbone with 2 or 3 fingers on xiphoid.

PLACE heel of one hand just above fingers so that you are on lower one-half of breastbone, PLACE other hand on top of first; KEEP arms straight.

Small child — use heel of one hand at midpoint of breastbone.

Infant — use 2 fingers at midpoint of breast bone.

COMPRESS breastbone straight down 1 1/2 to 2 inches . . .

Child — 3/4 to 1 1/2 inches

Infant — 1/2 to 3/4 inch

. . . at a RATE of 60-80 times per minute.

Child/Infant 80-100 times per minute.

ONE PERSON — give 2 BREATHS after 15 CHEST COMPRESSIONS. Chest compressions are done at a rate of 80 times per minute.

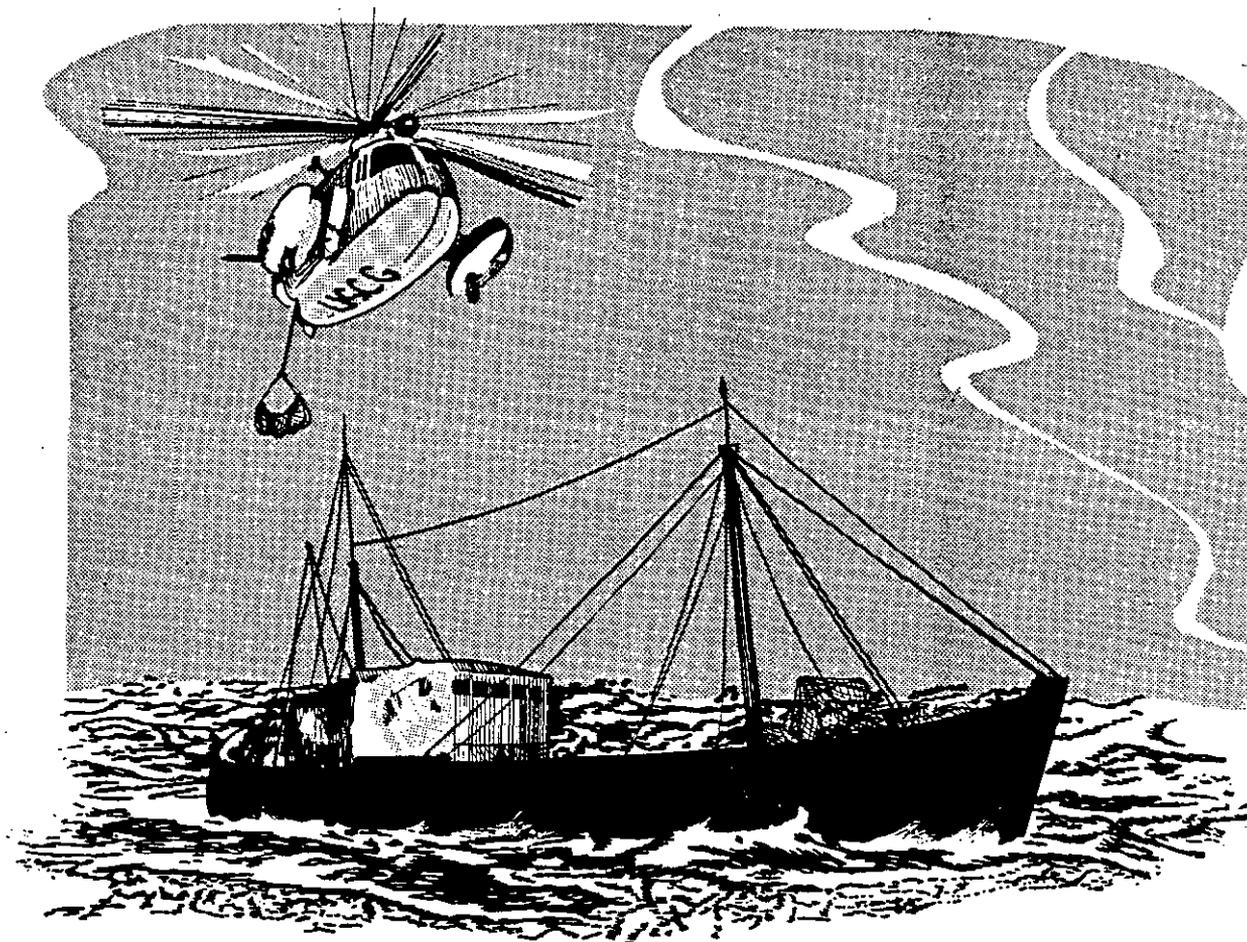
TWO PERSONS — Give 1 BREATH during the upstroke of each 5th CHEST COMPRESSION. Chest compressions are done at a rate of 60 times per minute.

BREASTBONE

RIBS

XIPHOID

Call for Help.



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 patient's 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.

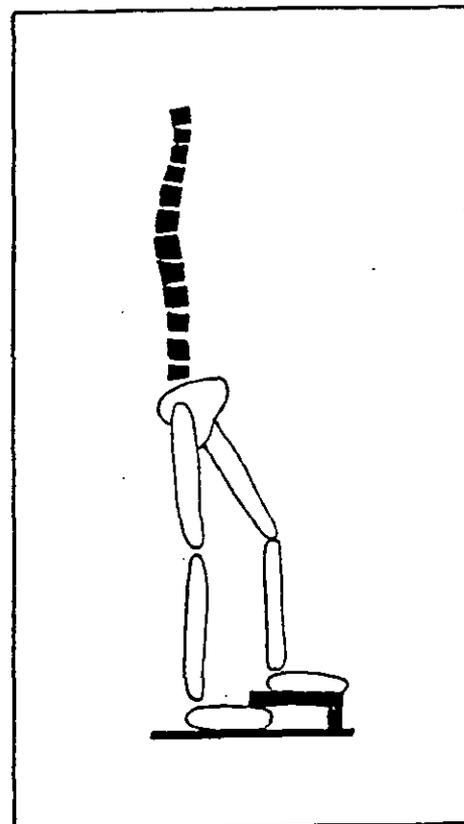
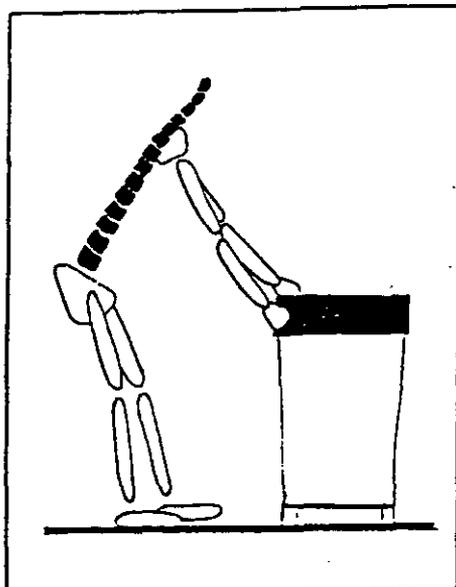
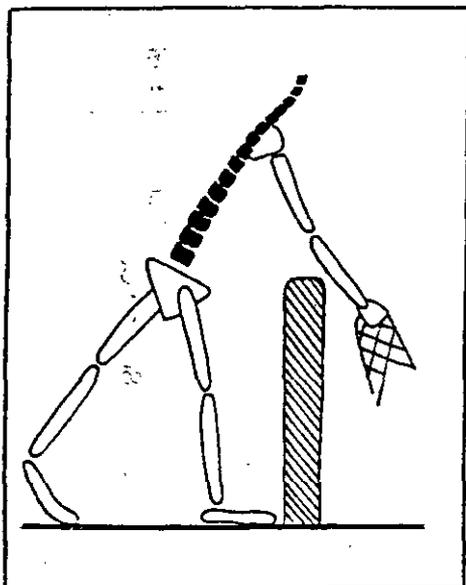
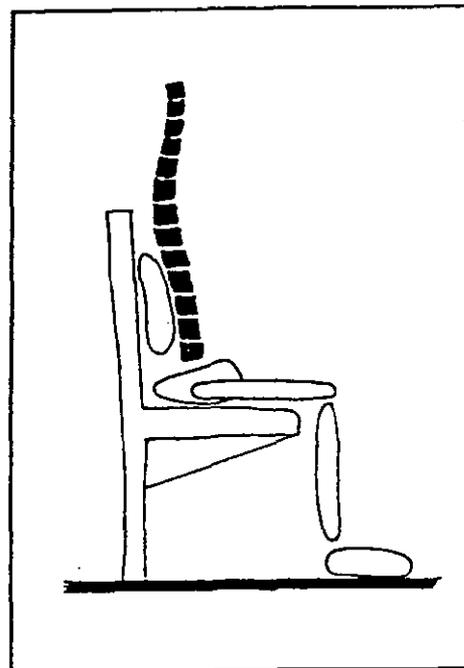
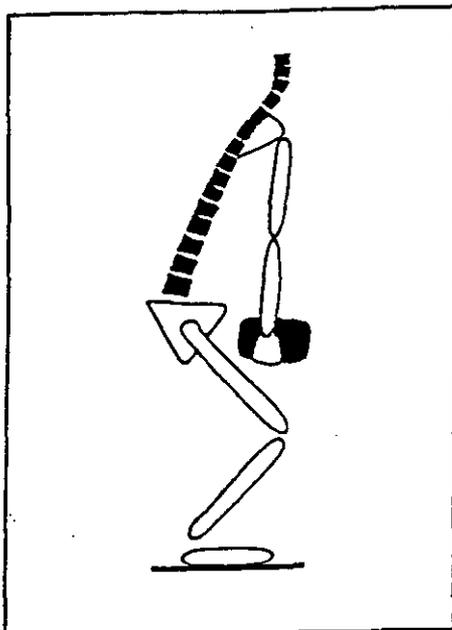
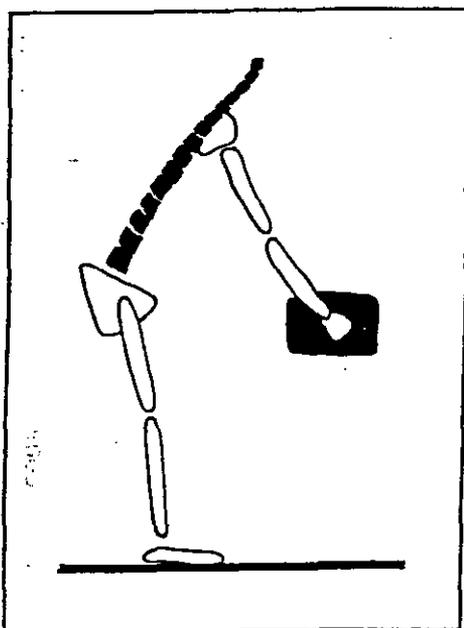
▲ Conditions permitting, have patient in life jacket, strapped in, face up, and hands clear of sides.

▲ 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.

PREVENTING BACK INJURIES



1. The stress on the back is increased when the work is too far away from the body.

2. Taking the time to get a load directly in front of and close to you will reduce the chance of hurting your back. Always bend your knees and lift with a straight back.

3. If you have to sit for a long period, make sure the seat supports the lower back. If it doesn't, put a rolled-up sweater or towel behind your waist.

4. If you have to reach over something to do a job, put your weight on one leg and stretch the other leg straight out behind.

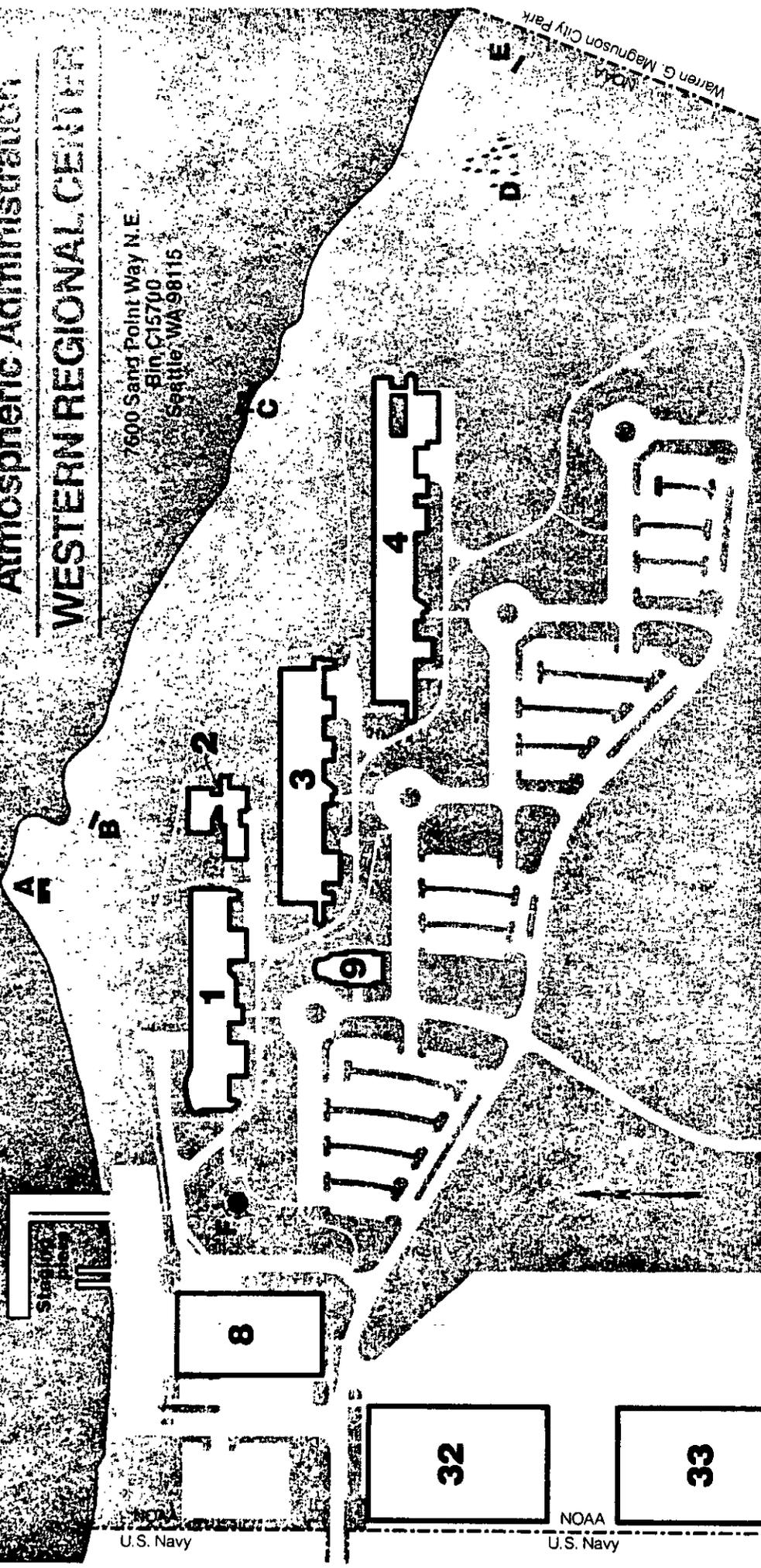
5. If you have to pull or push an object, take the extra step to get it straight in front of you.

6. If you must stand for a long period, put one foot up on a low ledge or rail.

National Oceanic and Atmospheric Administration

WESTERN REGIONAL CENTER

7600 Sand Point Way N.E.
 Bin C15700
 Seattle, WA 98115



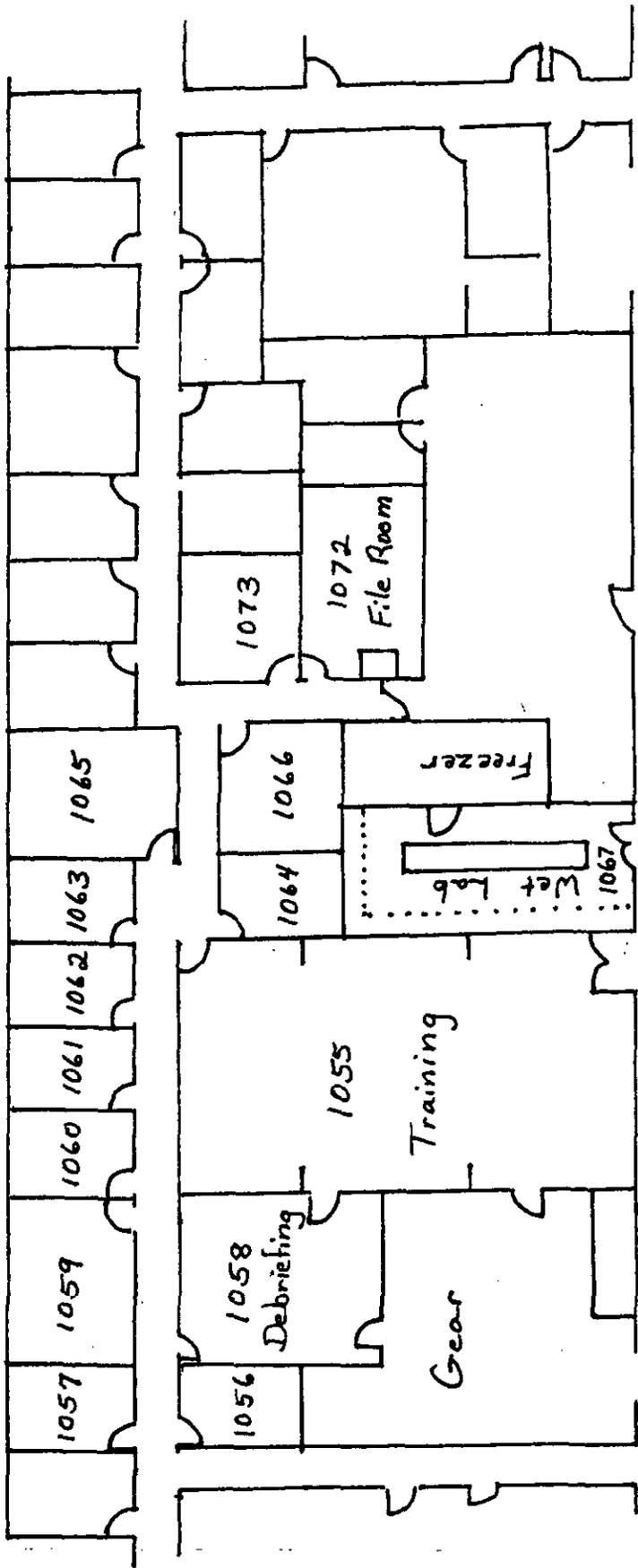
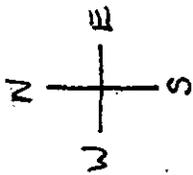
For safety sake — use sidewalks and paths, and observe speed limits

- Building 32**
 NMFS Resource Assessment and Conservation Engineering
- Building 33**
 Warehouse
- Building 8**
 Pacific Tide Party, PMC.
 Western Regional Diving Facility.
 Shops.
 Warehouse.

- Building 1**
 NW Regional Office, NMFS.
 NW Regional Counsel.
 NW Ocean Service Center.
 Public Affairs.
 Office for Civil Rights.
 National Weather Service Forecast Office.
 Western Administrative Support Center.
- Building 2**
 Cafeteria.
 Health care facility.

- Building 3**
 Pacific Marine Environmental Laboratory.
 Nautical Chart Branch, PMC.
 Library & Information Services Division.
 Ocean Assessments Division, NOS.
- Building 4**
 Northwest & Alaska Fisheries Center, NMFS
- Building 9**
 Auditorium and seminar rooms

- Artworks**
- A** Viewpoint
- B** NOAA Bridge
- C** Berth Haven
- D** A Sound Garden
- E** NOAA Bridge
- F** Knoll for NOAA



Observer Program Facilities, Building 4 ground floor

GLOSSARY

Aft - towards the stern of a vessel

Benthic - living in direct relation with the bottom

Bin - a large compartment built into a ship for holding fish. Also called live tank, refridgerated seawater tank (RSW tank), lobby.

Bosun - chief of the deck crew

Bottom - 1) ocean floor, or 2) fishing depth, or 3) a ship hull. Which meaning to apply must be taken from context.

Breech - a behavioral characteristic of some marine mammals such as humpback whales, where they rise vertically out of the water, and then with most of their body above the surface, they fall to their back or side.

Chaffing gear - protective carpeting (or strands of nylon forming a carpet pile) on the outer, underside of the trawl net to keep it from catching and ripping on obstacles on the bottom.

Codend - the end "bag" of a trawl net where the majority of the fish are collected and held.

Combing - a low partition that separates the trawl deck from the side pockets.

Compliance - in accordance with the fishing regulations.

Directed fishing - targeting or fishing for a species quota.

Disembark - to get off a vessel.

EEZ - Exclusive Economic Zone. This is the term for the 200 mile jurisdiction zone formerly called the FCZ.

Embarkation - to board a vessel.

Flatfish - fish which are laterally compressed and who orient themselves in the water with their lateral surfaces or sides towards the surface and bottom.

Forecastle - the forward part of a ship where sailor's quarters are located.

Forward - towards the bow of a vessel.

Freezer trawler - a large, catcher/processor vessel whose products are whole fish or parts of fish frozen into blocks.

Fresh weight - the weight of the whole fish (or animal) as it was when alive. Also called round weight, whole weight.

FUS - Fully Utilized Species. FUS is a designation given to bycatch species whose quota has been taken but the fishery was permitted to continue. Fully Utilized Species must be discarded from the catch like prohibited species.

Gallows - the large upright framework that spans the trawl deck; used for suspending or supporting.

Gangen - the leader line, about a meter in length, tied into a longline with a hook tied to it's free end.

Gantry - see gallows.

Gas bladder - a sac filled with air or similar gases in the body cavity. May or may not be attached to the throat by a duct.

Gill rakers - bony toothlike structures on the anterior edges of the gill arches. For protection or straining out food.

Gunnel or Gunwale - the upper edge of the side of a boat.

Hatch - an opening in a deck or bulkhead of a ship.

Haul - a catch of fish from one tow of a net

Joint Venture - a cooperative fishing/processing effort between vessels of different nationalities.

Lee, Leeward - the side protected from the wind, opposite the "windward" side

Master - fishing master and/or captain.

Mothership - an at-sea, floatin processing vessel whose fish come from catcher boats deliveries.

Otterboard - Another name for a trawl door; Refer to net diagram.

Otter trawl - The type of net gear used on stern trawlers; Refer to net diagram.

Peritoneum - the lining of the gut cavity

Pod - a group of marine mammals traveling in association

Pond - see "bin", the Koreans use this term for a fish bin.

Porthole - a window in the hull or the outside bulkhead of a ship.

Radio Call Sign - four letters and/or numbers which are an international identifier of a vessel. The International Radio Call Sign (IRCS) is painted in large letters on the side of each vessel and on the deck of the flying bridge.

Rostrum - a pointed, calcareous, median extension on the anterior end of crab carapaces.

Regenerated scale - a fish scale which has grown in to replace one that was lost. Regenerated scales are useless for aging the fish.

Roundfish - fish that orient themselves in the water with the dorsal side towards the surface and ventral side towards the bottom.

Round weight - the weight of the whole fish (or animal) as it was when alive, synonymous with fresh weight.

Stern trawler - any of various sized fishing vessels which trawl a conical shaped mesh net through the water, haul it up a ramp through the stern of the ship, empty, and process the catch to make a wholesale fish product. These vessels may fish for a month or more at sea without support.

Surimi - minced fish meat paste usually produced from pollock.

Trawl - the towing of a mesh net behind a vessel to catch fish.

Vessel Code - A code used only by the observer program to identify a ship.

Wing - the sides off a trawl net near the opening, usually with larger mesh than the rest off the net.

Zulu - another name for GMT.