1989 High Seas Squid Driftnet Fishery

Section I. Introduction

A: Overview

Several events precipitated the development of new high seas driftnet fisheries in the North Pacific Ocean in the late 1970's. First, the price of fuel increased during the 1970's to the extent that fishing techniques like driftnetting which do not require extensive daily travel and fuel consumption became more economically attractive. Second, led by Peru and Ecuador, coastal nations of the world adopted exclusive economic zones to 200 miles offshore, forcing many distant-water fleets to develop new high seas fisheries. Third, falling tuna prices in the late 1970's stimulated tuna longline vessels to explore other fishing opportunities. Fourth, reduction of salmon available to driftnet fleets as a result of the passage of the U.S. Magnuson Fisheries Conservation and Management Act in 1976, amendments to the International Convention for the High Seas Fisheries of the North Pacific Ocean in 1978 and 1986, and decreased Japanese salmon quotas by the Soviet Union idled many driftnet vessels.

Displaced from salmon fishing in the late 1970's and early 1980's, many of the Japanese salmon driftnet vessels moved south to target on the flying squid, Ommastrephes bartrami. When not involved in other fisheries, other vessels also entered the high seas squid driftnet fishery. These fleets operate outside of the jurisdiction of any national (other than domestic) or international management regime. Since the early 1980's, the Japanese fleet has stabilized at about 500 high seas squid driftnet vessels operating 4-7 months per year. The ROK and Taiwan have also developed driftnet fleets of about 100-150 vessels each, which are known to fish for flying squid.

The Japanese Squid Driftnet Fishery

The driftnet fishery for flying squid was begun in 1978 by the Japanese. The development of this fishery coincided with reductions in other, distant-water fishing grounds due to the implementation of 200-mile Fishery Zones in the late 1970's. Salmon catcher boats displaced from the Japanese mothership salmon fishery were first to enter this fishery, followed by vessels from tuna and other fisheries.

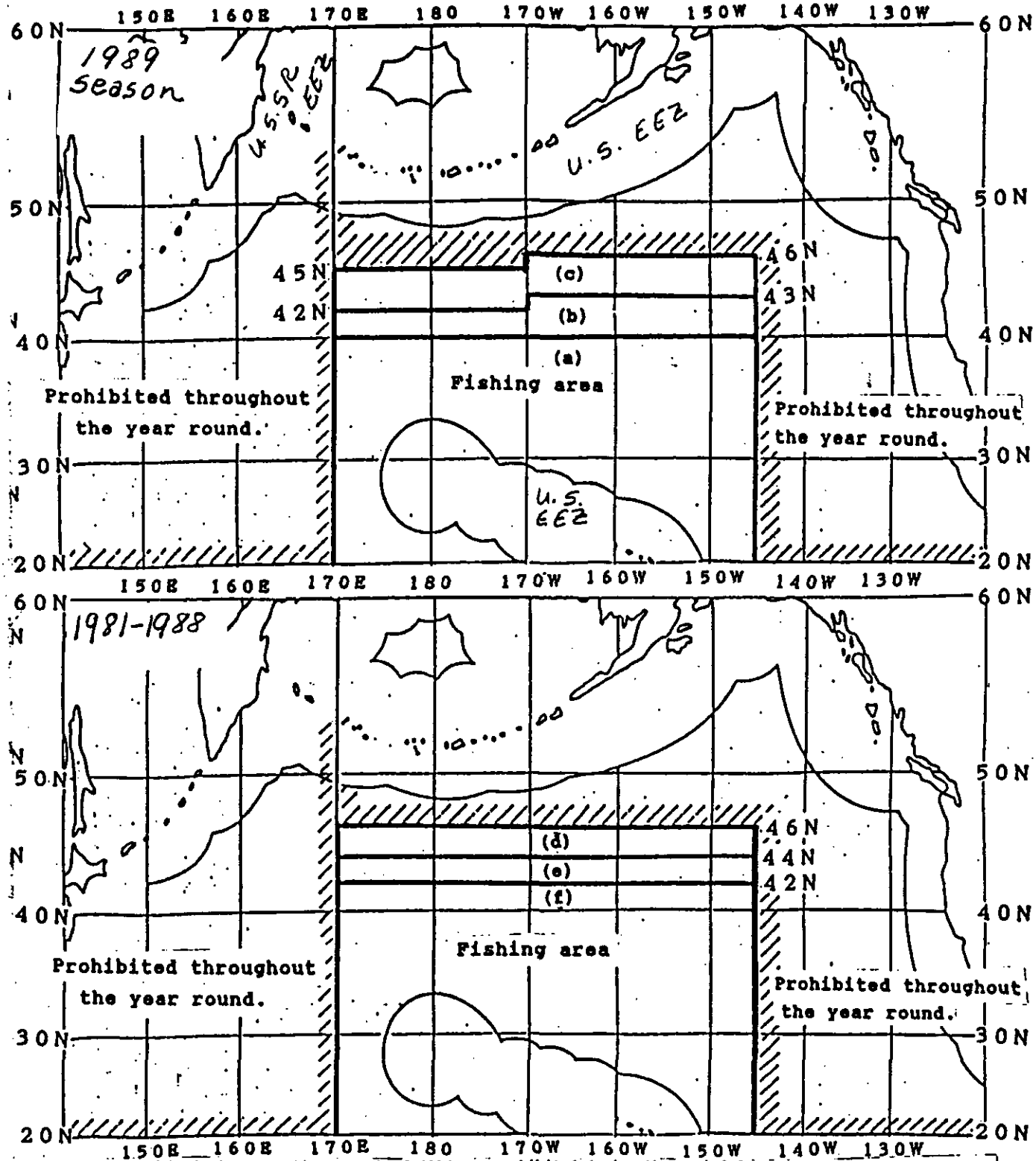
Financial losses by Japanese squid jigging vessels and high catch rates by the growing fleet of squid driftnetters, led in 1981 to the establishment of an a limited-entry system as well as time/area regulatory measures. These regulations established a 7-month fishing season extending from June through December, and a northern boundary that changed monthly over the fishing season to prevent the incidental catch of salmonids. Two permits for vessels between 50 and 500 GT were issued; one allowing 7 months of operations from 1 June to 31 December and the other allowing 4 months of operations from 1 August to 30 November.

According to Japanese reports in 1987, a total of 29,613 driftnet operations were conducted in the Japanese North Pacific squid driftnet fishery, a 10% decrease from 1982. The number of licensed vessels has declined by approximately 7% since 1982 to 478 licensed vessels in 1987. However, there have been yearly increased in the percentage of large vessels participating in the fishery. Larger vessels deploy more gear, are able to fish in rougher weather, and have greater endurance, all of which results in greater fishing effort per vessel. Information on the total amount of gear used or the amount of gear used by vessel type is not available.

Five different vessel types are found in the squid driftnet fishery. The length of fishing season varies by vessel type as most of these are committed to fish in other salmon, squid, tuna, or groundfish fisheries. Fishing effort is usually concentrated in the northern 2 degrees latitude of the regulatory area. During the fall, however, a number of vessels, typically the mothership or landbased salmon vessels, fish further south in warmer waters. Most driftnet operations occur between June and October with peak effort occurring in August, the first month in which all vessel types participate in the fishery.

Generally 450-1,000 single panels or tans of net are set daily by each vessel. Dimensions of nets are non-standard with a tan reported to be approximately 72-90 m in length and observed to be 40-105 m in length. The nets are all of similar design--a corkline at the surface, monofilament mesh, and a leadline at the bottom. Mesh size is regulated by Japan to be greater than 110 mm stretched mesh and typically ranges from 115 to 120 mm. Depth of net ranges from 9 to 10 m. Single tans are tied and laced together to construct "sections" of gear approximately 3 nm long. Two, 3-nm-long sections are sometimes tied together to form double-length net sections. Most of the larger vessels deploy 8-10 net sections per night.

Time and Area Restriction for Fishery (Amendment)



(a): Fishing operations north of 40°N are prohibited during the period from June 1 to 30 and December 1 to 31.

(b): Fishing operations north of 42°N and west of 170°W or north of 43°N and east of 170°W are prohibited during the period from July 1 to 31.

(c): Fishing operations north of 45°N and west of 170°W or north of 46°N and east of 170°W are prohibited during the period from August 1 to 31.

(d): Fishing operations north of 46°N are prohibited during the period from September 1 to 30.

(e): Fishing operations north of 44°N are prohibited during the period from October 1 to 31.

(f): Fishing operations north of 42°N are prohibited during the period from November 1 to 30.

The Republic of Korea Squid Driftnet Fishery

The ROK high seas driftnet vessels first began harvesting flying squid in 1979. Although fishing grounds were initially located in the western North Pacific, the fishery soon extended eastward reaching 160°W by 1983. Number of registered vessels grew from 14 in 1980 to 99 by 1983 and approximately 130 in 1987. Although the ROK has recently developed domestic regulations prohibiting the retention of salmonids and marine mammals by squid driftnet vessels, there are not time/area restrictions for this fishery.

Each year, the ROK fishery begins in late April, starting around 35°N and 165°E. The vessels quickly move eastward to as far as 165°W by July, concentrating fishing effort east of 170°E. In early fall, the vessels move westward, fishing near the coast of Japan at the season's end in January. In late spring and summer, the fishery targets on the large size-group of flying squid. By fall and early winter, the fishery operates west of 170°E, targeting on squid that have grown to a harvestable size and are caught in smaller mesh size driftnets.

Most ROK driftnet vessels are converted tuna longliners, reflecting the economic difficulties faced by tuna longliners in recent years. The converted vessels are superannuated with 90% of them 16 or more years old. Vessels range from 170-500 GT with an average displacement of approximately 290 GT. Mesh sizes of nets range from 86 to 155 mm, although the sizes principally used are 96 to 115 mm; mesh sizes are changed throughout the fishing season due to seasonal changes in the size of flying squid. Single panels (tans) of net are 50 m long and 8 m deep. Since the start of the fishery, the average number of tans deployed nightly per vessel rose steadily, from 200 in 1980 to 540 in 1983 and 1,000 in 1987., Little increase is expected as current ROK

vessels are operating at maximum capacity when 1,000 tans are fished. In 1988, there were 147 vessels in the ROK squid driftnet fleet.

The Taiwanese Squid Driftnet Fishery

The Taiwanese driftnet fishery began with 12 vessels in 1980, growing to almost 150 vessels by 1984. In 1988, there were 165 driftnet vessels. Although fishing grounds were initially located in the western North Pacific, the fishery extended eastward reaching 160°W by 1983. Fishing has generally occurred from May through October with peak effort in August and September.

Due to concerns by the United States about the incidental harvest of salmonids, Taiwan adopted domestic regulations for squid drifnetters in 1985. In waters west of 170°E, fishing is prohibited north of 39°N. Regulations similar to Japanese domestic regulations were adopted for waters east of 170°E.

The most popular type of vessel is a jigging/driftnetting combination vessel. These vessel average 390 GT and 47 m in length. They are typically converted Japanese longliners and are relatively old vessels. During the early 1980's net panels were reported to be 50 m long, 6.5 m deep, made of monofilament vinyl chloride fibers, with a stretched mesh size of 94 mm. Since 1983, the percentage of driftnets of less than 100 mm stretched mesh size have increased from 18% to 44%. As in the case of the ROK fishery, there have been yearly increases in the number of driftnets per vessel. At first, Taiwanese driftnetters were equipped with 250-500 tans of driftnets. By 1987, an average of 1,059 tans of driftnets were loaded on each vessel.

Other Driftnet Fisheries

Japanese Salmon Driftnet Fisheries

An assessment of the impact of high seas salmon fisheries on marine resources was made in 1986 during the decision making process prior to issuance of an incidental take permit to the Japanese mothership salmon fishery under the Marine Mammal Protection Act (MMPA). This information is detailed in documents associated with the hearings and is summarized here.

Japanese Mothership Salmon Fishery

The Japanese mothership salmon fishery has operated on the high seas in the western North Pacific Ocean and Bering Sea since 1952. It is presently regulated by two international treaties: the International Convention for the High Seas Fisheries of the North Pacific Ocean between Canada, Japan, and the United States operated under the International North Pacific Fisheries Commission (INPFC), and the bilateral U.S.S.R.-Japan treaty. The fishery expanded rapidly in the early 1950's and at the peak of operations included 16 motherships and 460 catcher boats. After renegotiation of the INPFC treaty in 1978, the mothership fishery consisted of four motherships, each with 6 scout boats and 37 catcher boats, for a total of 172 catcher boats in the fishery. In 1986, the annex to the INPFC treaty was modified by the member countries to phase out fishing north of 56°N latitude in the Bering Sea over the period 1986-1994. In 1988, with further reductions in the salmon quotas set by the U.S.S.R. and prohibition of fishing inside the U.S. EEZ due to an injunction against their incidental take permit under the MMPA, the fishery was reduced to a single mothership with 43 catcher boats fishing in international waters of the North Pacific and Bearing Sea.

Salmon quotas for both the mothership and the landbased salmon fisheries are set through negotiations with the U.S.S.R. since a large portion of the Japanese catch comes from salmon spawned in Soviet rivers. The salmon quota was reduced from a peak 87,000 mt in 1957 to 3,276 mt in 1988, a 96% reduction.

The annual fishing effort from 1978 to 1986 by the mothership fishery averaged 2.7 million tans (128,932 km) and the majority of the fishing effort (average 72%) occurred inside the U.S. EEZ.

Based on the 1986 Annex to the INPFC treaty, the mothership fishery operates from 1-9 June south of the U.S. EEZ between 170°E longitude and north of 46°N latitude (Figure 1-1b). On 10 June the fleet may enter the U.S. EEZ, if the fishery industry holds a valid incidental take permit. After 25 June, the fleets may operate a certain number of fleet days north of 56°N latitude in the central Bering Sea outside the U.S. EEZ in conjunction with the phase out schedule listed in the Annex. Fishing ends on or before 31 July under Soviet regulation, depending on when the salmon quotas set by the U.S.S.R.-Japan agreement or marine mammal quotas set by the United States are reached.

The location of the daily fishing operation of each catcher boat is determined by the mothership fleet commander and fishing staff. Nets of each fleet are generally set in the same compass orientation (20° or 200° in the U.S. EEZ), usually at a slight angle to the prevailing swell direction. The catcher boats are nearly always positioned at least 8 km apart in any direction in rows along parallels of latitude. Each catcherboat sets a net no longer than 15 km (330 tans), consisting of 121 mm (maximum 40%) and 130 mm stretched mesh monofilament. The net extends from the surface to about 8 m in depth. The net is usually set in two or three sections weakly connected at

the time of setting. One or more radio and/or radar beacons as well as light buoys and flags are attached to aid in locating the net sections for retrieval. Nets are set at dusk and retrieved at dawn, drifting and fishing overnight for about 9-10 hours.

Landbased Salmon Fishery

The landbased salmon fishery operates south and west of the mothership salmon fishery (Figure 1-1a) and uses similar gear. Differences in the operation of the landbased fishery include smaller vessel size (60-127 GT vs 96-127 GT), separation of 6 km between driftnets, mesh size greater than 110 mm stretched mesh, and vessels operating independently rather than as part of a unit fleet. Two distinct vessel classes which are separately licensed operate in the landbased fishery from inshore to 170°E longitude between 38°N and 44°N latitude and between 38°N and 46°N west of 174°E to 170°E longitude. One class consists of small (under 10 GT) vessels that numbered about 1,200 in 1962-76 and 671 in 1984. The other portion consisted of small (under 30 GT) and larger vessels until 1971 when the smaller vessel component ceased operations. The larger vessels increased in number from 58 in 1952 to a maximum of 374 in 1972-74, and decreased to 209 in 1978-1985 and 157 in 1988. Fishing effort by the landbased fishery from 1978 to 1984 ranged from about 2.3 million to 3.4 million tans annually.

B: Role of the Observer

As a scientific observer contracted to collect data on the fishing operations and incidental catch of non-target species in the squid fisheries of foreign nations, each individual is expected to provide complete and unbiased data records which can be used to assess the potential impact of

these fisheries on living marine resources. In addition, the observer may collect biological data and specimens from marine mammals in order to contribute to an understanding of the affected populations' abundance and life histories.

It is imperative that the observer conduct him/herself in a completely professional manner consistent with the actions of a U.S. Government representative. The collection of complete, consistent and unbiased data necessitates the employment of observers who can successfully carry out their duties under uncomfortable and possibly adverse conditions.

While at sea, the observer has several duties, each one specific to a particular type of cruise. The priority assigned to each of these duties will vary with the type of cruise (research vs. commercial), the length of the gillnets fished, weather, and the length of the cruise itself. Prior to departure, the observer will be fully briefed on which duties are most critical for his/her cruise. THE OBSERVER MUST FOLLOW THE INSTRUCTIONS, AND NOT DEVIATE FROM THE ASSIGNED PRIORITIES AND DUTIES. The duties and data to be collected are the result of international agreements and are not to be modified in any way during the cruise. Problems are to be documented and discussed with the Project Leader, NMML, during debriefing.

In general the following types of duties will be required for most cruises. The order of this discussion is not listed in order of their relative priorities, those can be found on page 1-12.

1. Marine mammal sighting surveys during vessel transits. Detailed descriptions of marine mammal sighting survey methodology can be found in Section III.

2. Observation of driftnet deployment. Instructions are in Section II.

3. During the driftnet retrieval, record data on the catch (nontarget and target), environmental conditions, and general vessel activity. Detailed instructions are in Section II.

4. On research vessels when marine mammals are brought onboard dead, collect specified biological data and specimens.

5. Special collections of data or biological specimens other than marine mammals may also be required. Since these duties may be quite specific, and minor in comparison with other priorities, any special collection instructions will be provided during training. DO NOT INITIATE NEW COLLECTIONS OF DATA OR SAMPLES. All such collections have been specified under international agreement and cannot be modified without consent of all parties. Any attempt to modify data collected will have negative effects on subsequent negotiations and research attempts.

Given the brief introduction to the observer duties provided above, heir relative priorities are assigned as follows. Note that **High** corresponds to a duty that must be fully completed as a basic requirement of the cruise. No deviations from the assigned instructions can be accepted. **Medium** corresponds to a duty that is a requirement, but must not compromise the collection of high priority data. These duties are generally completed with emphasis on quality as in the case of marine mammal sighting surveys. **Low** corresponds to a duty that will be completed on a limited scale. This does not mean that it

can ignored, but rather it will be completed as time allows, or only at specified times.

Priorities On Commercial Cruises:

Commercial cruises are defined as scientific observer trips onboard fishing vessels engaged in fishing activities for profit through the sale of the catch.

1. Driftnet Retrieval Observation - (High)
2. Marine Mammal Sighting Effort - (Medium to High)
3. Driftnet Setting Observation - (Low, except initially)
4. Special Collections - (Low)

Priorities On Research Cruises:

Research cruises are defined as those observer trips onboard fisheries or oceanographic research vessels, or other chartered vessels engaged primarily, if not solely, in the collection of scientific data.

1. Driftnet Retrieval Observation - (High)
2. Marine Mammal Sighting Effort - (High)
3. Biological Sampling - (High if permitted)
4. Driftnet Setting Operations (High)
5. Special Collections - (Medium)

C: PRE-CRUISE RESPONSIBILITIES

Training

Upon arrival in Seattle, the observer will receive approximately one week of training in biological data and specimen collections as they relate to the cruise. The length of training will vary depending (primarily) on class

size. The observer will train from 0800 to 1630 at the National Marine Mammal Laboratory, NOAA Fisheries, 7600 Sand Point Way N.E., Building 4, Seattle, Washington. The observer will be responsible for reviewing pertinent parts of the training manual prior to the discussion of each topic. Written assignments to be completed in the evening can be expected. In general, the observer can expect to cover the following:

1. An introduction to the squid fishery operations.
2. Instruction on driftnet set observation, data forms and collection format.
3. Instruction on marine mammal sighting effort methodology, and associated data forms.
4. Instruction in identification of certain species of marine mammals, seabirds, fish, squid, and sea turtles.
5. Instructions for data summary and the cruise report.
6. Instruction in marine mammal dissection, sampling, and data collection.
7. Briefing on the intended cruise track, shipboard life, and any specific aspects of the vessel or the cruise.

Personal Passport

Before reaching Seattle for training, the observer should obtain a personal passport, or if he/she already has one, ascertain that it is not due to expire during the cruise period. The responsibility for obtaining the passport is solely the observer's, as is the fee. Note that the cost of a

personal passport is $40 (plus $6-10 for photos), and it is valid for 10 years.

Visa

Travel in and out of far eastern countries (but not Japan) require a Visa in addition to a valid personal passport. These can be obtained at no charge through consulate offices in the United States. To obtain a Visa for official business purposes, the observer will need:

1. A valid personal passport
2. An official letter of introduction (provided by NMFS)
3. A copy of the travel itinerary (provided by NMFS)

The observer will hand carry these materials to the appropriate office in downtown Seattle early in the training period. Turn around time for visas is usually 2-4 hours, so the observer will either wait or arrange to pick up the visa later that day. Note that the visa offices are generally closed between 1200 - 1300. The following are the Seattle consulates for Japan, Republic of Korea, and Taiwan:

Japan

Japanese Consulate General
3110 Rainier Bank Tower
Seattle, WA 682-9107

Republic of Korea

Korean Consulate General
2033 6th Ave.
Seattle, WA 441-1011

Taiwan, Republic of China

Coordination Council for
North American Affairs - Republic of
China in Taiwan
Westin Building
Seattle, WA 441-4586

Physical Examination

As a requirement for sea duty each observer must show evidence of having passed a physical examination within the last six months. In the information packet provided by the Contractor, the observer will find specific instructions and suggestions for locations of clinics in the Seattle area. The cost of physical examinations will not be borne by the observer. A physical examination to be conducted in Japan is also required for scientific observers on Japanese commercial squid vessels. This will be arranged by the Japanese after you arrive in Japan.

Preparation of Personal Gear

Each observer is responsible for the preparation of his/her own personal gear, as only scientific gear will be provided by NMFS. In general, the

observer should be prepared for a wide variety of environmental conditions ranging from warm and humid to cold and wet. If the observer plans to take along an expensive cassette player, watch of foreign manufacture, personal binoculars, etc., he/she should register them at Customs, SEA-TAC Airport, prior to departure from the U.S. to avoid possible tariffs upon reentry to the U.S.

The actual cruise track or anticipated fishing grounds will dictate the final selection of gear. The observer should pack light, but efficiently, remembering that he/she will also be carrying gear issued later. The following personal gear is recommended:

Clothing While Onboard Ship, 1-2 month cruise

cotton socks - 2-3 pair

wool socks - 2-3 pair

thermal socks - 2-3 pair

polypropolene underwear - 1 set

underwear - 4-6 sets

work pants or jeans - 2 pair

flannel or chamois shirts - 2

T-shirts - 4

wool sweater - 1

sweatshirt - 1

scarf - 1

wool hat or equivalent - 1

baseball cap - 1

medium weight jacket - 1

light weight sneakers - 1 pair

sandals or slippers - 1 pair

Clothing during travel or in port

dress clothes - 1 set

shoes (acceptable w/ dress clothes) - 1 pair

Basic necessities

daypack - 1

seabag or dufflebag, medium or large size - 1

seabag or dufflebag, small size - 1

toilet articles

towel, bath - 1

washcloth - 1

wristwatch - 1

travel alarm - 1

sunglasses - 1

reading material

cassette player and tapes

language dictionary

vitamin supplements

medication for motion sickness

sun screen

Acquisition and Care of NMFS Equipment

During the training period you will be issued gear for sampling, marine mammal sighting survey and personal safety/comfort. All gear is to be returned to NMFS in working order and/or in good repair after the cruise. The

following annotated list covers the equipment you will receive in Seattle.

Survival suit - The observer is responsible for trying on the suit and repeated practice in doing it as quickly as possible. If scheduling permits, each observer will participate in a water drill.

Mustang exposure suit - The Mustang suit is provided as a means of protection from wind and moisture while on deck. It replaces the need for heavy jacket and rain gear in many cases. It is <u>not</u> to be worn while dissecting porpoise or during any other activity that will expose it to blood or fish slime. Although it is considered a Class V personal floatation device, it is <u>not</u> a surrogate for the survival suit.

Binoculars (7 x 50) w/cleaning fluid and lens paper - The binoculars provided are of high quality and made especially for the marine environment. Although they are described as "armored", they should be handled as a precision instrument. All binoculars of this type are particularly susceptible to mis-alignment when jarred. Be aware that the cost of replacement for the binoculars is $200 - $650 per pair (depending upon the type issued).

Camera (35mm) and film - A lightweight, moisture resistant rangefinder camera will be provided for official use only, to photograph specimens and to document shipboard activities as requested. Care should be taken in use and storage of the camera and film. All film exposed during the cruise is U.S. government property, and will be processed immediately upon return to Seattle. Arrangements for copies of pictures taken can be arranged through NMFS. <u>No personal cameras can</u>

be used on commercial vessels as this is not part of the international agreement.

Field guide to birds - The paperback version of The Golden Guide to Field Identification of Birds of North America (1983) is compact and adequately detailed to supplement the seabird training you will receive.

Field guide to marine mammals - The NOAA Technical Report, NMFS Circular 444 "Whales, Dolphins, and Porpoises of the Eastern North Pacific and Adjacent Arctic Waters" is the standard issue. Previous observers have noted that this guide is accurate and very useful.

Cooler (48 or 68 quart) - The cooler is provided for the transport of data, supplies, and any biological specimens back to the nearest U.S. port (most likely Seattle). If biological specimens are to be collected during the cruise, the observer is responsible for obtaining ice for the trip back to the United States. He/she will include the cooler as part of their baggage.

Dissection kit - A kit which includes knives, measuring tapes, plastic bags, tags, forceps, scissors, marking pens and other collection gear will be provided for cruises which involve the sampling of marine mammals. Specific instructions for dissection are provided during training for these cruise types.

Data forms, binders, logbooks and office supplies - All data forms, logbooks and office supplies needed during the cruise will be provided for the observer.

Expenses Prior to/and After Departure

Observers will spend approximately three weeks in Seattle at the National Marine Mammal Laboratory during training and debriefing (one week before, and up to two weeks after). Transportation and travel expenses from the observer's home to Seattle for training, and from Seattle back home after completion of all commitments to the program will be at the observer's expense. Similarly, costs for food and lodging in Seattle, both before and after the cruise, are also assumed by the observer.

Contact with the Observer Contractor

The observer is an employee of the contracting agency, not the U.S. Government. As such, the observer is entitled to pay and benefits provided by the Contractor under terms of the contract signed by the observer. All questions concerning pay, terms of employment, benefits, or any other topic concerning the employee/employer relationship should be directed to the Contractor, not NMFS staff. The NMFS staff will provide training and participate in the debriefing. Questions concerning the data, data collection and/or the program itself can be directed to the NMFS staff.

D: OBSERVER RESPONSIBILITIES DURING THE CRUISE

Traveling as a Contract Observer

The cruise officially begins when the observer leaves his/her temporary residence in Seattle enroute directly to the airport on the date of departure. While traveling and onboard ship the observer is representing the U.S. Government, but travel is provided by the Contractor and travel records will be kept in accordance with the specifications prescribed by the Contractor.

All expenses for lodging, meals, currency exchange, excess baggage and miscellaneous supplies should be documented with receipts. Maintain a clear record of the expenses for computation of travel costs and reimbursements upon return.

Scientific observers on Japanaese commercial vessels: All shipboard expenses of room and board are to be paid by the observer at the time of boarding. Travelers checks in Japanese yen will be issued by the contractor prior to your departure from Seattle. Be sure to settle this expense with the Captain immediately upon boarding.

The observer travels as a private U.S. citizen under a personal passport. The observer should not falsely represent him/herself as a government employee since this implies traveling under an Official Passport with travel orders. If asked about the specific purpose of the trip, the observer should provide a brief summary as documented in the letter of introduction each observer will carry (provided by NMFS).

Special Foreign Travel Considerations

Travel from Seattle to the port of embarkation should proceed with a minimum of complications, aside from the usual pitfalls all travelers must face. The process of finding the point of embarkation will be facilitated wherever possible by contacts at the point of arrival. If this is not possible, then directions to connecting transportation or lodging will be provided, as possible, prior to departure. All observers should be prepared, however, to be resourceful in finding their point of departure on schedule. Certain difficulties in making connecting flights, especially in Korea, are already identified, and the observer will be appraised of the appropriate contingencies.

Travel back from the point of disembarkation is likely to be somewhat more confused than the embarkation leg. The observer should be prepared to handle the following situations before or on the trip home:

1. Payment of shipboard per diem - The scientific observer will need to pay for his/her food consumed onboard the vessel prior to final departure for home. This payment, often requested in cash (in the national currency) is based upon the number of days on board multiplied by the charge per day. The observer will be provided with the necessary funds to make the payment. Note that the observer may need to pay on both the fishing vessel as well as on the transport vessels to and from the fishing grounds.

2. Traveling with biological specimens - The observer may be returning home with biological specimens preserved either by freezing or in formalin. Prior to departure from the fishing vessel or research vessel, prepare the specimens as follows:

   Frozen Material - pack the specimens in the cooler and top with as much crushed ice as possible. The crushed ice may need to be replenished or the cooler placed in a freezer if the observer is unable to secure a flight to the U.S. within 24 hours. Be certain that the drain plug is closed and taped. Place one copy of the collection permit, in a sealed ziplock bag, inside the cooler. Secure the cooler lid with the straps provided. Attach a label (written in black felt tip marker on a 5 x 8 index card) addressed to NMML, care of Dr. Linda Jones on the lid. Do not seal the cooler closed with tape since it may need to be opened for inspection at Customs.

Formalin Material - drain off the formalin in the storage bucket and temporarily remove the fixed specimens. Rinse the bucket with sea water and line it with a plastic bag. Place the specimen materials in ziplock bags by type (e.g., testis bagged separately from ovaries) and place back into the lined bucket. Seal the liner bag. Place one copy of the collection permit (provided by NMFS) into a ziplock bag, seal and place inside the bucket. Seal the bucket firmly. Attach a label to the outside as in the case for the cooler. The observer should carry the small hacksaw provided by NMML in an accessible location in case Customs wants to inspect the bucket contents.

3. Airline reservations - The round trip airline ticket each scientific observer carries is open for the return flight which means that a seat has not been reserved for the observer on any particular flight. The observer must make the return reservation him/herself. This can be accomplished by calling the airline upon arrival in port, or if possible, arranging for reservations during the trip back to port. Each observer will be briefed on the best approach to reservations prior to the cruise. The aid of foreign fisheries or Embassy contacts may be involved.

4. Customs - All scientific observers returning to the United States must clear U.S. customs and immigration. The observer should have a copy of the collection permit (the same document sealed in each container holding specimens) ready for the customs inspector. No specimen material other than that requested by NMFS should be collected and carried back. This includes seabirds (unless a

separate permit is provided), fish for personal consumption, or any other biological material found at sea. Any tariffs levied on goods purchased in foreign countries (other than for official purposes) will be paid by the observer.

Initial Meeting with Fisheries Representatives

Soon after arrival in the foreign port, the observer will usually be asked to attend a pre-cruise orientation meeting. In attendance will be representatives of a fishing company, the ship's officers, scientists from the host nation, or government fisheries officials. The purpose of this meeting will be to introduce the participants and contacts, to summarize the cruise plan or observation arrangement and to address any last minute problems or requirements. The scientific observer's role in this meeting may be rather passive, in that it will be more important to listen to the discussion and take notes as necessary. If asked to summarize his/her role on the cruise, the observer will work from the letter of introduction provided by NMFS as it will include a brief description of the observer's major duties. The observer will be given instructions by NMFS prior to departure regarding any special concerns to be addressed at the meeting.

On any cruise where biological sampling is planned, the observer should indicate that a small supply of formaldehyde will be needed for the preservation of specimens collected. He/she should inquire about local availability (funds will be provided to purchase the supply) or whether or not a supply is available onboard ship (research vessels will almost certainly carry some, but catcherboats normally do not). One or two pints will be sufficient in most cases.

Duties Between Embarkation and Arrival at the Fishing Grounds

On commercial cruises, the scientific observer may spend up to ten days transiting to the fishing grounds. The transfer vessel may be the fishing vessel itself, or a large transport (freighter or tanker). During this period, the observer's top priority is to conduct as much marine mammal sighting effort as possible per the instructions in Section III. No fishing activity will be observed during this time, so maximizing marine mammal sighting effort will not conflict with any other duties. These duties are a critical element and are not optional. Observers on research vessels will maximize their time on marine mammal sighting effort similarly during this period and thereafter whenever the vessel is in transit.

All observers should review the manual and identification guides as necessary during this period. Some parts of the cruise report which concern the initial meeting and travel to the point of embarkation can also be drafted.

As is the case at all times onboard ship, the observer should maintain open and friendly relations with the crew, particularly the officers. The observer will follow the instructions given by the vessel operator and will minimize interference with normal vessel routine. In particular, the observer should seek permission of the master before routinely entering the bridge to obtain positions and environmental data. A bridge officer should introduce the observer to the instruments and restrictions on their use prior to the start of data collection. It is imperative that the observer reflect a cooperative and competent character as his/her actions will impact the level of cooperation in the future.

Duties While on the Fishing Grounds

As stated earlier, the observer's primary duty while on the fishing grounds will be to accurately record data on the driftnet retrieval operation. Detailed instructions for monitoring the driftnet setting, and retrieval operations are presented in Section II.

At the end of each day, the scientific observer should check all data collected for errors and omissions. The data summary, report writing and debriefing process will be much easier if problems in the data are solved as they occur. The observer should make every effort to keep up to date with all record keeping since errors and inconsistencies will be difficult if not impossible to solve later.

Scientific observers should make an effort to conduct some marine mammal sighting effort whenever the vessel is in transit and the sighting conditions permit (per instructions in Section III). However, the long hours of haul monitoring and subsequent data logging and checking will preclude maximizing sighting time. If the vessel transits for an entire day or more, however, the observer should dedicate at least a few hours to marine mammal sighting effort. If the cruise is on a research vessel, then sighting effort should be maximized.

In addition to the collection of biological data, all observers should also learn as much as possible about the squid fishery through open communication with the vessel personnel and scientific staff. Items that would be of interest and suitable for inclusion in the cruise report (particularly commercial cruises) include the following:

1. How do the fishermen locate places to fish?

2. Do they fish alone or as a member of a group? What percent of fishing effort is as a single vessel?

3. Do they always set the nets in a similar pattern? If not, what options do they employ?

4. Do they offload or reprovision on a regular schedule or simply as necessary? How do they arrange for offloading and resupplying?

5. Has the squid fishing improved, stayed the same or diminished since they began fishing?

6. For how many seasons do they use the same gear? Do they use the same gear (mesh size), length of net, etc. all season?

7. How long does the vessel stay on the fishing grounds before returning to port? How does this vary? How is one trip length determined?

These questions should be used as topics for conversation, but never pressed or asked at any time when general information is not already forthcoming. The information obtained will be used to better prepare the data collection process and to understand the logistical constraints that impact the placement of other scientific observers.

Duties Between Departure from Fishing Grounds and Disembarkation

On the return trip from the fishing grounds back to port, observers should again prioritize marine mammal sighting effort. As on the outbound leg, this portion of the observer's duties is critical and shall not be considered optional.

As time allows, the observer should begin the process of preparing tables and text for his/her cruise report. The data forms and logbook should be complete, and rechecked again at this time. A significant amount of

confusion during debriefing can be alleviated by careful compilation and summarization of the data records. Refer to Section V for instructions on cruise reports and debriefing.

E: OBSERVER RESPONSIBILITIES AFTER THE CRUISE

Upon arrival in Seattle, the observer should notify the Contractor and NMFS as soon as they have arrived. Arrangements will be made at this time to transfer the cooler of specimen materials into the NMFS freezer facilities. The initial debriefing meeting will be held at the National Marine Mammal Laboratory about one day after arrival in Seattle.

Normally, debriefing will take five to ten business days, but the actual duration will depend upon the volume and quality of the data collected. During this time the scientific observer will work closely with the debriefing staff, and must be prepared to submit data forms, logbooks and a draft of their report on schedule. Likewise, the observer should be prepared to remain in Seattle until all data and the cruise report have been accepted.

The equipment issued to the observer must be cleaned and returned. The equipment will generally be collected on the first or second day back.

The observer should arrange to meet with the Contractor to handle travel expenses and reimbursements.

F: OBSERVER PROGRAM CONTACT POINTS IN THE UNITED STATES

If the need arises to contact any individuals involved with the squid observer program, the observer should call (collect) one of the following individuals. Generally, problems of a logistical or personal nature should be

addressed to the Contractor while questions of a political or technical nature should be addressed to NMFS.

Seattle, Washington	
National Marine Mammal Laboratory (Front Office)	(206) 526-4045
Dr. Linda Jones (NMML Office)	(206) 526-4021 (206) 524-8043
Dr. R.V. Miller (NMML Deputy Director's Office)	(206) 526-4048
Jim Coe (Alaska Fisheries Research Center Office)	(206) 526-4009
(home)	(206)
Auke Bay, Alaska	
Auke Bay Laboratory, National Marine Fisheries Service	(907) 789-6005
Dr. Michael Dahlberg (ABL Office)	(907) 789-6002
(home)	(907) 789-9132
Honolulu, Hawaii	
Honolulu Laboratory, National Marine Fisheries Service	(808) 943-1221
Dr. Jerry Wetherall (HL Office)	(808) 943-1258
(home)	(808)

G: GENERAL DATA COLLECTION GUIDELINES

Refer to the following list of general instructions when making notations on data forms and logbooks:

1. Write with a soft (#2 lead) pencil on all data forms. An eraser should be used to correct errors made on the day of entry only. Any errors discovered thereafter should be noted in the logbook and noted during debriefing. If there are extensive changes nessecary, make a list in the logbook.

2. All logbook entries should be made with hard lead pencil. Do not use ink or felt tip pens.

3. All data, including logbook entries should be printed, legibly.

4. Observe and accurately record objective data with explicit notes and explanations. Record data as they occur, trusting nothing to memory.

5. Fill in all blanks on data forms as instructed. Zero is considered data, a blank indicates data was not collected.

6. All transcriptions between logbook and the data forms must be 100% accurate. Both copies should be checked carefully for omissions and miscopies.

7. Both sides of two sided forms (Entanglement Diagram and ~~Life History Form~~) should be utilized.

8. All compass readings are recorded in degrees true. Magnetic readings are not to be used. Note that true north is 000 degrees (not 360).

9. Record latitude and longitude to the nearest 10th minute if the position is obtained from a satellite navigation system (SAT NAV). Positions obtained by dead reckoning should be recorded to the nearest minute.

10. All times will be recorded as four digits using the 24 hour clock (military time). For example, 5:30 PM is recorded as 1730.

11. Use ship's time in all notations. If the clocks onboard ship are changed as new time zones are entered, observers should wait until the next morning to change their clocks so that all data collected from a particular day are consistent throughout. One hour time zone differences taking effect at the start of a new day will not impact the data collected since little data collection occurs over the midnight period. Keep a list of time zone changes in the logbook.

12. The letter O is represented by Ø (slash through it) while the number 0 is represented by 0.

5-10 sec. per slide

MARINE MAMMAL SIGHTING EXERCISE

Instructions

You will be shown 3 series of slides, each representing a marine mammal "sighting". Complete one of the sighting forms provided for each of these 3 sightings. Vessel name, position of sighting, surface water temperature, time zone, and platform code have been filled in; complete the rest of the form as follows:

ITEM:

1. Fill in your name.
2. Use today's date, and the time at which the first slide in each series is shown.
5. Species identification based on your observations (see item 17). Include a sketch
6. Your best estimate of the number of animals in each sighting.
7. Leave blank for this exercise.

8 and 9.

Sighting 1: You first see these animals dead ahead of the vessel, and estimate the distance as 500 m.

Sighting 2: This sighting occurs 15° off the port bow at 75 m.

Sighting 3: This sighting is 35° off the starboard bow at 100 m.

10. Fill in your best guess.
11. Judge the sea state from conditions in the first slide of each "sighting".
12. Based on items 10 and 11.
13. Use your best guess.
17. Complete as if it were an actual sighting.

6-15-1 Of you want to number forms: upper

EXAMPLE 1

MARINE MAMMAL SIGHTING FORM – 1987
* DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK

1. OBSERVER NAME Karen Teig RECORD ID * (1 2 3 4 5 6)
VESSEL NAME KOEI MARU No. 53

2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR MO DAY: 8 9 0 6 1 5 (7 8 9 10 11 12); 1 1 1 6 (13 14 15 16)

3. LATITUDE (degrees/minutes/10ths)– N/S: 4 4 5 2 0 (18 19 20 21 22); N (23)

4. LONGITUDE (degrees/minutes/10ths)–E/W: 1 6 5 0 3 5 (24 25 26 27 28 29); E (30)

5. SPECIES Pacific White-sided Dolphin (Common name) Lagenorhynchus obliquidens (Scientific name); 1 0 (33 34); TENATIVE * (35)

This is very loose when done by slide

6. NUMBER SIGHTED 10 ± 2; C.I. 2 (36); 0 0 1 0 (37 38 39 40)

7. INITIAL SIGHTING CUE ——— (45 46)

8. ANGLE FROM BOW 0 0 0 (47 48 49)

9. INITIAL SIGHTING DISTANCE 500 m

(3-6) learn to est. distance "to horizon" even though is easier

NUMBER OF RETICLES ———

10's of meters 0 5 0 (50 51 52)

10. VISIBILITY 3 mi

11. SEA STATE (Beaufort) 4

12. VIS CODE 4 (53) 3 to 4

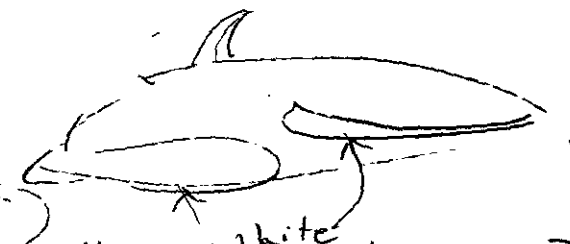
13. WEATHER Clear

14. SURFACE WATER TEMP.(°C) ± + (54); 1 5 (55 56)

15. PLATFORM CODE 1 5 1 6 (57 58 59 60)

16. TIME ZONE ± – (61); 0 9 (62 63)

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



grey body - small recurved dorsal white to trailing diffuse edges to white markings

edge of dorsal

porpoising thru water

robust body

white

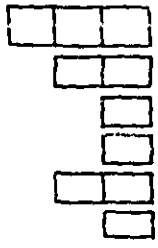
all animals the same?

rostrum (couldn't see yet) - small

porpoising in a group together (4 at a time)

18. ADDITIONAL INFORMATION((OPTIONAL)

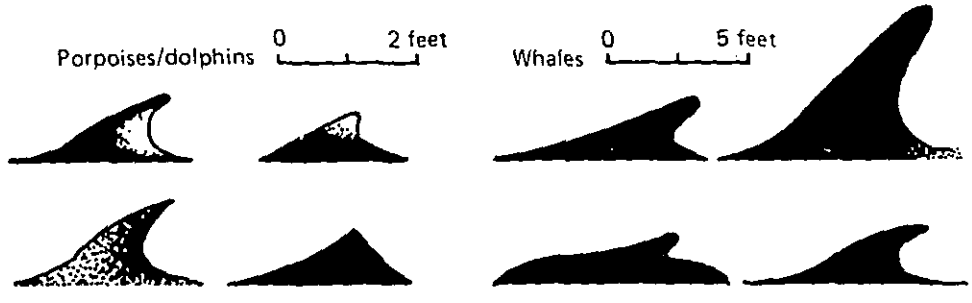
A. DIRECTION OF TRAVEL (RELATIVE TO VESSEL)
B. CLOSEST APPROACH (10's of meters)
C. POINT OF CLOSEST APPROACH
D. DIRECTION OF TRAVEL (code)
E. MOST SPECIFIC BEHAVIOR
F. CALVES PRESENT?



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:



Prominent blow?	Yes	No	
Number of blows before a long dive:	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		Bow riding
	Following vessel		Slow rolling
	Breaching		Porpoising
	Stern riding		Other _____

Distinctive markings
(white patches, etc):

6-15-2

EXAMPLE 2

MARINE MAMMAL SIGHTING FORM – 1987
* DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK

1. OBSERVER NAME Karen Teig — RECORD ID * [ ][ ][ ][ ][ ][ ] (1 2 3 4 5 6)
VESSEL NAME KOEI MARU No 53

2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR MO DAY: [8][9][0][6][1][5] (7 8 9 10 11 12); [1][1][5][0] (13 14 15 16)

3. LATITUDE (degrees/minutes/10ths)–N/S: [4][4][5][2].[5] (18 19 20 21 22) [N] (23)

4. LONGITUDE (degrees/minutes/10ths)–E/W: [1][6][5][0].[5][1] (24 25 26 27 28 29) [E] (30)

5. SPECIES Dall's porpoise (Common name) — Phocoenoides dalli (Scientific name) [P][X] (33 34) PD — TENATIVE * [ ] (35)

6. NUMBER SIGHTED 3 ± 1 — C.I. [1] (36) [0][0][0][3] (37 38 39 40)

7. INITIAL SIGHTING CUE ~~———~~ roostertailing [9][7] (45 46)

8. ANGLE FROM BOW [3][4][5] (47 48 49)

9. INITIAL SIGHTING DISTANCE 75 — 0 0 8 — NUMBER OF RETICLES _____ — 10's of meters [0][8][0] (50 51 52)

10. VISIBILITY 3 mi — 11. SEA STATE (Beaufort) 3 — 12. VIS CODE ~~4~~ 3 (53)

13. WEATHER Clear — 14. SURFACE WATER TEMP.(°C) ± [+] (54) [1][5] (55 56) 4

15. PLATFORM CODE [1][5][1][6] (57 58 59 60) — 16. TIME ZONE ± [–] (61) [0][9] (62 63)

use the matrix of these - don't take descriptions literally don't be overly severe - visibility code 4 beam margin data in analysis

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

Black body - small
roostertailing
crisp white patches
not clearing
the water when
surfacing

water splash
Squat rostrum
ru bust
pectoral w/white

dalli - white patch to mid body
Truell. to just behi
head - behind
pec.

don't do 2nd sighting form for mixed stocks indicate predom. & note mix

18. Additional information (optional) – see reverse side

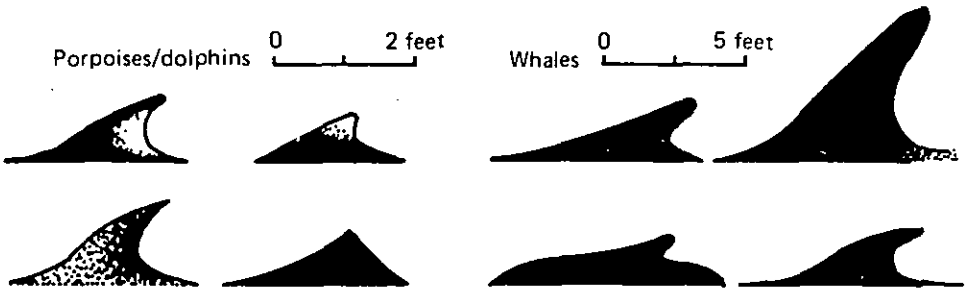
18. ADDITIONAL INFORMATION((OPTIONAL)

A. DIRECTION OF TRAVEL (RELATIVE TO VESSEL)
B. CLOSEST APPROACH (10's of meters)
C. POINT OF CLOSEST APPROACH
D. DIRECTION OF TRAVEL (code)
E. MOST SPECIFIC BEHAVIOR
F. CALVES PRESENT?

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:



Prominent blow?	Yes	No	
Number of blows before a long dive:	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	Bow riding	
	Following vessel	Slow rolling	
	Breaching	Porpoising	
	Stern riding	Other _____	

Distinctive markings (scarring, white patches, etc):

6-15-3

EXAMPLE 3

MARINE MAMMAL SIGHTING FORM – 1987
* DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK

1. OBSERVER NAME Karen Teig — RECORD ID * [1 2 3 4 5 6]
VESSEL NAME KOEI MARU No 53

2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR MO DAY: 8 9 0 6 1 5 (7 8 9 10 11 12); 0 8 1 5 (13 14 15 16)

3. LATITUDE (degrees/minutes/10ths)–N/S: 4 5 0 0 . 1 (18 19 20 21 22); N (23)

4. LONGITUDE (degrees/minutes/10ths)–E/W: 1 6 5 0 7 . 3 (24 25 26 27 28 29); E (30)

5. SPECIES Northern right whale dolphin (Common name) — Lissodelphis borealis (Scientific name); L B (33 34); TENATIVE * [ ] (35)

6. NUMBER SIGHTED 2 ± 1; C.I. 1 (36); 0 0 0 2 (37 38 39 40)

7. INITIAL SIGHTING CUE — body - porpoising; [ ] (45 46)

8. ANGLE FROM BOW 0 3 5 (47 48 49)

9. INITIAL SIGHTING DISTANCE 100 m
NUMBER OF RETICLES ____ 10's of meters 0 1 0 (50 51 52)

10. VISIBILITY 4 mi (most sighting effort)

11. SEA STATE (Beaufort) 3

12. VIS CODE 3 (53) or 2

13. WEATHER clear, good

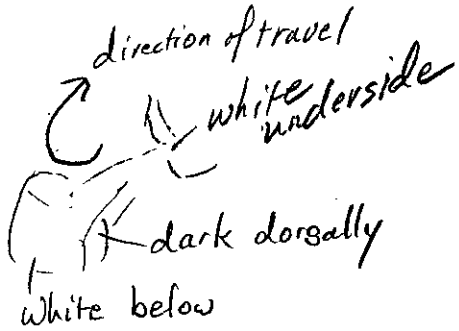
14. SURFACE WATER TEMP.(°C) ± [ ] (54); 1 4 (55 56)

15. PLATFORM CODE 1 5 1 6 (57 58 59 60)

16. TIME ZONE ± – (61); 0 9 (62 63)

---

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



Small animal
Dark grey/black body color
white below (ventrally)
behavior - porpoising
no dorsal fin
sleek slender body shape tapered tail

distinct color demarkation

Side view didn't show any white

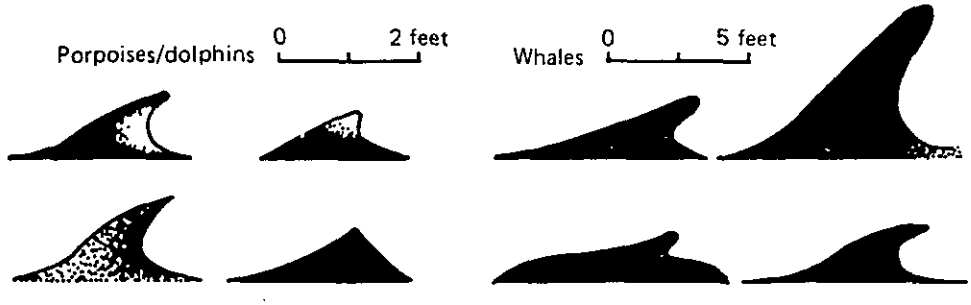
18. Additional information (optional) – see reverse side.

18. ADDITIONAL INFORMATION((OPTIONAL)

A. DIRECTION OF TRAVEL (RELATIVE TO VESSEL) ☐☐☐
B. CLOSEST APPROACH (10's of meters) ☐☐
C. POINT OF CLOSEST APPROACH ☐
D. DIRECTION OF TRAVEL (code) ☐
E. MOST SPECIFIC BEHAVIOR ☐☐
F. CALVES PRESENT? ☐

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:				



Prominent blow?	Yes	No	
Number of blows before a long dive:	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 _____

Distinctive markings
(scarring, white patches, etc):

Section II. Set and Retrieval Procedures

A: GENERAL

Driftnet operations, whether conducted on board commercial or research vessels, share several common features. All operations include the set, the soak, and the retrieval.

Commercial Sets

In the commercial squid fisheries, generally the set is made in the early evening hours. The net is deployed over the stern while the vessel steams at moderate speed (often 5-7 knots). Marker buoys are attached to the net and deployed at specific locations, but the vessel does not stop unless problems occur. The duration of the set operation is largely dependent upon the length of net and sea conditions. For instance, a commercial squid net 40 km long will take about 2-2.5 hours to set. The vessel course should remain constant while a net is being set, although it is possible that the net will be broken into 5 or more units (referred to as net sections) and laid along 2 or more parallel courses.

Research Vessels

Sets on research vessels may employ unusual techniques since many vessels (particularly NOAA ships) are not geared for driftnet fishing. The time that the set is initiated will roughly correspond to that of the commercial operations, early evening, but may be influenced by other research activities. In general, the nets used on research vessels will be rather short (1 to 5 km), and the duration of the set closer to 0.5 - 1 hour long. Since the nets are short, the entire net generally will be set along a single course line.

Net Soak

The soak refers to the period during which the net is left in the water, without any direct contact from the vessel. Squid nets are left to soak throughout the night. Sea conditions, and vessel preference may influence the duration of a specific soak, but the overall strategy involves maximizing fishing effort while the target species are thought to be high in the water column. Soak times for commercial and research vessels will be similar (8-10 hours).

Retrieval

The retrieval or haul operation is the longest, most complex, and most variable of the three segments. A typical commercial squid retrieval may take 6 hours, but can be as short as 4.5 or as long as 12 hours. A research vessel retrieval may take only 0.5 to 1.5 hours, although it may take longer if the vessel is not specifically designed to efficiently retrieve and stack the nets.

Commercial vessels retrieve the net by running along side it while the cork line and lead line are pulled onboard the forward, port work deck by two hydraulic stripping machines. The crew gathers by hand the net stretched between the lead line and cork line pullers and removes the catch as it comes over the rail. After removal of the catch, the driftnet is pulled through a tube to the stern net bin where it is stacked in preparation for the next set. Research vessels will follow the same general procedure, but vessel design may dictate how the net is brought on board and readied for the next set.

The retrieval operations which require long hours to complete often result from poor sea conditions and/or large catch (both target and non-target). As sea conditions deteriorate the net is more likely to break apart

into sub-sections, or become tangled. Each time a broken net end is located, the vessel begins a search mode to find the other end of the broken piece or the next marker buoy. Runs between broken net ends may take 30 minutes or more. To untangle large animals, particularly marine mammals, billfish, and large tunas, the vessel may stop, just as large catches of any species will result in slower vessel progress along the net.

The Observers' Daily Activities During Driftnet Operations

The observers' daily activities on board commercial and research cruises will be very different. The commercial retrieval operations take longer to monitor and result in more data to log and edit. Research cruise driftnet operations are shorter, but a wider variety of other activities will require observer attention. Since the observer's daily activities on the two cruise types are so different, two separate examples of typical schedules best illustrate how observers fit into the vessel activity.

Commercial vessels:

0400 Standby - crew arises, prepares to begin the retrieval. The first meal of the day may be eaten now, or in shifts as the retrieval proceeds. The vessel runs to the end of the net to be brought onboard first. The observer also arises, and may eat now or later (while remaining on station) in accordance with arrangements made upon arrival on board.

0430 Driftnet retrieval begins, the observer is on station to monitor the operation and remains there until it is completed.

1200-1500 Driftnet retrieval ends. The second meal of the day may begin now, or has already been eaten, in shifts, late in the retrieval. The observer eats on station whenever possible.

1500-1900 Meas length of mm & birds Vessel runs to the vicinity of the next set position, crew processes the catch, gear repaired and readied for the next set. The observer rests, reviews morning data.

1900 Driftnet set begins. The observer monitors the set in accordance with instructions. Complete monitoring of the set will not always be required.

2100 Driftnet set completed, vessel runs to its drift position for the night. Third meal of the day served, crew retires thereafter. Observer completes all data requirements, then retires.

Research Cruises:

0400: Standby - crew arises, prepares for driftnet retrieval. Observer arises and awaits beginning of retrieval.

0430: Driftnet retrieval begins.

0500-0630 Driftnet retrieval completed.

0700 First meal of the day served.

0730-1900 Vessel runs and positions for next activity, e.g., CTD's, mid water trawls, etc. Observer maximizes marine mammal sighting effort during all transits.

1900 Driftnet set begins.

Vessel Equipment Important to Observer Data Collection

To record the required weather, oceanographic and position data, the observer will need to be familiar with the following instruments. In all cases, the observer should ask a ship's officer for instructions on proper use, and restrictions on use, of this equipment. This summary indicates their function and likely location. Since vessels vary by age and construction, however, equipment may be located elsewhere.

a) Satellite Navigation System (SAT NAV)

Function: ship's position (latitude and longitude)

Location: chart room or radio room, adjacent to bridge

Remarks: 12 to 20 times per day a satellite passes over and relays the true position of the vessel back to the onboard computer. From this known point some systems calculate a running course by dead reckoning until the next update. Note whether a separate speed control unit is connected to the Satellite Navigation Unit. This indicates that the unit must be programmed manually after each satellite fix to determine the vessel's true position. In general, the position on the unit will be correct and the vessel operator will alert the observer if positions are not reliable.

b) Anemometer

Function: wind speed and direction

Location: on the bridge

Remarks: may read in meters per second or in knots.

Record in knots. The conversion is roughly (m/s x 2 = knots).

Note that most units do not compensate for the vessels forward movement, adjust readings accordingly. - if wind is fr. dead ahead or from rear & vessel is making headway

c) Thermograph

Function: sea surface temperature

Location: on the bridge

Remarks: record in degrees centigrade. The unit may need to be turned on each time it is read if continuous readings are required by the vessel. Ask an officer if the unit is functioning and properly calibrated before recording data.

d) Gyrocompass (gyro)

Function: ship's heading

Location: the gyro itself is probably in the chart room, but readings are taken from repeater stations located in multiple locations such as on the bridge, bridge wings and upper bridge.

Remarks: the readings are in ° true.

B: DRIFTNET SET DUTIES

Logbook Entries and Form 89A2

For all driftnet set operations, a complete record of times, positions and environmental conditions will be recorded in the Logbook(s). These original data are the permanent record and should be legible. All data, notes, and data forms are property of the NMFS and are not to be copied except under specific directions. Entries for each set include the following items which are always recorded on a left-hand logbook page in the exact format illustrated in the example on page 2-29.

1) Vessel name
2) Set number - The driftnet operations are to be numbered sequentially through the season.
3) Date
4) Beginning set time - The time that the first buoy hits the water.
5) Beginning set position - The position corresponding to d above.
6) Ending set time - The time that the last buoy hits the water.
7) Ending set position - The position corresponding to g above.
8) Beaufort stage - Refer to Table 6.3 in Section III.
9) Visibility - An estimate of the distance (in miles) one can see ahead of the vessel.
10) Wind speed and direction - Speed is recorded in knots and direction refers to the direction from which the winds are coming.

11) Swell height and direction - Height is defined as crest to trough, and direction corresponds to the direction from which the swell is coming.

12) Sea surface temperature - Recorded for the beginning of the set, in degrees centigrade. Round up starting with 0.5 degrees.

13) Weather - A brief description of the conditions at the start of the set such as "clear" or "intermittent fog".

14) Net type - General term for the kind of net being used such as squid research, or squid commercial, followed by mesh size(s). If different mesh sizes are used, diagram the net showing the distribution and amount of each mesh size.

15) Direction of set - The heading taken by the vessel in setting the net.

16) Describe the pattern of deployment of the net sections for the initial set including amount of net per section and total net set.

Following these items, the observer will generally note events (and the time at which they occur) in chronological order. Events during the set may include all buoy deployments, problems or delays in the set, marine mammal sightings (off effort), and the beginning and end of each separate net section.

On commercial squid vessels where retrieval times are very long, observation of every evening set is not required in order to lighten the observer's work schedule. Observers should, however, monitor the first few to become familiar with the process. Limit set notes to one page only. When the set process is not monitored directly, items 1-5, 8-15 are filled in at the start of the set and information on the end of setting, amount and number of

sections set is obtained later. Note in the logbook that the set process was not monitored. Items 1 through 16 must be recorded for each set even if it is not monitored.

On the Squid Driftnet Observer Forms 89A2 and 89B2 computer data forms, record:

1) Vessel name
2) Observer
3) License No.
4) OPE. No. (operation number, i.e., the set number)
5) Year
6) Mesh size
7) Tan length - check this
8) Net depth (top and bottom) check this 8 - 12 m, or 15m ?
9) Sea surface temperature (twice, once at the start, then once again at the end of the set
10) Air temperature
11) Wind speed and direction
12) Beaufort Stage
13) Swell height and direction
14) Cloud cover (0 - 10)
15) Visibility (to the nearest ~~mile~~) 1/10 mile
16) Time and Position at start of setting
17) Time and Position at end of setting
18) Direction of Set on 89A2

Net Diagrams (optional)

To document the driftnet configuration, the observer should complete a net diagram on the form(s) provided for each set. The Net Diagram Form is composed of 3 parts: if you can

1) Information Block containing:
   a) Vessel name
   b) Observer name
   c) Date
   d) Set number
2) Set Array Block - using lines illustrate the layout of the net sections (e.g., all in one line, several parallel lines, etc.)
3) Net Section Block - six net section silouettes are provided on each sheet. Using as many sheets as necessary per set, note the following for each net section
   a) Buoy placement, by type:
      A = Flag buoy
      B = Radio buoy
      C = Radar buoy
      D = Light buoy
   b) Tears or separations
   c) Marine mammal entanglements - ~~mark with an "X",~~ ~~or~~ Use the species codes ~~if more than one species appears in any one net section.~~

NET DIAGRAMS

page 1 of 2

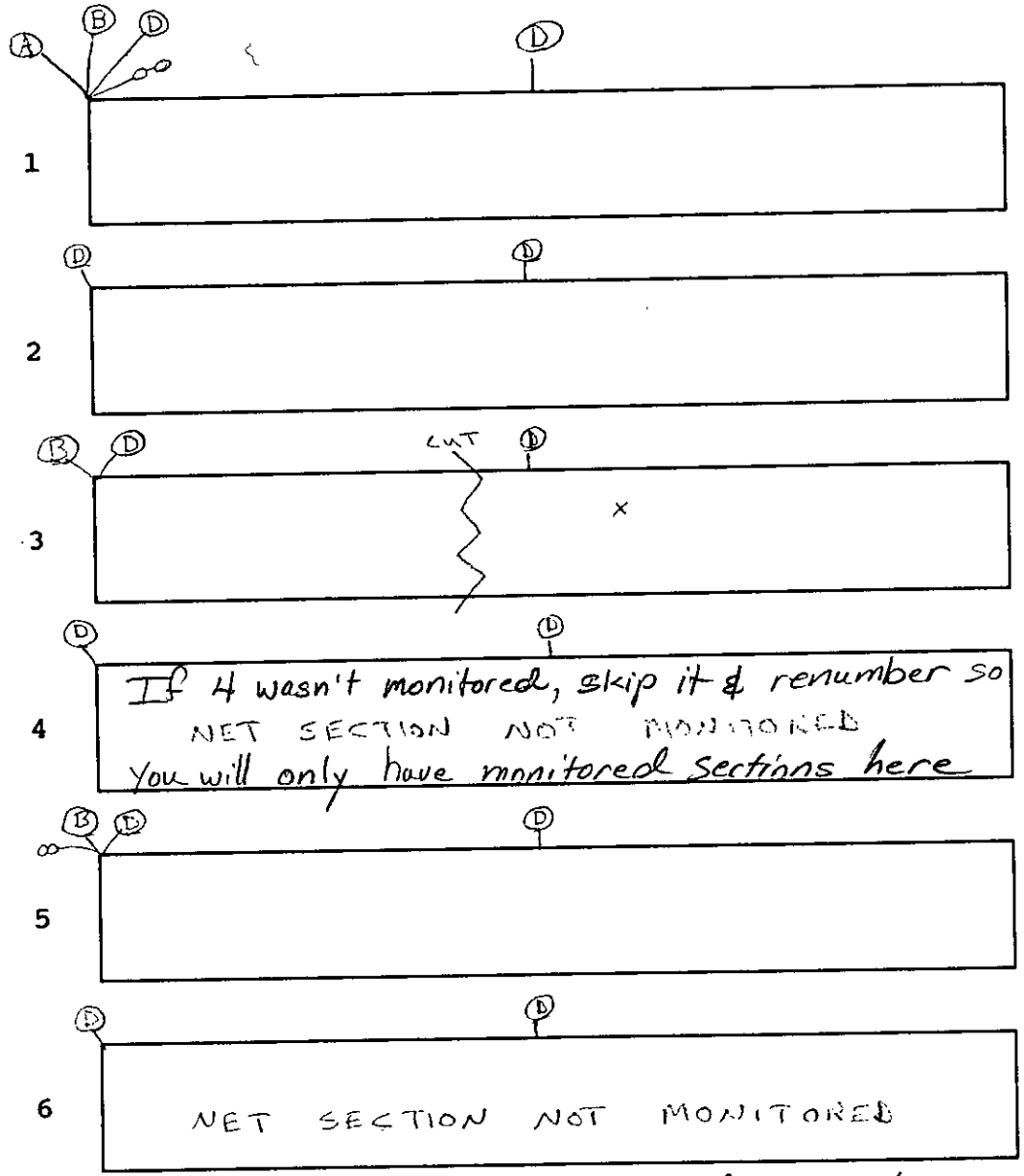
∞ = FLOATS

Date 6-7 Aug 89
Set Number 001 SAF
Observer Name SHANNON FITZGERALD
Vessel Name KOEI MARU No. 53

Array (Net Deployment Pattern):

also put in a N arrow ↑

(Usually it'll be this way) → N



Note entanglement location of mm w/sp. code

NOTE: For this example only one of two pages is shown.

C: DRIFTNET RETRIEVAL DUTIES

Daily Work Schedule For Retrievals

A Japanese observer will probably be present with the U.S. or Canadian observer on the commercial squid vessels. Data collected by each observer will be exchanged by NMFS and the Japan Fisheries Agency after the cruise, once it has been checked carefully for omissions or mistakes during debriefing.

Driftnet retrievals lasting six to twelve hours require a daily work schedule designed to provide rest breaks for the observers while ensuring a minimum of data loss. Both observers will be on break during one of every four net sections. To determine which section represents the observer break time, the following coin toss system will be used.

Observer A and B each toss a coin. Each of the 4 possible combinations of "heads" and "tails" represents a different net section. At the start of the net section identified by the coin toss both observers will go "off station", then return when the next net section is retrieved. If there are less than four sections to monitor in the remainder of the retrieval then all remaining sections will be monitored. Observer A and B identity will be alternated daily.

		Observer A First Coin Toss	
		H	T
Observer B Second Coin Toss	H	1	3
	T	2	4

Note the observer break in the logbook where the species and tally notes would normally appear.

Observations should be conducted from atop the pilot house, the flying bridge, the bridge wing, or as a last resort, on the bridge. The best position will be elevated with a good view forward and along side where the net is coming onboard. The view downward, and along side is particularly important for observing dropouts of the catch.

Retrieval data will be recorded directly in logbooks as the operation progresses. Afer the operation is complete, the data will be summarized, then transcribed onto the two coding forms (Squid Driftnet Observer Form 89A2 and 89B2). Instructions for completion of the logbook entries and the coding forms are each discussed separately in the following section.

Logbook Entries

As was the case for the set operation, specific logbook entries are required for each retrieval operation. This data is recorded on the right hand page of the logbook adjacent to the data recorded for the previous evening's set. Follow the exact format illustrated in the example on page 2-30. Entries for each retrieval include the following:

a) Vessel name

b) Set number - The set number is the same for both the set and retrieval segments of a given operation.

c) Date - The date should be one day after the set date under most circumstances.

d) Beginning retrieval time - The time that the first buoy is brought on board.

e) Beginning retrieval position - The position corresponding to (d) above.

f) Ending retrieval time - The time that the last buoy is brought on board.

g) Ending retrieval position - The position corresponding to (g) above.

h) Beaufort stage

i) Visibility - An estimate of the distance (in miles) one can see ahead of the vessel.

j) Wind - Direction and speed as defined for set notations.

k) Swell - Direction and height as defined for set notations.

l) Sea surface temperature

m) Weather - A brief description of conditions at the start of the retrieval such as "overcast" or "light rain".

Entanglements will be recorded by species (in accordance with Appendices A and C) by number and in some cases by condition (e.g., Dead, Alive, Lost) over 10 minute intervals. To facilitate this process, these data will be organized in tabular form. The logbook should be oriented side-ways and prepared with the headings as illustrated in the example on pages 2-31 to 2-38. As each new species comes on board the species code should be noted under the appropriate heading and a running tally started next to it. As more of the same species come on board update the tally until the 10 minute period is completed. Repeat this process for each 10 minute segment.

At the start of a new net section record:

START SECTION _____: (time)

At the end of a net section record:

SECTION TALLY (tally each species for the 10 minute block)

END SECTION _____: (time)

Draw a double line across the page, then repeat the start process for the next net section.

When on break, note:

START SECTION _____: (time)

OBSERVER ON BREAK - SECTION NOT MONITORED

END SECTION _____: (time)

At the end of the retrieval, tally all sections; note:

SET TOTAL (Sections ___, ___, etc.)

The COMMENTS section can be used to describe events other than entanglements, detailed descriptions of animals not positively identified, or marine mammal sightings. Refer to the following section (Data to be Collected) for complete details.

Data To Be Collected *Reiteration of Objectives*

Monitoring of driftnet operations can involve five overall objectives, although under terms of this particular international cooperative agreement only the first has been agreed upon. All five are presented here, however, in the event that additional data collection by U.S. and Canadian observers is allowed at a later time.

Objective 1: Determine the number, by species of all designated marine mammals, sea birds, fish by-catch and sea turtles incidentally taken in each driftnet operation.

Under international agreement between the governments of Japan, Canada, and the United States, only data on designated species are to be collected by U. S. and Canadian scientific observers. Observers are not to modify these during the cruise under any circumstances.

Species included in the agreement:

Under Appendix A

Dall's porpoise	Phocoenoides dalli
Northern fur seal	Callorhinus ursinus
Flying squid	Ommastrephes bartrami
Boreal clubhook squid	Onychoteuthis borealijaponicus
Eight-armed squid	Gonatus borealis
Pomfret	Brama japonica
Albacore	Thunnus alalunga
Yellowtail	T. albacares
Skipjack	Euthynus pelamis
Blue shark	Prionice glauca

Under Appendix C

Cetaceans

Pacific white-sided dolphin	Lagenorhynchus obliquidens
Northern right whale dolphin	Lissodelphis borealis
Common dolphin	Delphinnus delphis
Striped dolphin	Stenella coeruleoalba
Other cetaceans	

Marine turtles

Kemp's Ridley Sea Turtle	Lepidochelys Kempi
Hawksbill Sea Turtle	Eretmochelys imbricata
Loggerhead Sea Turtle	Caretta caretta
Green Sea Turtle	Chelonia mydas
Leatherback Sea Turtle	Dermochelys coriacea

Seabirds	
Albatross, short-tailed	Diomedea albatrus
Albatross, black-footed	D. nigripes
Albatross, Laysan	D. immutablis
Shearwater, sooty	Puffinus grissus
Shearwater, short tailed	P. tenuirostris
Shearwater, flesh footed	P. carneipes
Shearwater, Buller's	P. bulleri
Puffin, tufted	Fratercula cirrhata
Puffin, horned	F. corniculata
Storm-petrel, Leach's	Oceanodroma leucorhoa
Fulmar, northern	Fulmarus glacialis
Salmonids	
Chinook	Oncorhynchus tshawytscha
Chum	O. keta
Coho	O. kisutch
Pink	O. gorbuscha
Sockeye	O. nerka
Steelhead	O. mykiss

These are the only species that are to be recorded. The United States requested these species based on special concerns for these species based on the potential for impacts. Data for other species which are collected by the Japanese may be requested by the U. S. or Canadian government. To aid us in this process you should be aware of other species that are caught in the net.

Marine Mammal Entanglement

Each incidental marine mammal take is recorded by one of three categories:

a) **Dead** - those animals that are brought on board, and show no sign of life. They might be retained onboard for sampling or immediately discarded (depending upon specific circumstances), but they are still considered "dead".

b) **Released Alive** - those animals that show signs of life, however slight, and are disentangled and released. The disentanglement may occur in the water or on board, but, in the observer's best judgement, the animal was alive when released. For any animal released alive, the data should include a description of its condition ("swimming feebly", "badly wounded", etc.).

for birds, mm & turtles, "Dropouts": is used for oth. sp.

c) **Lost** - those animals that were neither released alive nor brought onboard dead. Typically the animal tears free of the net along side and the scientific observer does not see any indication of life. If, however, the animal tears free and the observer does see signs of life (e.g., weak swimming and normal orientation) then the take would be recorded as "released alive". As soon as a marine mammal entanglement is observed ahead of the vessel, the observer should concentrate on the animal's movements, if any, before it comes aside and is lifted from the water. The observer should note :

- where in the net (i.e., near the corks, at mid net or near the lead line) the animal is entangled,
- what parts of the body are entangled,
- the amount of webbing covering the body,
- any obvious signs of injury (e.g., bleeding or dismemberment),
- the approximate length of the animal (in centimeters),

- whether it was a dalli or a truei color type for Dall's porpoise, and,
- if a northern fur seal, what was the whisker color and were ear tags seen.

The scene around the entanglement should also be described fully:

- Were there any buoys close by?
- Were other marine organisms close by?
- Did the entanglement occur close to the end of a net section or a tear?

Seabird Entanglement

Seabird entanglements are generally seen as the driftnet emerges from the water just before it comes over the rail. The observer should identify the species or make a list of characteristics if identification is not possible. Each bird take should be classified as either "dead", "released alive" or "lost" per the definitions given under Event 1.

~~Optional~~ As you can: Record its vertical position in the net (upper, middle or lower 1/3) and its condition if released alive. Each seabird entanglement should be considered a separate event, unless two or more come up less than a minute apart (e.g., "0715 two sooty shearwaters entangled at the corks, 2 m apart, both dead").

More important to get nos than to record position in net

Marine Fish Entanglement

This category of catch can be expressed as by-catch, or any fish species caught incidental to effort on target species. Although accurate counts for some species are of more concern than for others, it is important to keep track of all such catches as closely as possible. Observers should pay

particular attention to drop outs (those fish caught, but not decked), and log them, but it is not necessary to note dead vs. released alive fish. Some species, such as pomfret, can be so numerous that it is impossible (and unnecessary) to keep track of every one. For very abundant catches, estimate the numbers or record "high" or "moderate". Define what you mean by these designations (e.g., high = > 50).

Sea Turtle Entanglement

Sea turtle entanglements are logged by simple tally. The condition of turtles released alive, however, should be noted. Identification may be difficult, so always list identification characteristics. Record Dead Alive & Lost

Objective 2: **Record observations of discarded net debris**
(Has not been agreed upon w/Japanese)

A Piece of Netting Comes Up in the Net

Don't do this during fishing unless easy to do so

Any netting that comes up in the driftnet is noted. Record the type, color, mesh size and presence or absence of marine organisms attached to or entangled in it. Similarly, if a piece is seen nearby, but not caught in the net make the same notations. Refer to Section III Sighting Surveys for additional information regarding observations of discarded webbing.

Objective 3: **Record details on the driftnet retrieval itself**

The Net is Separated or Ripped

Net separations (intentional), and mid section breaks in the net (unintentional) delay the retrieval since the next part of the net must be located and picked up. These delays complicate laboratory reconstruction of the retrieval, so it is helpful to note them as they occur.

The Net is Tangled

If the net has become tangled, a group of corks will often be seen floating in a tight bunch ahead of the vessel. The observer should note how much webbing is tangled, and if tangle causes a delay in the retrieval.

The Net Forms Large Bends

Currents and winds may cause the net to form large bends which may slow the retrieval and possibly represent a feature important to the entanglement question. Note how many bends are observed and the approximate distance they extend.

Many Holes Appear in Net

If the observer notices holes in the net over 0.5 meter in diameter they should be noted.

The End of a Net Section Comes On Board

The driftnet is set in several sections, oftenattached together by short lines. The observer should keep track of which section is being retrieved. Record the time the end of one and the beginning of another is brought onboard. Sections should be numbered from one onward, with section one corresponding to the one hauled in first at the start of the retrieval.

Objective 4: Collect data on the environmental conditions associated with marine mammal and seabird entanglements.

Analysis of factors involved in these incidental takes requires information on the circumstances surrounding the incident which may provide clues to the cause. Though not clear at the present time, changes in local environmental and oceanographic conditions might be useful information. The

events in this group should be noted throughout the retrieval, but particular attention is required whenever marine mammal and seabird entanglements are encountered.

A Change in Weather Conditions Occurs

Although this may not have an impact on entanglements at that point in time, it may impact events as the retrieval progresses. In general, once the observer becomes aware of a weather change it is probably significant enough to make the notation.

A Change in Oceanographic Conditions Occurs

If the swell picks up (or drops off), the wind changes speed or direction (effecting the Beaufort stage) or the water color changes, the observer should describe the change.

Objective 5: Record the behavior of marine mammals observed near the driftnet during the retrieval operation.

A Marine Mammal is Observed Swimming Near the Driftnet

Any marine mammals sighted near the driftnet or vessel during the retrieval should be observed for as long as is practical without missing other events. These animals may become entangled, and details of an eye witness account would be very valuable. If the animals are seen periodically, then several separate notations (events) should be made updating their latest behavior. Marine Mammal Sighting Forms should be filled out for each sighting. If a group (particularly pinnipeds) stays with the vessel for an extended time, treat that as a single sighting on one Sighting Form, but

update their activities periodically in both the logbook and on the (Sighting) form.

Squid Driftnet Observer Forms (89A2 and 89B2)

Entanglement data that has been recorded in the logbook must be transferred to coding forms 89A2 and 89B2 (examples are found on pages 2-39 and 2-40). The first (89A2) will by now already contain information on the set operation. The times and locations of the beginning and end of the retrieval are noted next. The entanglement tally, by net section, for the squid species, pomfret, albacore, yellowtail, skipjack, blue shark and salmonids are noted on this form under the appropriate columns for each species. Tallies are all right justified and zero filled. Only one line per net section is completed on Form 89A2. When a net section was not monitored, write in 99 under the 2 left-hand columns under Flying Squid as a flag. Refer to the variable list for definitions.

Form 89B2 is organized somewhat differently than 89A2 in that the columns under "Marine Mammals", "Shearwaters", "Albatrosses", and "Other Animals" are not reserved for specific species. Instead, the observer must list the code for a species taken under the proper heading (e.g., code 01 for N. fur seal would appear under the marine mammal heading) and place the corresponding tally next to it. In this way, multiple lines per net section may be necessary in order to accomodate several species within one of the four broad categories. Refer to the species code list to determine which species belong under each of the four categories.

Variable list for Squid Driftnet Observer Form 89A2

VESSEL NAME - include vessel numbers, e.g., HOYO MARU NO. 32

OBSERVER - use 3 initials

LICENSE NO. - obtain from Fishing Master - should be painted on the vessel bridge

OPE NO. - operation number = sequential number of sets/retrievals observed during the cruise. Same number is used for the set and subsequent retrieval.

YEAR - last two digits of gear, e.g., 89.

ARRAY FISH - No = 1

Yes = 2

Is your vessel fishing alone or in cooperation with other squid vessels? If with other vessels, how many? Write total number including your vessel below the box.

MESH SIZE - stretched mesh in mm. Obtain from Fishing Master. Watch for any changes over the season.

TAN LENGTH - in m. obtain from Fishing Master. Might be variable.

NET DEPTH: TOP/BOTTOM - in m. Depth of net and distance of top of net from surface of the water.

SURFACE SEA TEMPERATURE - start and end of set - to nearest 0.1 degree centigrade.

AIR TEMPERATURE - to nearest 0.1 degree centigrade.

DIRECTION OF SET, 360° - direction in which ship heads during net set.

WIND SPEED - meters per second from Anemometer.

WIND SCALE - Beaufort

ARRAY FISH - No = 1

Yes = 2

Is your vessel fishing alone or in cooperation with other squid vessels? If with other vessels, how many? Write total number including your vessel below the box.

MESH SIZE - stretched mesh in mm. Obtain from Fishing Master. Watch for any changes over the season.

TAN LENGTH - in m. obtain from Fishing Master. Might be variable.

NET DEPTH: TOP/BOTTOM - in m. Depth of net and distance of top of net from surface of the water.

SURFACE SEA TEMPERATURE - start and end of set - to nearest 0.1 degree centigrade.

AIR TEMPERATURE - to nearest 0.1 degree centigrade.

DIRECTION OF SET, 360° - direction in which ship heads during net set.

WIND SPEED - meters per second from Anemometer.

WIND SCALE - Beaufort

SWELL DIR. - direction from which swell is coming.

SWELL HEIGHT - in m, from crest to trough, estimated by eye.

CLOUD: 0-10 - Percent cloud cover (eatimate)

VISIBILITY - in nm.

START NET SETTING - JST month day hour minutes latitude longitude

END NET SETTING - JST month day hour minutes latitude (N) longitude (west/east)

START NET RETRIEVAL - JST - month day hour minutes latitude longitude

END NET RETRIEVAL -

SECTION NUMBER	-	sequential number of sections of nets set and retrieved, not just the number observed.
TTL TANS	-	total number of tans set per section of net.
N.G. TANS	-	number of ineffective tans - due to wrapping up or removed.

Marine Mammal Entanglement Diagrams (optional)

For each marine mammal entangled, one entanglement diagram should be completed, including a complete description of the event. Even if the observer sees the entanglement only briefly, the form should be completed as much as possible. When diagraming marine mammal entanglements, draw in the netting, corkline and leadline to indicate the following:

a) The amount of webbing covering the animal (generally a single layer vs. two or three).

b) Whether or not the corkline was in contact with the animal.

c) Whether or not the leadline was in contact with the animal.

d) The portion(s) of the animal's body covered by the webbing (i.e., head, whole body, flippers, flukes or a combination thereof).

e) How the animal hit the net (if it can be determined).

f) The initial time that the observer saw the entanglement (i.e., was the animal in the net ahead of the vessel, along side, or being brought onboard?

g) Whether or not the observer witnessed the actual event (i.e., did a free swimming animal hit the net which the observer was watching).

h) The size of the animal (estimate in centimeters). Calibrate visual estimates by measuring all dead animals after the retrieval is completed if possible. Record the measured length whenever taken. If you cannot estimate size, record small, medium, large categories.

i) How close the entanglement was to the nearest entanglement, if others were present.

j) The condition of the animal (dead, released alive or lost).

An entanglement diagram example can be found on page 2-41.

No. 1136 (on left side of facing pages)

① DRIFTNET SET - 001 SMF KOEI MARU No. 53

(observer's initials) 6 AUG. 89 (will be 1 day different from retreival)

	START	END
LOCAL TIME	1720	2050
LAT.	40° 45.3' N	40° 45.9' N
LONG.	161° 07.6' E	162° 42.4' E
BEAUFORT:	3	VISIBILITY: 1.5 (miles)
WIND:	265° at 8 KTS	SWELL: 230° at 1 meter
SEA SURFACE TEMP:	20.7° C	WEATHER: CLEAR (to nearest whole meter)
NET TYPE:	COMMERCIAL SQUID: 110-115 122mm	DIRECTION OF SET: 090° (heading - usu. E↔W)
NUMBER OF SECTIONS:	8	

TIME	EVENT
1720	- RADIO BUOY, LIGHT BUOY, AND FLAG BUOY DEPLOYED, EACH TIED TO CORKLINE WITH SEPERATE 10 m LINES. 2 POLY-FLOATS ON 10 m line.
1733	- LIGHT BUOY DEPLOYED, 10 m LINE
1746	- END SECTION 1. LIGHT BUOY OVER, 10 m LINE
1758	- LIGHT BUOY OVER, 10 m LINE
1812	- END SECTION 2, RADIO BUOY AND LIGHT BUOY, 10 m LINES
1826	- LIGHT BUOY OVER, 10 m LINE
1840	- END SECTION 3, LIGHT BUOY ON 10 m LINE OVER.
1852	- LIGHT BUOY OVER, 10 m LINE
1907	- END SECTION 4, LIGHT BUOY, RADIO BUOY, AND 2 POLY-FLOATS DEPLOYED ON 10 m LINES.
1921	- LIGHT BUOY OVER, 10 m LINE
1935	- END SECTION 5, LIGHT BUOY OVER, 10 m LINE
1948	- LIGHT BUOY OVER, 10 m LINE
2000	- END SECTION 6, LIGHT BUOY DEPLOYED ON 10 m LINE, RADIO BUOY ON 20 m LINE.
2013	- LIGHT BUOY OVER, 15 m LINE
2024	- END NET SECTION 7. LIGHT BUOY ON 10 m LINE OVER.
2037	- LIGHT BUOY OVER, 10 m LINE.
2050	- END OF NET, LIGHT BUOY, FLAG BUOY, RADIO BUOY, AND 2 POLY-FLOATS DEPLOYED.

② On right side of facing page

DRIFTNET RETRIEVAL - 001 SMF (same no. as setting set no.) KOEI MARU No 53

7 AUG. 89 (usu 1 day after set date)

	START	END	
LOCAL TIME	0600	1532	
LAT:	40°41.5'N	40°45.0'N	
LONG:	162°46.6'E	161°09.8'E	
BEAUFORT:	3	VISIBILITY:	0.5 mi
WIND:	215 at 7 kts	SWELL:	240° at 1m
SEA SURFACE TEMP:	19.5°C	WEATHER:	FOG

(REFER TO PAGES 3 TO 10 FOR HAUL 001)

Enter Page Nos in upper left hand corner of pages & No. the Books - & Write inclusive set nos on title page (title page not numbered)

Before Retrieval:
Coin toss - 1 toss for ea. 4 sec (2-12)
if 7 sec. retrieved - only 1 break

Note: Vacation break → every 6th set off
(if bad weather causes break, start count over)

Set Nos. only are of sampled sets - don't skip a set no for unsampled sets.

START SECTION 1: 0600

TIME	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MARINE MAMMALS D A L	SEABIRDS SPP	SEABIRDS D A L	OTHER ANIMALS SPP	OTHER ANIMALS #	COMMENTS
0600 Start time of each 10 min	70	15	75	III (3)							58	1	RADIO BUOY, FLAG BUOY, AND LIGHT BUOY, ATTACHED TO NET WITH 10 m LINES, BROUGHT ON. 2 POLY-FLOATS BROUGHT ON.
	71	3	73	III (3)									
0610	70	78	75	HH (5)									
	72	5											
0620	70	43											
0630	70	115	75	II									LIGHT BUOY COMES ON AT 0632, 10 m LINE.
	71	1	73	III									
	72	1											
0640	70	67	75	HH II									
0650	70	23	74	1									
	71	17											
0700													0700 END OF NET SECTION COMES ABOARD. LIGHT BUOY ATTACHED TO CORKLINE W/ 10 m LINE
TOTAL	70	341	75	17							58	1	
	71	21	73	5									
	72	6	74	1									

Don't abbreviate headings - write as shown here on each sheet

Total Dropouts separately for each sp. (except birds & mm) & enter no & "D" for ea. category

Salmon - They're holding on deck - count each put in parenthesis next to catch no. - do not total do not put on coding form

Use 1 page per set section

END SECTION 1: 0700

(3)

No. 1136

START SECTION 2: 0701

TIME	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MARINE MAMMALS D	MARINE MAMMALS A	MARINE MAMMALS L	SEABIRDS SPP	SEABIRDS D	SEABIRDS A	SEABIRDS L	OTHER ANIMALS SPP	OTHER ANIMALS #	COMMENTS
0701	70	15	75	11													
0711	70	12													57	1	SWORDFISH, DROPS OUT, ESTIMATE BODY LENGTH 2.0 m
0721	70	12	52	3													0726 - LIGHT BUOY, ATTACHED TO NET WITH A 15 m LINE, BROUGHT ON BOARD. BUOY WAS ENTANGLED AT CORKLINE, YELLOWTAILS CAUGHT WITHIN 2 m OF BUOY.
			74	IN III													
			75	11													
0731	70	8	52	14													
	72	2															
0741	70	21	52	25													FOG BEGINNING TO LIFT, VISIBILITY NOW ≃ 1 mi.
			75	IIII													
0751	70	6	52	14													
0800			73	III													END OF NET SECTION
TOTAL	SPP	#	SPP	#													
	70	60	75	8													
	72	2	52	60													
			74	8													
			73	3													

Species diversity determines length of block - use. only 3-4 spp.

Comments Should Include

Chng. in weather
Bouys
Entanglement Desc.
Where in net
How tangled
Length of Animal
injury
assoc. animals or net-bouys

END SECTION 2: 0800

START NET SECTION 3 : 0803

TIME	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MARINE MAMMALS D A L	SEABIRDS SPP	SEABIRDS D A L	OTHER ANIMALS SPP	OTHER ANIMALS #	COMMENTS
0803	70	47	52 73	3 111									LIGHT BUOY ATTACHED TO BEGINNING OF NET SECTION WITH A 10 m LINE, RADIO BUOY ATTACHED WITH A 20 m LINE
0813	70	122	52 73	4 IIII									FOG CLEARED, VISIBILITY TO HORIZON
0823	70	46	73 75	12 1									WIND IS INCREASING, NOW SEA-STATE IS BEUFORT 4.
0833 (0843)	70	15	73	7									0840 NET HAS BEEN CUT, BRNG END ON AND BEGIN MOVING TO NORTHEAST.
0851	70	34	73	9									0846 - NET IS IN SIGHT 0851 - GRAPPLE NET END AND RESUME HAULING 0857 - LIGHT BUOY BROUGHT ON, ATTACHED TO CORKLINE WITH 10 m LINE.
0901	70 71	72 1	73 75	27 111							37	1	LEATHERBACK SEA TURTLE, CARAPACE LENGTH (ESTIMATE) 1.5 m long by 1.0 m wide.
0911	70	13	73 75	14 1			03	1-0-0					LISSODELPHIS ENTANGLED AT DEPTH OF 2 m, NO NEARBY ORGANISMS. 0912 ESTIMATE LENGTH 1.9 m

TIME	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MARINE MAMMALS D	MARINE MAMMALS A	MARINE MAMMALS L	SEABIRDS SPP	SEABIRDS D	SEABIRDS A	SEABIRDS L	OTHER ANIMALS SPP	OTHER ANIMALS #	COMMENTS
0921	70	11	73	42													
			75	11													
0931	70	42	73	17													
0941	70	31	73	7													
			75	1													
0948																	END OF NET SECTION COMES ABOARD,
TOTAL	70	433	52	7			03	1	-0	-0							
	71	1	73	145											37	1	
			75	8													

END SECTION 3: 0948

START SECTION 4: 0951

SECTION 4 NOT MONITORED: OBSERVER ON BREAK

END SECTION 4: 1042

START NET SECTION 5: 1044

1044	70	29															RADIO BUOY AND LIGHT BUOY ATTACHED TO CORKLINE WITH 10 M LINES. POLY-FLOATS (2) ALSO BROUGHT ON.
1054	70	40	73	5													
			75	1													
1104	70	62	75	4													
1114	70	51															1121 LIGHT BOUY BROUGHT ON, ATTACHED TO CORKLINE WITH 10M LINE
	72	3															

TIME	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MM D	MM A	MM L	SEA BIRDS SPP	SB D	SB A	SB L	OTHER ANIMALS SPP	OTHER ANIMALS #	COMMENTS
1124	70	22	75	1											58	1	
1134	70	32									17	9	2				MANY SMALL JELLYFISH IN WATER, RESIDUE ALL OVER NET (FROM JELLYFISH?)
1144	70	18	75	3											58	1	
1154	70	25	75	2											61	1	GROUP OF 4 DALLS PORPOISE SURFACE ≈ 50 m BEYOND NET, MOVE OFF TO SOUTHEAST, ≈ 150° SEE SIGHTING FORM
	71	IIII	73	III													
			74	++++													
1204	70	6															1207 END OF NET SECTION BROUGHT ONBOARD
TOTAL	70	285	73	8							SPP 17	D 9	A 2	L	SPP 58	# 2	
	71	4	75	11											61	1	
	72	3	74	5													

END SECTION 5 : 1207

START SECTION 6: 1209

SECTION 6 NOT MONITORED : OBSERVER ON BREAK

END SECTION 6: 1309

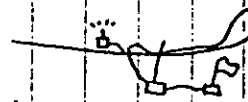
START SECTION 7: 1310

TIME	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MARINE MAMMALS D A L	SEABIRDS SPP	SEABIRDS D A L	OTHER ANIMALS SPP	OTHER ANIMALS #	COMMENTS
1310	70	14											RADIO BUOY AND LIGHT BUOY BROUGHT ON, ATTACHED TO CORKLINE WITH 10 m LINES.
1320	70	20	73 75	111 1			02	1-0-0					DALLS entanglement BROUGHT ON BOARD AT 1322. ENTANGLED AT CORKLINE, NET WRAPPED AROUND FLUKES. ONE POMFRET WAS WITHIN 2 METERS OF PORPOISE. ESTIMATE LENGTH OF DALLS AS 1.7 m
1330 1340 1350 1400 1410 1415	70	5			47	1							1334 - START OF "GREEN KOPE", NET IS ROLLED UP. 1341, LIGHT BUOY IS BROUGHT ON BOARD. LINE ROLLED UP INTO NET - NET ROLL-UP CONTINUES
TOTAL	SPP 70	# 39	SPP 73 75	# 3 1	SPP 47	# 1	SPP 02	# 1-0-0					END OF NET SECTION, NET ROLLED UP INTO "GREEN ROPE" TO THE END.

END SECTION 7: 1415

START SECTION 8: 1416

1416	70 71	15 111	75	1	47	2							LIGHT BUOY BROUGHT ON BOARD
1426	70	32	75	1	47	5							
1436	70	18			47	11							N. FUR SEAL SWIMMING ALONG CORKLINE

TIME	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MARINE MAMMALS D	MARINE MAMMALS A	MARINE MAMMALS L	SEABIRDS SPP	SEABIRDS D	SEABIRDS A	SEABIRDS L	OTHER ANIMALS SPP	OTHER ANIMALS #	COMMENTS
1446	70 71	17 11			47	6											N. FUR SEAL SWIMMING ALONG CORKLINE, DIVING NEAR NET, ±30 meters ahead of vessel.
1456	70	15	75	1	47	3											FUR SEAL REMAINS NEAR NET SEVERAL LARGE (5-6 m) TEARS IN NET, NEAR CORKLINE
1506	70	8			47	10	01		1						32	1	FUR SEAL NEAR VESSEL, SWIMMING OVER NET. PUFFW CAUGHT AT 2.5 m DEEP - FUR SEAL ENTANGLED WHILE SWIMMING NEAR NET, 1509, RELEASED ALIVE IN GOOD CONDITION. SWIMS AWAY
1516	70	21			47	7											FREQUENT TEARS OF 3-6 m IN NET
1526	70	4			47	1											Approx. LAST 100 m OF NET DOUBLED BACK ON ITSELF, WITH FLAG AND RADIO BUOY AND LIGHT BUOY ON OPPOSITE SIDES OF THE CORKLINE  Buoys brought on AT 1530, DOUBLED NET BROUGHT ON UNTIL 1532. END OF SECTION / END OF NET
1532																	
TOTAL	SPP 70 71	# 130 5	SPP 75	# 3	SPP 47	# 45	SPP 01	D 0	A 1	L 0					SPP 32	# 1	

END SECTION 8: 1532 (END OF HAUL 001 SMF)

2-37

No 1136

SET TOTAL (SECTIONS 1, 2, 3, 5, 7, 8) 0015MF

NET SECTION	SQUID SPP	SQUID #	FISH BY-CATCH SPP	FISH BY-CATCH #	SALMON SPP	SALMON #	MARINE MAMMALS SPP	MARINE MAMMALS Δ-A-L	SEABIRDS SPP	SEABIRDS Δ-A-L	OTHER ANIMALS SPP	OTHER ANIMALS #	
SECTION 1	70	341	73	5							58	1	
	71	21	74	1									
	72	6	75	17									
SECTION 2	70	60	52	60							57	1	SWORDFISH - DROPS OUT
	72	2	73	3									
			74	8									
			75	8									
SECTION 3	70	433	52	7			03	1-0-0			37	1	
	71	1	73	145									
			75	8									
SECTION 5	70	285	73	8					17	9-2-0	58	2	
	71	4	75	11							61	1	
	72	3	74	5									
SECTION 7	70	39	73	3	47	1	02	1-0-0					
			75	1									
SECTION 8	70	130	75	3	47	45	01	0-1-0					
	71	5									32	1	
TOTAL FOR HAUL	70	1288	52	67	47	46	01	0-1-0	17	9-2-0	32	1	HORNED PUFFIN
	71	31	73	164			02	1-0-0			37	1	LEATHERBACK SEA TURTLE
	72	11	74	14			03	1-0-0			57	1	
			75	48							58	3	
											61	1	

Dropouts (in parentheses) should be entered here

(SP. No) put sp. in same order for ea. sec

流し網漁業による操業調査記録（操業毎）様式89A2　SQUID DRIFTNET OBSERVER FORM (FORM 89A2)

船名	VESSEL NAME
	KOEI MARU No.53

調査員名	OBSERVER
	SMF

LICENCE No. 承認番号	OPE. No. 操業番号	YEAR 西暦
533	001 (Set No.)	89

操業方法: 1 単船 / 2 船団 — 1

ARRAY OF FISHING: 1 NO / 2 YES — 1

fishing in a pattern (array) with other boats? (Yes) or no
If yes, write the no. of boats (inclusive) in array below)
block

MESH SIZE 網目 (mm)	TAN LENGTH 1反ノ長さ (m)
120	50

record other no's beside block if they vary

NET DEPTH 網の水深 (m): TOP 上部 0015 BOTTOM 下部

depth of float line / depth of groundline

DIR. OF SET 投網方向 360: 090

Start of Set

SURFACE SEA TEMP 表面水温 (C) START OF SET 投網開始	END 終了	AIR TEMP 気温 (C)	WIND DIR. 風向 360°	WIND SPD. 風速 m/s	WIND SCAL 風力 *	SWELL DIR. ウネリ方向	SWELL HT. 高さ (m)	CL-OUD 雲量 0-10	VISIBLTY 視界 MILE
207	194	234	265	04	03	230	01	00	15

* BEAUFORT'S WIND SCALE

% old cover, 10=ヶ 100%

START OF NET SETING 投網開始 (JST)

MTH. DAY 月 日	HR. MIN 時 分	LAT. (N) 緯度	LONG. (W/E) 経度 (W/E)
0806	1720	40°53	161°08 E

END OF NET SETTING 投網終了 (JST)

MTH. DAY 月 日	HR. MIN 時 分	LAT. (N) 緯度	LONG. (W/E) 経度 (W/E)
0806	2050	40°46	162°42 E

START OF NET RETRIEVAL 揚網開始 (JST)

MTH. DAY 月 日	HR. MIN 時 分	LAT. (N) 緯度	LONG. (W/E) 経度 (W/E)
0807	0600	40°42	162°47 E

END OF NET RETREIVAL 揚網終了 (JST)

MTH. DAY 月 日	HR. MIN 時 分	LAT. (N) 緯度	LONG. (W/E) 経度 (W/E)
0807	1532	40°45	161°10 E

How to record Breaks: 99 under 2 left col's of squid is for non-sampled Sections →

N-39

カード B-01/18　漁獲尾数　CATCH IN NUMBER　Ire/Blank

Sec. No. 張り番号	TTL tans 投網反数	N.G. tans 無効反数	Flying Squid アカイカ	BRL SQD ツメイカ	8ARM SQD タコイカ	Pomfret シマカツオ	ALB ビンナガ	YLW TAIL ヒラマサ	Skip jack カツオ	BS ヨシキリザメ	OTH FISH ソノタサカナ	Chum シロザケ	Coho キンザケ	Pink カラフトマス	Sock eye ベニザケ	Chi-nook マスノスケ	Steel head スチールヘッド	UNID SLMN 不明サケマス
	1 2	3~6	7~9	10~15	16~18	19~21	22~24	25~27	28~30	31~33	34~36	37~39	40~42	43~45	46~48	49~51	52~54	55~57	58~60	61~63
01	00	60	00	0	0	0	34	1	02	1	00	6	0000005		001		017								
02	00	00	00	0	0	0	06	0			00	2	0000003		008	060	008								
03	00	70	00	0	0	0	43	3	00	1			000145			007	008								
04	00	60	00	0	99																				
05	00	00	00	0	0	0	28	5	00	4	00	3	0000008		005		011								
06	00	60	00	0	99																				
07	00	10	05	0	0	0	39						000003				001							00	1
08	00	70	00	0	0	0	13	0	05								003							04	5
09																									
10																									
11																									
12																									
13																									
14																									
15																									
16																									
17																									
合計																									

70 is all that were Set, 50 lost (not 70 good, +50 NG = 120)

Do total this form

Total →

(18) TTL Tans: Total number of tan deployed (set)
N.G. Tans: Number of ineffective tan (4 last)
BRL SQD: Boreal squid　ALB: Albacore　BS: Blue shark

89A2

89B2

流し網漁業による操業調査記録（操業毎）様式89B2 — New pg for ea. set
SQUID DRIFTNET OBSERVER FORM (FORM 89B2)

コード	海産ほ乳類	コード	ミズナギドリ	コード	その他の動物
01	オットセイ	11	ハイイロ	31	エトピリカ
02	イシルカ	12	ハシボソ	32	ツノメドリ
03	セミイルカ	13	アカアシ	33	コシジロウミツバメ
04	カマイルカ	14	ミナミオナガ	34	その他の海鳥
05	マイルカ	15	フルマカモメ	35	海亀
06	スジイルカ	コード	アホウドリ	36	アカウミガメ
07	その他	21	アホウドリ	37	オサガメ
		22	クロアシ		
		23	コアホウドリ		

船名 VESSEL NAME	LICENCE No. 承認番号	OPE. No. 操業番号 (Set No.)	YEAR 年度
KOEI MARU No53	533	001	1989 (4 digit)

Make Correction: Section

混獲尾数 INCIDENTAL CATCH IN NUMBER

~~SET~~ Section No. 張り番号			MARINE MAMMALS 海産ほ乳類 CODE 種類	DEAD 死	ALV 生	LOST 失	TTL 計	SHEARWATERS ミズナギドリ CODE 種類	DEAD 死	ALIVE 生	LOST 失	TOTAL 計	ALBATROSSES アホウドリ CODE 種類	DEAD 死	ALV 生	LOST 失	TTL 計	OTHER ANIMALS その他の動物 CODE 種類	DEAD 死	ALV 生	LOST 失	TTL 計
01																		58	01	00	00	01
02																		57	00	00	01	01
03			03	01	00	00	01											37	01	00	00	01
03																		72	02	00	00	02
05								17	009	002	000	0011						58	02	00	00	02
05																		61	01	00	00	01
07			02	01	00	00	01															
08			01	00	01	00	01											32	01	00	00	01
合計 TOTAL																						

Squid code (inappropriate) sp. note

use dead for everything other than turtles

2-40

Zero fill only where there are entries

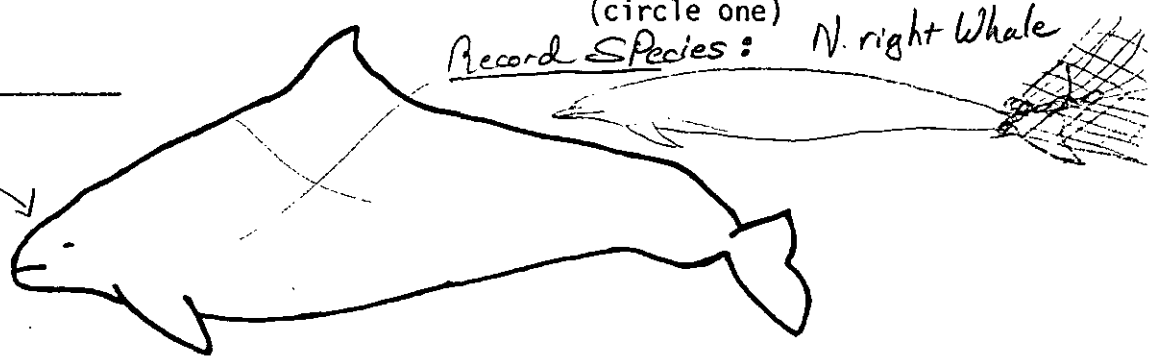
Don't total this form

ENTANGLEMENT DIAGRAMS (optional - Good for a cross-check)

Date of Retrieval: 7 Aug 89 Set Number: 001 SMF (DEAD) ALIVE LOST (circle one)

Size Estimate: 1.9

Record Species: N. right Whale



Dall's Porpoise Drawing

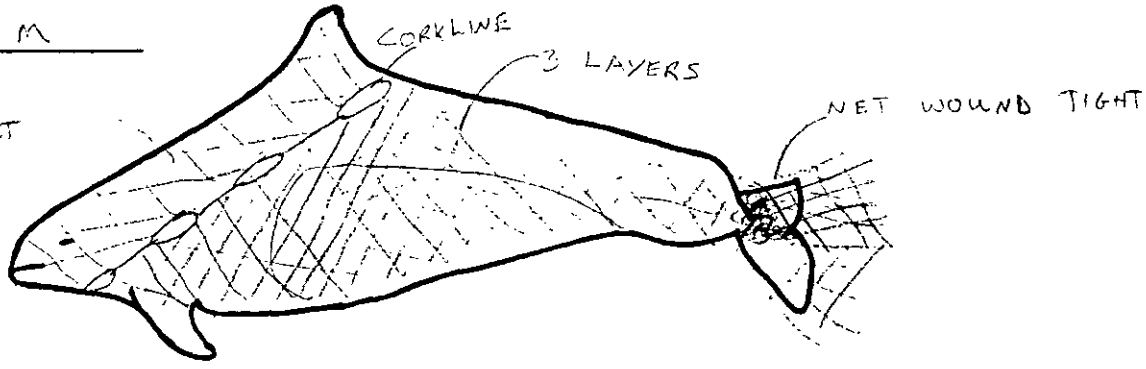
Not good for N. rt. Whale

Comments: (Number of net layers, corks or leadline touching body, scars, other organisms near , etc.) LISSODELPHIS ENTANGLED IN SECTION 1. BROUGHT ON AT 0912. ENTANGLED AT DEPTH OF 2 M in NET. BODY FREE OF WEBBING BUT FLUKES WRAPPED IN SEVERAL LAYERS (3?). NOT IN CONTACT WITH CORKLINE OR LEADLINE. NO OTHER ORGANISMS NEARBY.

ACTUAL LENGTH = 2.12 M

Date of Retrieval: 7 Aug 89 Set Number: 001 SMF (DEAD) ALIVE LOST (circle one)

Size Estimate: 1.7 M



Comments: (Number of net layers, corks or leadline touching body, scars, other organisms near , etc.) CORKLINE WRAPPED AROUND BODY AS SHOWN ABOVE. BODY WRAPPED IN SEVERAL LAYERS (1-3) OF NETTING. NET WOUND TIGHTLY AROUND FLUKES. ONE DOMART WITHIN 2 M, NO OTHER NEARBY ORGANISMS

ACTUAL LENGTH = 1.55 M

In the green logbook (non-waterproof paper) each observer should construct the following ~~two~~ three tables in addition to any miscellaneous records he might be keeping. Remember that this logbook will be considered data and will be kept by NMFS. This is not a personal journal.

COMMERCIAL CATCH

Date	Set#	Neon Flying Squid	Clubhook Squid	8-armed Squid	Other No. 1	Other No. 2

(Construct a heading for each species according to the particular catch product weights you are given; you may go across two adjacent pages to construct the table if several different product weights are provided for each species)

RADIO MESSAGES

Date	Message

3rd Table:

MM data

~~Animals Entangled When on break~~

Date & Set No. Section No Sp. Sex Length (Notes)

May do a similar 4th table for other retained sp - birds, salmon, turtles w/just date, set Sp. code & tot. No.

Section III. Marine Mammal and Debris Sighting Surveys

A: General

Sighting data are used for estimating the abundance of marine mammal species, their distribution and movements. These data are extremely important; the quality of the data is dependent upon the observer's care and concern. Marine mammal sighting surveys are to be conducted whenever the vessel is in transit for extended periods (more than half an hour) and conditions permit (up to a Beaufort 4-5). Once fishing operations begin, sighting survey work is of lower priority than observing the retrievals. On days when you are not observing a retrieval and sighting conditions are good, schedule some sighting survey time if the vessel is in transit.

Suitable sighting conditions are characterized by sea states with minimal chop, and visibility at least one kilometer ahead. This includes Beaufort stages 0-4 with unrestricted visibility or visibility conditions between levels 1 and 4 (see page 3-26). During poor weather or visibility conditions 5 or 6 do not attempt any sighting since the quality of data is likely to be poor.

Limit concentrated sighting effort to one hour intervals with a break in between to avoid fatigue. The observations should be made from the flying bridge or other elevated position. The bridge generally is an inferior sighting position and should <u>not</u> be used.

It is important that species identifications be accurate. When you are <u>uncertain</u> of an identification, note this on the Sighting Form. Record the information and characteristics used to make the identification in detail.

Note if more animals/groups appeared after you sighted the first animals or group. Note how you first became aware of the presence - by roostertails, slow rolling, etc.

Note if all animals disappear at once or in small groups. Note whether the animals come to the vessel (attraction) and if so, to the bow, stern or some other location, or alter course away from the vessel (avoidance).

Note the behavior of the animals in objective terms. Observations on their behavior will help us understand their reactions to vessels and gillnets and may help us find ways to reduce the number of entanglements. Be specific as possible but be careful not to interpret or anthropomorphize their behavior.

If marine mammals are sighted when the boat is not in transit, record the sighting but note on the bottom of the Sighting Form that it is "off effort" and indicate what the vessel mode was, i.e., during netset, retrieval, or some other time.

Marine mammal sighting data must include effort data in order to be useful in estimating abundance and density of the species. Remember to end a leg and start a new leg of effort when there is a significant change in weather, visibility, ship's course, ship's speed or watch personnel.

If you encounter any difficulties with the Sighting or Effort forms, refer to the following pages provide for detailed instructions. The best insurance against misinterpretation is to become completely familiar with all forms and instructions during training.

B: Description of Sighting Platform

There are several different types of vessels in the squid fishing fleet. The suitability of the upper bridge, bridge, and bridge wings for sighting surveys may vary. In your log book, write a description of the sighting platform or platforms that you use, including any obstructions or restrictions on your field of view, such as poles, search lights, etc. Also include a drawing of the view with positions of obstructions. This will help in analysis of the data and in placement of future observers for sighting surveys.

C: Observations of Discarded Webbing

If while conducting sighting surveys, you sight any floating webbing, record the following information:

a) Date and time

b) Position (Lat/Long) (of vessel)

c) Type of webbing (e.g., gillnet, trawl net)

d) Approximate mesh size (if possible), color of materials and any other details

e) Size of discarded net (include dimensions of percentage seen and indication of whether you feel more was below the surface)

f) Describe any entangled marine organisms (including marine mammals, fish, birds, or seaweed)

g) Describe how you saw it (e.g., floating by, or discarded from vessel by crewman).

Record the sighting on a Marine Mammal Sighting Form just as though it were an animal. The species block and behavior codes should be left blank.

D: Distance and Angle Estimation

Procedures for use of Fujinon 7x50 binoculars. The Fujinon binoculars contain reticles and compasses which are used to estimate the distance and angle to animals at the time of the initial sighting.

Calibration

1. Record the height in meters from the water line to your eye on the sighting platform (e.g., flying bridge). This only needs to be done once if you always use the same platform. This height will be used in converting the reticle number to distance.

2. At the beginning of each sighting period or transect leg, record the compass reading dead ahead from the location where you are doing sightings. This will be used to calculate the sighting angle.

Distance Measurement

When an animal is sighted, find the animals with the binoculars, and place the top horizontal line (reticle) on the horizon, then count the number of reticles down to the animal's waterline (the first reticle on the horizon is defined as zero). Every second reticle is longer so that you can count by twos. If the animals are close, it will be better to count up from the bottom (there are sixteen reticles counting the top one as zero, and the bottom line of vision as sixteen). Also note the compass reading (this will be used to calculate the sighting angle). Of course this will all need to be done simultaneously with identification of species, estimation of group size, and noting the behavior.

Table 6.1 shows the conversion for a reticle number to meters given the height of the eye above the water. Record the number of

reticles on the sighting form, then convert the number of reticles to sighting distance in meters using the table. Round off to the nearest tens of meters and write the sighting distance in the appropriate box.

Angle Estimation

The sighting angle is estimated by: sighting angle = (360) - (difference between recorded degrees and degrees dead ahead).

For example, if dead ahead is at 350 degrees, and a sighting is seen at 30 degrees (this is to starboard), then the sighting angle is 40 degrees, difference between recorded degrees and degrees straight ahead: 70-40=30.

Port: 360- Difference = 360-30=330° (360-350=10, and 10+30=40). If dead ahead is at 70 degrees and the recorded degrees is 40 (port), then the sighting angle is 330 degrees. Starboard: 30-350= -320, 360-320= 40°. Remember degrees increase in a clockwise direction from 0 to 360.

Table 6.1. Conversion of number of reticles (down from the horizon) to sighting distances in meters for several heights above water level for use with Fujinon binoculars.

Record the number of reticles as well as the converted distance on the sighting form.

No. of reticles	Height of eye above water level (in meters).							
	4	4.5	5	5.5	6	6.5	7	7.5
0	7675	8141	8581	9000	9400	9784	10153	10510
0.5	1344	1496	1646	1794	1940	2084	2226	2367
1	737	824	910	996	1081	1166	1250	1334
1.5	507	568	629	690	750	810	869	928
2	387	434	481	527	574	620	666	712
2.5	313	351	389	427	465	502	540	577
3	262	294	327	359	390	422	454	486
3.5	226	254	281	309	337	364	392	419
4	198	223	247	272	296	320	344	368
4.5	177	199	220	242	264	286	307	329
5	160	179	199	219	238	258	277	297
5.5	145	163	181	199	217	235	253	271
6	133	150	166	183	199	216	232	249
7	115	129	143	157	171	185	200	214
8	100	113	125	138	150	163	175	187
9	89	101	112	123	134	145	156	167
10	81	91	101	111	121	131	140	150
11	73	82	92	101	110	119	128	137
12	67	76	84	92	101	109	117	126
13	62	70	78	85	93	101	108	116
14	58	65	72	79	86	94	101	108
15	54	61	67	74	80	87	94	101
16	50	57	63	69	76	82	88	94

Table 6.1 (Cont.) Height of eye above water level (in meters).

No. of reticles	8	8.5	9	9.5	10	10.5	11.0	11.5
0	10854	11188	11513	11828	12136	12435	12728	13014
.5	2506	2644	2781	2916	3050	3183	3314	3445
1	1417	1499	1581	1663	1744	1825	1905	1985
1.5	987	1046	1105	1163	1221	1279	1337	1394
2	758	803	849	894	940	985	1030	1074
2.5	615	652	689	726	763	800	837	874
3	517	549	580	612	642	674	705	737
3.5	446	474	500	528	555	582	609	636
4.0	393	417	441	465	489	513	536	560
4.5	350	372	393	415	436	458	479	500
5	316	336	355	375	394	413	433	452
5.5	288	306	324	342	359	377	395	412
6	265	281	300	314	330	346	363	379
7	228	242	256	270	284	298	312	326
8	200	212	225	237	249	262	274	286
9	178	189	200	211	222	233	244	255
10	160	170	180	190	200	210	220	230
11	146	155	164	173	182	191	200	209
12	134	142	151	159	167	175	184	192
13	124	131	139	147	154	162	170	177
14	115	122	129	136	144	151	158	165
15	108	114	121	127	134	141	147	154
16	101	107	113	119	125	132	138	144

E: Dead Reckoning

The latitude and longitude of marine mammal sightings will need to be estimated by dead reckoning. The information that you have will be the latitude and longitude at the beginning and ending of the transect, and the times at the beginning, sighting, and ending. The position of the sighting can be estimated by,

$$A = \frac{ts - t1}{t2 - t1}$$

$t1 = t_1$

$$L_s = L_1 + A * (L_2 - L_1)$$

$$Lo_s = Lo_1 + A * (Lo_2 - Lo_1)$$

don't forget to convert difference to degrees & minutes

x 60 if less than one which is always the case in these vessels

where,

L_1	Latitude at beginning of transect	
Lo_1	Longitude	" "
t_1	time	" "
L_2	Latitude at end of transect	
Lo_2	Longitude	" "
t_2	time	" "
L_s	Latitude at sighting	
Lo_s	Longitude at sighting	
t_s	time of sighting	

F: Marine Mammal Sighting Form

NOTE: - All numeric entries will be right justified with leading zeros included.

* - Do not fill in boxes preceded by an asterisk except as directed.

- -

1. NAME - In the upper left hand corner of the log, write the observer's and vessel's name.

2. DATE (7-12) - Note proper sequence.

TIME (13-16) - Time of sighting is logged when the animal is first seen. All times are logged in local ship time and in military fashion. Record the time zone in boxes 60 62. All salmon catcher boats operate on Japan Standard time (-9). Note that the Japanese may refer to this as +9.

3. LATITUDE (18-23) - To tenths of minutes, if obtained from SAT NAV system, or to nearest minute if DR'ed. Place N in box 23.

4. LONGITUDE (24-30) - To tenths of minutes, if obtained form SAT NAV system, or to nearest minute if DR'ed. Place E or W in box 30 depending on which side of the 180th meridian the sighting occurs.

5. SPECIES (33-34) - Write in both the common and scientific name of the animals. 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. Cross-reference sighting records in comments (Col. 64-80).

Do not enter a species name unless you are absolutely positive. If you are 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. You might give your "best guess" and explain why think it might be that species and not another.

Important things to look for when attempting to make an identification are:

(Note and circle characteristics on back of Sighting Form)

1. Shape and size of dorsal fin and its position on the body. If possible, also note size and shape of tail and flippers.

2. Length. Size is difficult to estimate at sea, so it is convenient compare unfamiliar animals with a species with which you are familiar. For example - "about size of pilot whale", or "slightly smaller than bottlenose dolphin".

3. General shape of body (slender or robust).

4. 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?

5. Color pattern on fins and body (stripes, spots, patches, mottling, etc.).

6. 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?

7. Scars and scratch marks.

8. Dive times - Length of time between dives, blows before diving, general shape of blow (tall and thin vs. short and fat, etc.), and did animal show flukes when diving?

Table 6.2 contains Species Codes (pgs. 3-22 and 3-23).

6a. CONFIDENCE INTERVAL - Occasionally an observer will indicate that he/she saw 10 animals ± 2. Enter the following codes which best characterize the "confidence interval" of the sighting:

Code	Description
0	No error
1	plus or minus one animal
2	" " " two to three
3	" " " four to six
4	" " " seven to 12
5	" " " 13-35
6	" " " 36-75
7	" " " 76-100
8	" " " 101-1000
9	represents a minimal estimate of number of animals seen (e.g., at least 10 animals)

Tropical Porpoise
5-6 underneath for every
on surface

6b. NUMBER SIGHTED (37-40) - If unable to count the animals, estimate(37-40) the number seen in (37-40) terms of a range (e.g., 5 ± 1). 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. INITIAL SIGHTING CUE - Record primary sighting cue observed. For Dall's porpoise, the most frequently observed cues (and associated codes) are as follows:

01 - Body

08 - Bow riding

09 - Porpoising arcing out of the water

82 - Jug Handling

91 - Roostertailing

92 - Slow-rolling ft. Dall's

93 - Riding stern wake

94 - Surface splash

98 - Blow

Additional notes on behavior can be made in the comments field and in the "Additional Information" section on the back of the form.

8. ANGLE FROM BOW (47-49) - Observers should concentrate on the area from amidships forward to the bow on both sides. Pay particular attention to record the sighting at its <u>initial</u> location with reference to the transect line. Occasionally, animals approach vessels from the stern, so quickly scan the area aft of the beam every few minutes. Consider the ship a 360 degree circle when recording sighting angle; dead ahead being 000' and dead astern being 180'. Round to the nearest degree.

9. INITIAL SIGHTING DISTANCE - Note when in nautical miles, (50-52) yards, or meters - whichever you are most comfortable with. Convert to 10's of meters and place in boxes 49 - 51. Remember that all boxes are right justified (e.g., 100 meters = 10 in boxes 50 - 51).

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

11. SEA STATE - Beaufort Scale: See Table 6.3 (pg 3-24)

12. WEATHER - Rain, fog, blue skies, overcast, etc.

13. VISIBILITY CODE (53) - Codes are in Table 6.4 (pg 3-26). Note that this code reflects your ability to see animals.

14. SEA SURFACE TEMPERATURE (54-56) - In degrees Centigrade (round off to nearest whole degree). If below freezing, place a - in box 54. Temperature is placed in boxes 55-56. This can be obtained from engine inlet temperature (see Table 6.5 if in Fahrenheit - pg 3-27).

15. PLATFORM CODE (57-60) - For squid driftnet vessels use 1516.

16. TIME ZONE (61-63) - See item 2, TIME.

17. IDENTIFICATION - This section is one of the most important parts of the observation.

BEHAVIOR; COMMENTS

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 pertinent.

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).

Be generous with narrative of animal behavior. If there are several animals, are they in a tight school, a loose school, or scattered either single 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?

18. ADDITIONAL INFORMATION (optional) - See sighting survey supplement for details.

Examples of completed Sighting Forms are found on pages 3-14 to 3-18.

ARINE MAMMAL SIGHTING FORM – 1987
DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK

[illegible] the position was obtained from Sat Nav.

1. OBSERVER NAME Bob Roberts
VESSEL NAME Salvage Marine No 31 #17
RECORD ID * [ ][ ][ ][ ][ ][ ] (1 2 3 4 5 6)

2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR MO DAY: [8][1][0][6][1][8] (7 8 9 10 11 12) TIME: [1][4][3][1] (13 14 15 16)

3. LATITUDE (degrees/minutes/10ths)–N/S: [5][8][2][6][5] (18 19 20 21 22) [N] (23)

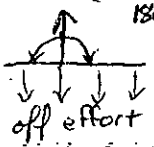
4. LONGITUDE (degrees/minutes/10ths)–E/W: [1][7][2][3][6][4] (24 25 26 27 28 29) [E] (30)

5. SPECIES Dall's porpoise (Common name) Phocoenoides dalli (Scientific name) pg 322 323 — [P][D] (33 34) TENATIVE * [ ] (35)

6. NUMBER SIGHTED 7 ± 1 — C.I. [1] (36) [0][0][0][7] (37 38 39 40)

7. INITIAL SIGHTING CUE Roosterailing [9][1] (45 46)

8. ANGLE FROM BOW [0][6][2] (47 48 49) write in



9. INITIAL SIGHTING DISTANCE 800 meters
Number of reticles
10's of meters [0][8][0] (50 51 52)

10. VISIBILITY 5 miles — 11. SEA STATE (Beaufort) 2 — 12. VIS CODE [2] (53)

13. WEATHER Cloudy — 14. SURFACE WATER TEMP.(°C) ± [+] (54) [0][5] (55 56)

15. PLATFORM CODE [1][5][1][6] (57 58 59 60) — 16. TIME ZONE ± [–] (61) [0][9] (62 63)

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

1431 Roosterailing animals moving in same direction as vessel (?)

1437 Vessel & animals seperated by 200-300 meters as animals altered course
ID made at aprox. 1432

Characteristics: 6-7' long, robust, white flank patch on dark body, rooster tail splash. white tip on dorsal fin

18. Additional information (optional) – see reverse side.

MARINE MAMMAL SIGHTING FORM – 1987
*** DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK**

In this example, observer was on effort, position taken DR'd

1. OBSERVER NAME Bob Roberts — *RECORD ID (1 2 3 4 5 6)
   VESSEL NAME Sakae Maru No 31 #17
2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR (7 8) MO (9 10) DAY (11 12): 8 1 0 6 1 8 — (13 14 15 16): 1 5 3 0
3. LATITUDE (degrees/minutes/10ths)–N/S: 5 8 3 4 . — (18 19 20 21 22): N (23)
4. LONGITUDE (degrees/minutes/10ths)–E/W: 1 7 2 5 9 . — (24 25 26 27 28 29): E (30)
5. SPECIES Dall's porpoise (Common name) Phocoenoides dalli (Scientific name) — (33 34): P D — *TENATIVE (35):
6. NUMBER SIGHTED 4 ± 0 — C.I. (36): 0 — (37 38 39 40): 0 0 4
7. INITIAL SIGHTING CUE slow roll — (45 46): 9 2
8. ANGLE FROM BOW (47 48 49): 0 8 4 — 9. INITIAL SIGHTING DISTANCE 300 meters
   10's of meters (50 51 52): 0 3 0
10. VISIBILITY 3+ miles — 11. SEA STATE (Beaufort) 3 — 12. VIS CODE (53): 3
13. WEATHER cloudy — 14. SURFACE WATER TEMP.(°C) ± (54): + — (55 56): 0 5
15. PLATFORM CODE (57 58 59 60): 1 5 1 6 — 16. TIME ZONE ± (61): – — (62 63): 0 9

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

4 porpoise slow roll, tight group, could not determine exact direction of travel. Seen for 3 minutes

characteristics seen: dark body, robust, back-curved dorsal fin w/ white on tip and trailing edge.

- no splash

estimated length - about 6'

18. Additional information (optional) – see reverse side.

* DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK

Sighting made during retrieval position DR'ed later

1. OBSERVER NAME Bob Roberts
VESSEL NAME Sakuo Maru No 31 #17

* RECORD ID [1 2 3 4 5 6]

2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR MO DAY: [8 1 0 6 2 0] (7 8 9 10 11 12); [0 7 0 0] (13 14 15 16)

3. LATITUDE (degrees/minutes/10ths)—N/S: [5 8 3 7] (18 19 20 21 22) [N] (23)

4. LONGITUDE (degrees/minutes/10ths)—E/W: [1 7 0 3 2] (24 25 26 27 28 29) [E] (30)

5. SPECIES Northern fur seal (Common name) Callorhinus ursinus (Scientific name): [C U] (33 34) TENATIVE * [ ] (35)

6. NUMBER SIGHTED 1 ± 0 C.I. [0] (36) [0 0 0 1] (37 38 39 40)

7. INITIAL SIGHTING CUE Jughandling [8 2] (45 46)

8. ANGLE FROM BOW [0 8 5] (47 48 49) 9. INITIAL SIGHTING DISTANCE 10 meters

10's of meters [0 0 1] (50 51 52)

10. VISIBILITY 3 miles 11. SEA STATE (Beaufort) 3 12. VIS CODE [3] (53)

13. WEATHER cloudy 14. SURFACE WATER TEMP.(°C) ± [+] (54) [0 7] (55 56)

15. PLATFORM CODE [1 5 1 6] (57 58 59 60) 16. TIME ZONE ± [-] (61) [0 9] (62 63)

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

seen jughandling near net, stayed 2 minutes, then not seen again.

Characteristics seen:

slenderhead, dark brown body w/ white under chin, about 3' long

flippers interlaced

18. Additional information (optional) — see reverse side.

3-16 [Gillnet Relay. 1]

... IN BOXES PRECEDED BY AN ASTERISK

sighted, identification characteristics seen pro and effort, position obtained from SAT NAV

1. OBSERVER NAME Bob Roberts
VESSEL NAME Sakae Maru No 31 #17

RECORD ID * [1 2 3 4 5 6]

2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR [8] MO [1] DAY [0 6 2 0] (7 8 9 10 11 12) [1 3 3 1] (13 14 15 16)

3. LATITUDE (degrees/minutes/10ths)—N/S [5 8 3 5 1] (18 19 20 21 22) [N] 23

4. LONGITUDE (degrees/minutes/10ths)—E/W [1 7 1 3 2 4] (24 25 26 27 28 29) [E] 30

5. SPECIES Unidentified baleen whale — Common name / Scientific name [U Z] (33 34) TENATIVE * [ ] 35

6. NUMBER SIGHTED 1 ± 0 C.I. [0] 36 [0 0 0 1] (37 38 39 40)

7. INITIAL SIGHTING CUE whale at surface, blowing [0 1] (45 46)

8. ANGLE FROM BOW [0 8 4] (47 48 49) 9. INITIAL SIGHTING DISTANCE 1000 meters

10's of meters [1 0 0] (50 51 52)

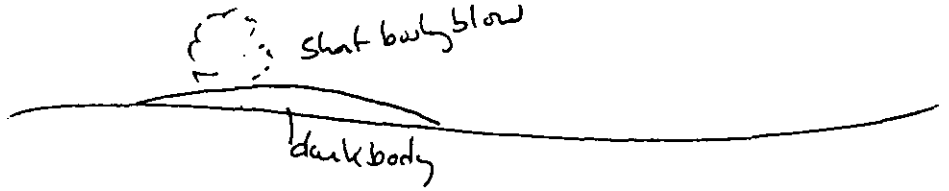
10. VISIBILITY 3+ miles 11. SEA STATE (Beaufort) 4 12. VIS CODE [3] 53

13. WEATHER cloudy, light rain off and on 14. SURFACE WATER TEMP.(°C) ± [+] 54 [0 6] (55 56)

15. PLATFORM CODE [1 5 1 6] (57 58 59 60) 16. TIME ZONE ± [—] 61 [0 9] (62 63)

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

large whale surfaced, saw short, bushy blow, estimated length greater than 45', dark body, only 1 blow seen. no flukes seen on dive, not seen again.



18. Additional information (optional) — see reverse side.

3-17

* DO NOT FILL IN BOXES PRECEDED BY AN ASTERISK

Example. Sighting made on effort position DR'ed later.

1. OBSERVER NAME Bob Roberts — RECORD ID *: (1 2 3 4 5 6)
VESSEL NAME Tayo Maru No 43 #04

2. DATE (Yr./Mo./Day) & TIME (local) OF SIGHTING — YR MO DAY: 8 1 0 7 1 0 (7 8 9 10 11 12); 1 2 3 0 (13 14 15 16)

3. LATITUDE (degrees/minutes/10ths)–N/S: 5 9 3 1 (18 19 20 21 22); N (23)

4. LONGITUDE (degrees/minutes/10ths)–E/W: 1 7 3 3 2 (24 25 26 27 28 29); E (30)

5. SPECIES Unidentified pinniped (Common name) — (Scientific name); U P (33 34); TENATIVE *: (35)

6. NUMBER SIGHTED 1 ± 1; C.I.: 1 (36); 0 0 0 1 (37 38 39 40)

7. INITIAL SIGHTING CUE Dead flashy in disturbed webbing; 2 7 (45 46)

8. ANGLE FROM BOW: 0 3 2 (47 48 49)

9. INITIAL SIGHTING DISTANCE 200 meters
10's of meters: 0 2 0 (50 51 52)

10. VISIBILITY 5 miles

11. SEA STATE (Beaufort) 3

12. VIS CODE: 3 (53)

13. WEATHER cloudy

14. SURFACE WATER TEMP.(°C) ±: + (54); 0 5 (55 56)

15. PLATFORM CODE: 1 5 1 6 (57 58 59 60)

16. TIME ZONE ±: - (61); 0 9 (62 63)

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

green trawl web (approx 3 meters x 4 meters ball) seen floating, within webbing could see small pinniped, possibly fur seal.

18. Additional information (optional) – see reverse side.

G: Marine Mammal Sighting Effort Forms

Fill in the same information as you do on the Marine Mammal Sighting Form, except for items 33-51. In addition, there are two other items to fill in - transit flag and observer positioning code.

TRANSIT FLAG - This is our method of recording effort. At the beginning of watch, fill in the name, vessel, date, time, position and environmental conditions, and place a 1 in box 63. When you end a watch (go below, change course more than 5 degrees, change cruising speed more than 3 knots, or if sea state visibility change), fill out the above information and place a 2 in box 63.

As marine mammals are sighted, fill out the sighting form but do not go below to get a position. Positions for all marine mammals sighted while on effort should be obtained by dead reckoning after the sighting effort is completed. You may request the radio master to calculate positions (or calculate them yourself) for all times of sightings at the end of the day, or you may leave such positions blank until you return to Seattle, whereupon you will calculate them yourself (not recommended). For all positions obtained by dead reckoning, record to nearest minute. For all positions obtained by satellite navigation systems, record to nearest 10th minute.

Transits of 20 minutes or more are of value. If continuous watch is maintained for several hours, log positions (end and begin new watch) every hour as a navigational check. Note that when a watch ends, and a new one begins immediately, the end of leg (transit flag 2) information will be the same as the beginning of the next leg information (transit flag 1). Do not maintain effort forms if your vessel is drifting or making very slow headway (e.g., oceanographic or fishing stations). Log mammals seen during these

periods on the sighting forms and make note of the vessel's activity in the comments section. Do not maintain effort forms if you are not actively looking for mammals. By the same token, if you are actively looking for mammals and don't see any, fill out the effort form. It is just as important to know where the animals are not as where they are.

Refer to page 3-21 for an example of the Marine Mammal Sighting Effort Form.

OBSERVER POSITIONING CODE -- This notation gives an indication of where the observer conducted the sighting work. Colums #77-80 are used for this purpose. Use columns 77 and 78 for the sighting position code and 79 and 80 for observer eye height above sea level in meters. Refer to Table 6.6.

MARINE MAMMAL SIGHTING EFFORT FORM

1	2	3	4	5	6

• Record I.D.

7	8	9	10	11	12
8	1	0	6	1	9

Year Month Day

One day per form

Name Bob Roberts

Vessel Sakae Maru No. 31 #17

TIME	LATITUDE	N/S	LONGITUDE	E/W	SEA STATE	WEATHER	VISIBILITY	•	Vis code	±	Sea surface	Temp (° C)	•	Platform code		±	Time zone	Transit flag	Water depth (meters)	Observer Position Code		
13 14 15 16 17	18 19 20 21	22	23 24 25 26	27 28 29 30				52	53	54	55	56	57	58	59	60	61	62	63	77	78	79	80
0900	58.00	6	N 147 20	0.5 E	Beau. 1	clear	6 miles +	2	+	0	5	1	5	1	6	-	0	9	1	u	D	0	4
1000	58.16	3	N 147 20	6.7 E	Beau. 1	clear	6 miles +	2	+	0	5	1	5	1	6	-	0	9	2	u	D	0	4
1001	58.16	3	N 147 20	6.7 E	Beau. 2	clear to Pt. Cldy	6 miles +	2	+	0	5	1	5	1	6	-	0	9	1	u	D	0	4
1045	58.27	2	N 147 21	1.8 E	Beau. 2	clear to Pt Cldy	6 miles +	2	+	0	5	1	5	1	6	-	0	9	2	u	D	0	4
1046	58.27	2	N 147 21	1.8 E	Beau. 2	Partly Cloudy	6 miles +	2	+	0	5	1	5	1	6	-	0	9	1	u	D	0	4
1130	58.38	6	N 147 21	5.3 E	Beau. 2	Partly Cloudy	6 miles +	2	+	0	5	1	5	1	6	-	0	9	2	u	D	0	4
1205	58.39	0	N 147 21	5.9 E	Beau. 3	Cloudy	3 miles	3	+	0	5	1	5	1	6	-	0	9	1	u	D	0	4
1315	58.27	2	N 147 23	2.0 E	Beau. 4	Cloudy/Rain	>.5 mile	4	+	0	5	1	5	1	6	-	0	9	2	u	D	0	4
1316	58.27	2	N 147 23	2.0 E	Beau. 4	Cloudy/Rain	>.5 mile	4	+	0	5	1	5	1	6	-	0	9	1	u	D	0	4
1405	58.11	2	N 147 23	9.6 E	Beau. 4	Cloudy/Rain	>.5 mile	4	+	0	5	1	5	1	6	-	0	9	2	u	D	0	4

1316 = squid driftnet vessel

ft above water in meters

NOTES: End of transit at 1000 due to change in ship speed, from 7 knots to 11 knots. End of transit at 1045 due to a 10 degree change in ship course. End of transit at 1130, when catcherboat arrived at mothership to offload. End of transit at 1315 due to a change in visibility code, from code 3 to code 4. End of transit at 1405, when catcherboat arrived at set position.

3-21

TABLE 6.2--Common and scientific names and corresponding codes for marine mammals reported by Platforms of Opportunity Program observers; names are ordered and spelled as found in MMC, Marine Mammal Names, 1976.[1] NE indicates no equivalent.

Code	Common name	Scientific Name
UM	Polar bear	Ursus maritimus
OR	Walrus	Odobenus rosmarus
ZC	California sea lion	Zalophus californianus californianus (sp)
EJ	Northern sea lion	Eumetopias jubatus
CU	Northern fur seal	Callorhinus ursinus
EL	Sea otter	Enhydra lutris
PV	Harbor seal	Phoca vitulina
PL	Spotted seal; larga seal	Phoca largha
PH	Ringed seal	Phoca hispida
PF	Ribbon seal	Phoca fasciata
EB	Bearded seal	Erignathus barbatus
MA	Northern elephant seal	Mirounga angustirostris
UO	Unidentified otariid	NE
US	Unidentified phocid	NE
UP	Unidentified pinniped	NE
ER	Gray whale	Eschrichtius robustus
BA	Minke whale	Balaenoptera acutorostrata
BX	Bryde whale	Balaenoptera edeni
BB	Sei whale	Balaenoptera borealis
BP	Fin whale	Balaenoptera physalus
BL	Blue whale	Balaenoptera musculus
MN	Humpback whale	Megaptera novaeangliae
BG	Black right whale	Balaena glacialis
BM	Bowhead whale	Balaena mysticetus
SB	Rough tooth dolphin	Steno bredanensis
TT	Bottlenose dolphin	Tursiops truncatus
SL	Spinner dolphin	Stenella longirostris
SA	Spotted dolphin (Central Pacific)	Stenella attenuata
SG	Spotted dolphin (Eastern Pacific)	Stenella attenuata
SC	Striped dolphin	Stenella coeruleoalba
DD	Common dolphin	Delphinus delphis
LH	Frasier's dolphin	Lagenodelphis hosei
LO	Pacific whiteside dolphin	Lagenorhynchus obliquidens
LB	Northern right whale dolphin	Lissodelphis borealis
GG	Risso's dolphin	Grampus griseus
FA	Pygmy killer whale	Feresa attenuata
PC	False killer whale	Pseudorca crassidens
GM	Shortfin pilot whale	Globicephala macrorhynchus
OO	Killer whale	Orcinus orca
PP	Harbor porpoise	Phocoena phocoena

TABLE 6.2--(continued). Common and scientific names and corresponding codes for marine mammals reported by Platforms of Opportunity Program observers; names are ordered and spelled as found in MMC, Marine Mammal Names, 1976.[1] NE indicates no equivalent.

Code	Common name	Scientific Name
PD	Dall's porpoise	Phocoenoides dalli: dalli type
PT	Dall's porpoise	Phocoenoides dalli: truei type
PB	Dall's porpoise	Phocoenoides dalli: black type
PX	Dall's porpoise	Phocoenoides dalli: type unknown
DL	Belukha; beluga	Delphinapterus leucas
MM	Narwhal	Monodon monoceros
PM	Sperm whale	Physeter macrocephalus
BE	Baird's beaked whale	Berardius bairdii
ZX	Goosebeak whale	Ziphius cavirostris
MS	Bering Sea beaked whale	Mesoploodon stejnegeri
UD	Unidentified dolphin/ porpoise	NE
UZ	Unidentified large whale	NE
UX	Unidentified small whale	NE
UW	Unidentified whale	NE

[1] Marine Mammal Commission. 1976. Marine Mammal Names. 1625 Eye Street, N.W., Washington, D.C. 20006

6.3 Table of Sea Conditions

Knots	Description	Sea conditions	(Beaufort)	Wave ht. (ft.)
0-1	Calm	Sea smooth and mirror-like	0	-
1-3	Light Air	Scale-like ripples without foam crests	1	
4-6	Light breeze	Small, short wavelets; crests have a glassy appearance and do not break.	2	2
7-10	Gentle breeze	Large wavelets; some crests begin to break foam of glassy appearance. Occasional white foam crests.	3	2
11-16	Moderate breeze	Small waves, becoming longer; fairly frequent white foam crests.	4	4
17-21	Fresh breeze	Moderate waves, taking a more pronounced long form; many white foam crests; there may be some spray.	5	6
22-27	Strong breeze	Large waves begin to form; white foam crests are more extensive everywhere; there may be some spray.	6	10
28-33	Near gale	Sea heaps up and white form from breaking waves begins to be blown in streaks along the direction of the wind; spindrift begins.	7	14
34-40	Gale	Moderately high waves of greater length; edges of crests break into spindrift; foam is blown in well-marked streaks along the direction of the wind.	8	18

6.3--Table of Sea Conditions (continued).

Wind force Knots	Description	Sea conditions	Wave ht. (Beaufort)	(ft.)
41-47	Strong gale	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble, and roll over; spray may reduce visibility.	9	23
48-55	Storm	Very high waves with long overhanging crests. The resulting foam in great patches is blown in dense white streaks along the direction of the wind. On the whole, the surface of the sea is white in appearance. The tumbling of the sea becomes heavy and shocklike. Visibility is reduced.	10	29
56-63	Violent storm	Exceptionally high waves that may obscure small and medium-sized ships. The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere the edges of the wave crests are blown into froth. Visibility reduced.	11	37
64-71	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray; visibility very much reduced.	12	45

Table 6.4.--Explanation of surface visibility codes used in the Platforms of Opportunity Program computer format.

Code	Explanation
1	Excellent - Surface of water calm, a high overcast solid enough to prevent sun glare. Marine Mammals will appear black against a uniform gray background. Visibility >5 km.
2	Very Good - May be a light ripple on the surface or slightly uneven lighting but still relatively easy to distinguish animals at a distance. Visibility >5 km.
3	Good - May be light chop, some sun glare or dark shadows in part of the survey track. Animals up close (400 meters or less) can still be detected and fairly readily identified. Visibility ≤ 5 km.
4	Fair - Choppy waves with some slight whitecapping, sun glare or dark shadows in 50% or less of the survey track. Animals much further away than 400 meters are likely to be missed. Visibility ≤ 1 km.
5	Poor - Wind in excess of 15 knots, waves over two feet with whitecaps, sun glare may occur in over 50% of the survey track. Animals may be missed unless within 100 meters of the survey trackline, identification difficult except with the larger species. Visibility ≤ 500 m.
6	Unacceptable - Wind in excess of 25 knots, waves over three feet high with pronounced whitecapping. Sun glare may or may not be present. Detection of any marine mammal unlikely unless the observer is looking directly at the place where it surfaces. Identification very difficult due to improbability of seeing animal more than once. Visibility ≤ 300 m.

Table 6.5.--Temperature Conversion Table.

Fahrenheit	Celcius	Fahrenheit	Celcius
90	32.2	58	14.4
88	31.1	56	13.3
84	28.0	54	12.2
82	27.8	52	11.1
80	26.7	50	10.0
78	25.6	48	8.9
76	24.4	46	7.8
74	23.3	44	6.7
72	22.2	42	5.6
70	21.1	40	4.4
68	20.0	38	
66	18.9	36	
64	17.8	34	
62	16.7	32	0.0
60	15.6	30	1.1
		28	-2.2
		26	-3.3

Table 6.6.--Observer Position Coding

In order to provide more insight into sighting efficiency, the following information will be collected on the Effort Forms and coded into columns 77-80.

Observer position (column 77)

Code	Position
U	Upper Bridge
B	Bridge
W	Bridge Wing

Vessel code (column 78)	Vessel
D	Dedicated squid gill net
J	Squid jigging
H	Hokuten trawler and longliners
L	Landbased salmon fishery
M	Mothership salmon fishery

Height of observer eye above sea level in meters (columns 79-80).

4:A Identification Of Pacific Salmonids

Taxonomy

Pacific salmon (Oncorhynchus spp.) belong to the order Salmoniformes and the family Salmonidae (Hart, 1973). It is generally accepted that salmon evolved from the freshwater trout (genus Salmo), probably between a half-million and one million years ago in the Pleistocene period (Neave, 1958). Since then, six species have evolved -- one of which, the masu salmon (O. masou) is native only to Asia. The other five species -- sockeye salmon (O. nerka), pink salmon (O. gorbuscha), chum salmon (O. keta), coho salmon (O. kisutch), and chinook salmon (O. tshawytscha)-- which are native to both Asia and North America will be dealt with here.

Other common names by which the various species are identified are listed below (North American only):

Sockeye salmon (red, blueback salmon)
Pink salmon (humpy, humpback salmon)
Chum Salmon (dog salmon)
Coho salmon (silver, silversides, hooknose salmon)
Chinook salmon (king, spring, tyee, blackmouth, quinnat salmon)

General Distribution

It is necessary, prior to discussing the general distribution of Pacific salmonids, to establish that all members of the genus are anadromous, meaning that they spend a portion of their lives in the ocean, but when approaching maturity, they return to fresh water to spawn. Juvenile salmonids, in turn, spend a period in fresh water before migrating to sea to resume the cycle. Subpopulations of some species -- sockeye, coho and to a lesser extent chinook and pink salmon, remain in fresh water throughout their life.

Excluding limited transplants to such places as New Zealand and the Great Lakes, Pacific salmonids inhabit a major part of the temperate and subarctic North Pacific Ocean and adjacent coastal areas, and even extend -- to a much lesser extent -- beyond the Bering Strait to as far as the Coppermine and Lena rivers on the Arctic coasts of North America and Asia respectively. Distribution by species is shown in Figures 2-7.

Distinguishing Features:

Salmon and steelhead are robust soft-rayed fishes with cycloid scales, adipose fins and large mouths with well-developed teeth on the jaws, vomer, palatines and tongue (Hart, 1973). Pyloric caeca are numerous and sexual dimorphism in secondary sex characteristics is strongly developed at spawning time. Salmon have 13 to 19 rays in the anal fin as opposed to 8 to 12 in the steelhead trout (Table 1). Distinguishing characteristics for the individual species are listed in Tables 1 and 2 and also on the color plates.

Table 1 - Meristic Characters of Pacific Salmonids[1]

Species	Anal Fin Rays	Gill Rakers			Pyloric Caeca	Branchiostegal Rays	Lateral Line Scales
		Upper	Lower	Total			
Chum	13-17	7-12	12-19	19-31	140-249	12-16	125-155
Sockeye	13-16	12-16	18-23	30-39	45-115	11-16	125-140
Pink	13-17	11-14	14-19	25-35	95-224	11-14	147-198
Chinook	15-19	7-12	10-16	19-28	90-240	13-19	132-152
Coho	13-16	8-13	9-14	18-27	45-114	12-15	120-140
Steelhead	8-12	6-9	11-13	17-22	27-80	8-13	100-150

[1] Source: Trautman, M. B., 1973. NOAA Tech. Memo NMFS ABFL-2.

Scott, W. B. and E. J. Crossman 1973. Freshwater fishes of Canada. Fish. Res. Bd. Canada, Bull. 184: 184-191.

Table 2. Distinguishing characteristics of five species of salmon indigenous to North America (adapted from Hart, 1973).

Species	Adult	(Prior to seaward migration)
Sockeye	Long, slender, closely-spaced gill rakers on the first gill arch. Fine black speckling on the back. The flesh is red.	Uniform unmottled, green back. Sides silver without green irridenscence. Parr marks (bars on sides) short, oval, usually mostly above lateral line.
Pink	Small scales. Large, very dark oval spots on the back and all over the caudal fin. The flesh is pink.	Without parr marks. Blue to greenish color along back. Sides silvery.
Chum	Absence of large, black spots from body end fins. Slender caudal penduncle. Dark color on tips of all fins but the dorsal. The flesh is pale pink.	Green irridescence on back. Parr marks as slender bars scarcely extending below lateral line.
Coho	Black spotting confined to back and upper lobs of caudal fin. The flesh ranges from pink to red.	Long, narrow parr marks, extending above and below lateral line. Parr marks narrower than interspaces. White on leading edge of anal fin. anal fin with first ray elongate.
Chinook	Black spotting on back, dorsal fin and both lobes of caudal fin. Salmon over 30 pounds (14 kg) are likely to be chinook. The flesh ranges from white to red.	Parr marks long vertical bars wider than spaces between bars. Parr marks approximately divided by the lateral line.

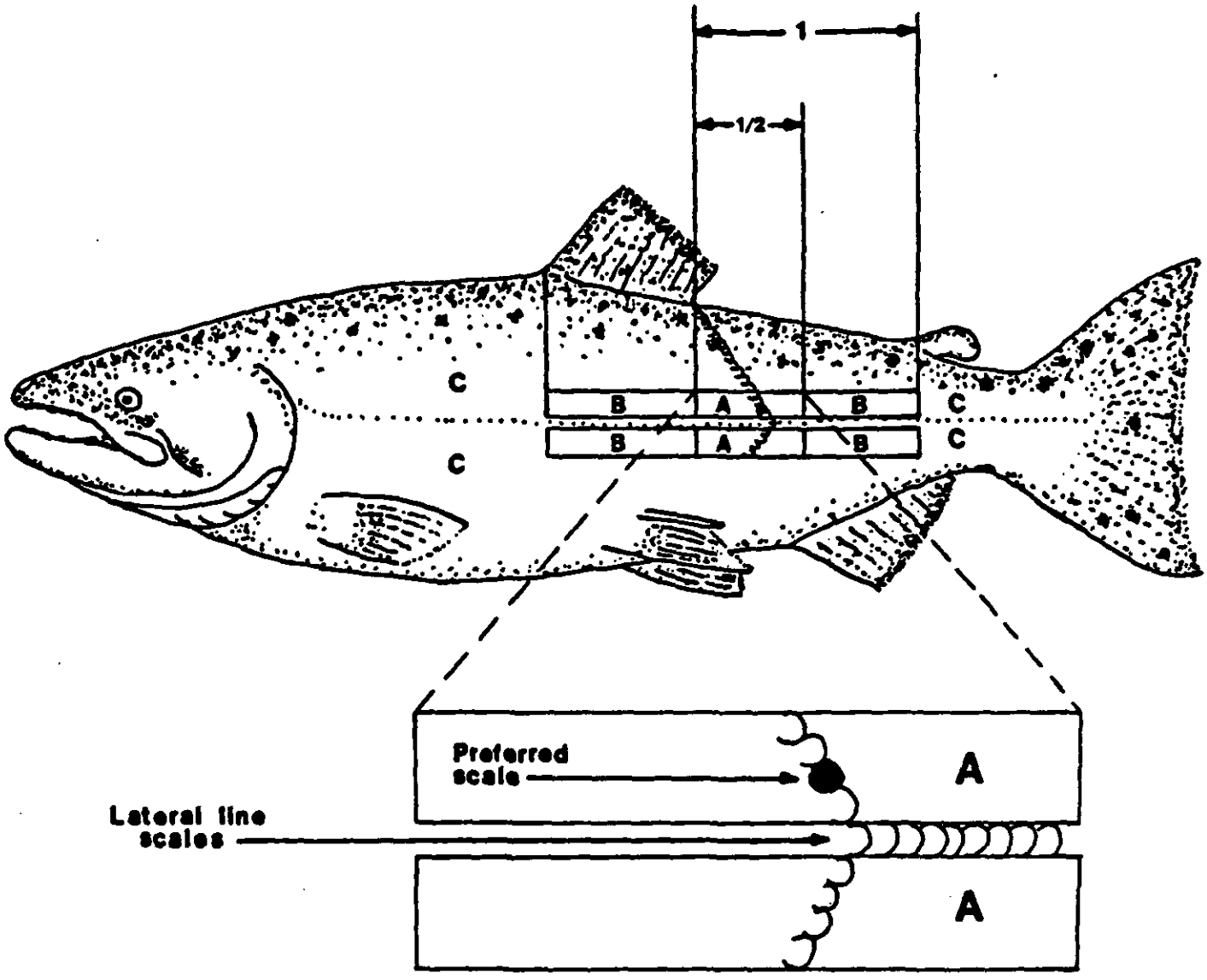


Figure 4-| Area of the salmonid's body designated as "preferred" (Area A) by the International North Pacific Fisheries Commission. Note the location of the "preferred" scale. Whenever possible, scales should be taken from Area A.

PROCEDURES FOR COLLECTING SCALES FROM SALMONIDS

Body Location to be Sampled for Scales

Scales should be taken as close as possible to the point on an imaginary line drawn from the posterior edge of the dorsal fin to the anterior edge of the anal fin, one or two scale rows above or below the lateral line (Fig. 4-1). Do not take a scale from the lateral line, as its morphology is quite different from that of "preferred" scales and lateral line scales are useless for determination of age or species. If scales must be taken from an area other than "A" or "B" as shown in the figure, please indicate the area sampled in the left margin of the data sheet on the line corresponding to that sample. Scales will be affixed to a gummed card and later using heat and pressure in a press an acetate impression of the scales will be produced for analysis.

Removal of Scales, Placement on Gummed Card

Two scales should be sampled from slightly different areas of each fish. Remove a single scale with the forceps. Remember which side is "exterior" and which is toward the fish. Gently clean each side of the scale to remove epidermal tissue, mucus and debris, including all quanine (silver tissue). Cleaning can be done quickly by gently wiping each side of the scale along a damp cloth, or by gently rubbing the scale between clean damp fingers. Quickly examine the scale for obvious malformation or gross regeneration, and choose another if it appears deformed. Dampen the smooth side of the scale (i.e., the side toward the fish) and affix it to the gummed card by placing it over the number corresponding to the specimen number and pressing down lightly. The scale should be dampened so as to liquify enough glue on the gummed card to ensure good adhesion. The entire surface of the scale should be adhered to the gummed card; loose edges often lead to loss of the scale during production of plastic impressions for final analyses. Too much moisture causes glue to flow onto the top side, occluding the circuli and later producing a poor or useless plastic impression. Be sure to place one scale from the fish directly over the appropriate specimen number and place the second scale slightly above, close to the first, but not so close as to overlap scales.

Recording Biological Data; Storage of Scale Cards

The biological data forms provided were drafted specifically for salmonids. The following codes should be used to identify species of salmonids sampled for scales:

41 = Sockeye
42 = Chum
43 = Pink
44 = Coho
45 = Chinook
46 = Steelhead
47 = Unknown

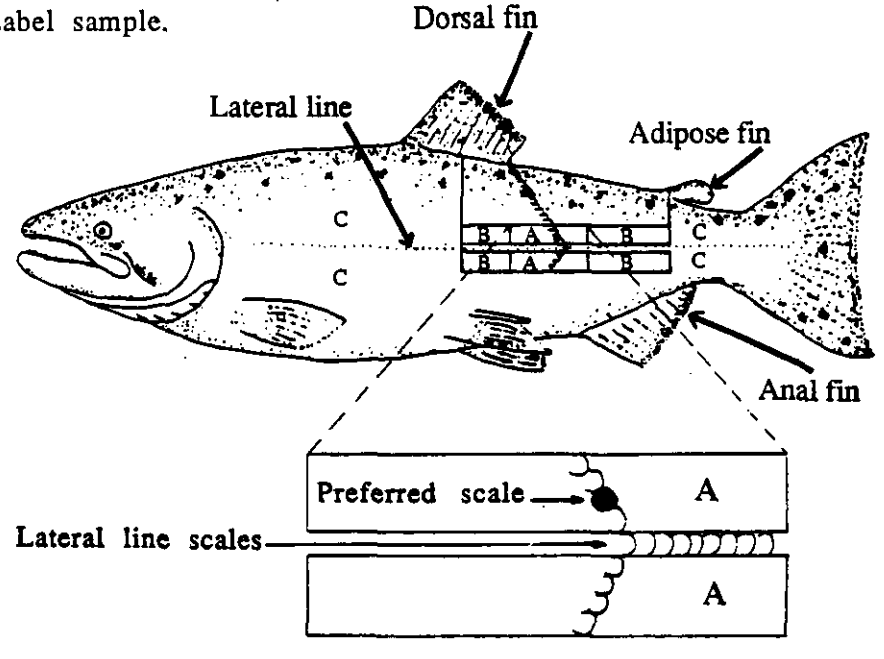
SALMON AND STEELHEAD TROUT SCALE SAMPLING PROCEDURE

Items required for scale sampling:

1. tweezers or knife for sampling fresh fish
2. knife for sampling frozen fish
3. small folded sheet of non-glossy, absorbent paper (approximately 3 inches square)

Procedure for collecting scales

1. Find the rear edge of the dorsal fin. See figure below.
2. Run an imaginary diagonal line from this spot down to the front edge of the anal fin.
3. Find where the lateral line crosses this imaginary diagonal line. Select several scales from the area that are 1 to 4 scale rows above or below the lateral line. This is area A shown in the figure.
4. Do not select lateral line scales because these scales have holes through them.
5. If there are no scales present on the fish in area A, turn the fish over and take scales from the same area on other side of the body.
6. If there are no scales present in area A on either side of the fish, then select scales from area B. If there are no scales present in area B, then select scales from area C close to the lateral line as shown in the figure.
7. Gently wipe the area free of slime, blood and free scales.
8. If fish is fresh (or thawed), remove scales from the skin with the tweezers by firmly grabbing the scale and gently pulling in the direction of the tail.
9. If fish is frozen, slice a section of skin leaving the scales attached. Remove as much flesh as possible from the skin.
10. Collect ten scales from each fish, if possible. Collect scales from 200 fish per species, if possible.
11. Place scales in the paper and fold it so that the scales won't fall out. Wrap sample in several layers of paper if a skin sample has been taken to absorb moisture.
12. Label sample.



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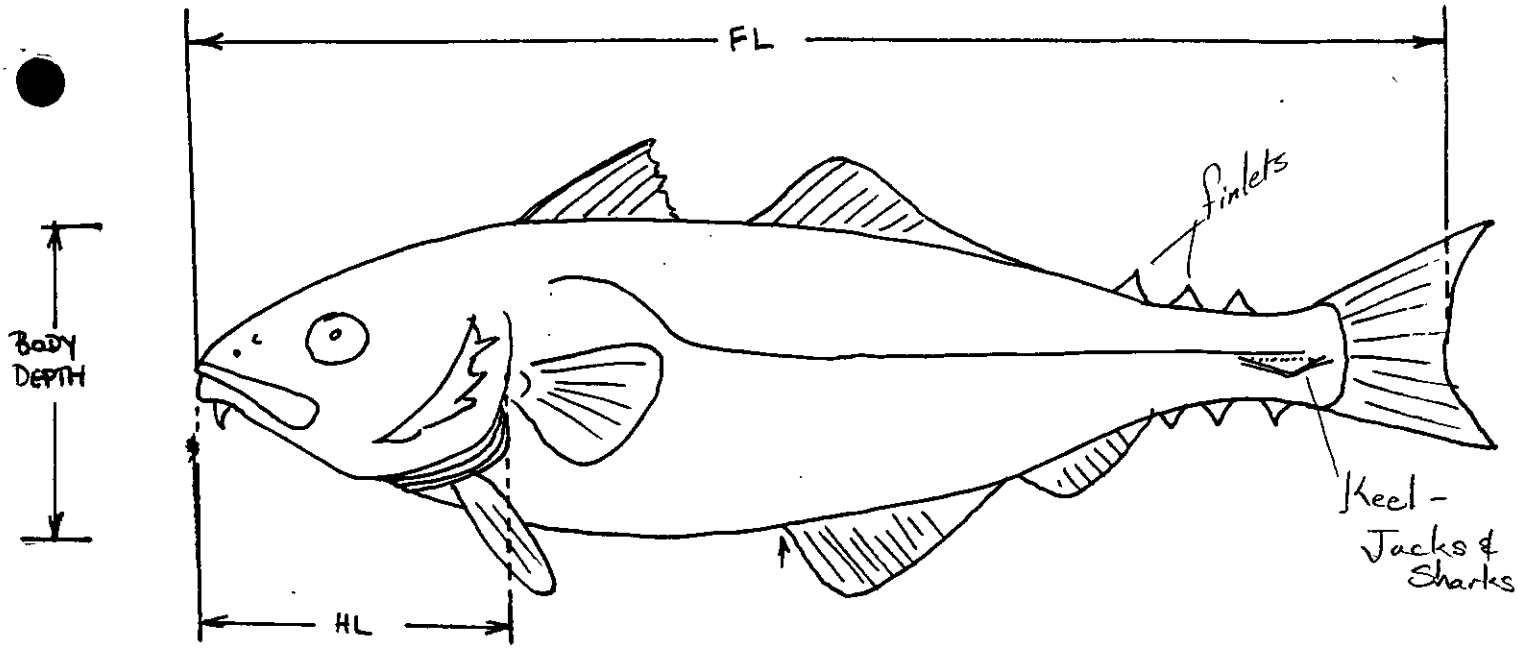
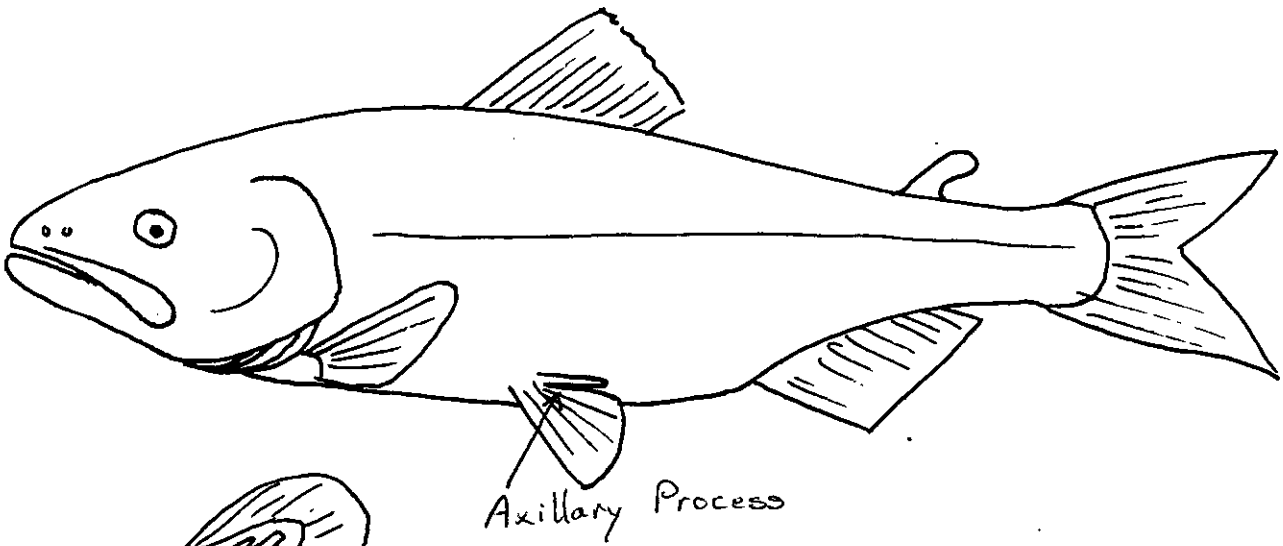
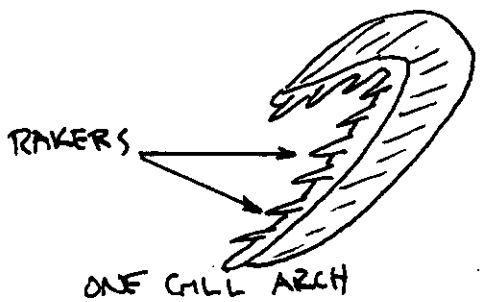
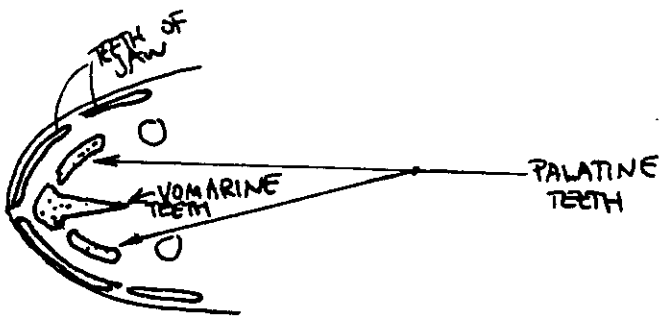


Median & paired dorsal anal & caudal







Section IV. Debriefing and Cruise Report Outline

A: General

Upon arrival in Seattle, the observer should inform NMML that he/she has returned. The debriefing process will generally begin the following work day. Observers will remain in Seattle for up to 2 weeks to edit the data, and to complete the cruise report. The observer should call the Contractor early on to notify them of their arrival and to make an appointment to discuss travel expenses. Any difficulties with pay or benefits should be directed to the Contractor, not NMFS.

The observers' role in debriefing includes three primary duties:

a) To provide completed data forms and logbooks, remaining available to answer questions and make corrections as necessary

b) To write a complete cruise report, including tables and figures in accordance with the instructions in this section

c) to clean and return all NMFS gear issued to them

The cruise reports will be typed on a word processor in Word Perfect 5.0 by the observer at either NMML or the Contractor's offices. The observer should anticipate completing the first draft early enough (e.g., third or fourth day) for one day of staff review and subsequent rewrite(s). Observers should expect to produce at least two drafts before a final is accepted. It is the responsibility of the observer to provide a complete report, including finish quality tables and figures, before leaving Seattle.

B: Cruise Report Outline

I. Introduction

A. Context of the cruise

1. What nation sponsored the cruise; on what vessel?

2. What was the general purpose of the cruise?

3. Who were the key participants?

4. Dates and duration of the trip

B. Pre cruise briefing

1. What was discussed (general)?

2. Were any changes in research plan made?

3. Were there any problems of note?

C. Travel from U.S. to point of embarkation

1. Flight itinerary

2. Ground transportation arrangements

3. Liaison assistance

4. Problems

D. General contents of the cruise report

II. Research objectives

A. Host nation cruise objectives

B. U.S. cruise objectives

III. General cruise narrative

A. Departure

1. Where?

2. When?

3. Initial destination

4. Weather conditions for early cruise (generally)

B. Activities planned and completed

1. Oceanographic stations (how many, where)

2. Gillnet set and haul operations (how many, where)

3. Sighting surveys (how much, when)

C. Vessel specifications and accommodations

1. Vessel description

2. Equipment on board

3. Observer accommodations

4. Daily activity schedule

IV. Research gear and Operations

A. Oceanographic stations

1. What events were scheduled for each station?

2. Were the plans altered during the cruise?

B. Gillnet operations

1. Description of the net

a. How long?

b. What mesh size?

c. How many sections?

d. How was it marked?

e. Did the structure change during the cruise?

2. Description of the set operation

a. When was set started?

b. How long did it take?

c. Any changes in the routine during the cruise?

d. Factors effecting routine

e. Did the observer monitor all sets?

3. Description of the haul operation

a. When was it started?

b. How was it accomplished?

c. How long did it take?

d. What problems were encountered?

e. What influenced timing and execution of haul?

f. Did the observer monitor all hauls? How many sets of what length were monitored?

g. Did the vessel stay near the net all night?

h. How were large animals removed from the net?

i. How was the net prepared for the next day?

j. Did the haul procedure work efficiently?

V. Catch Composition

A. Target species

1. Neon flying squid

a. How many?

b. Largest, smallest and mean haul size

c. How processed?

2. Other squids

a. How many, by species?

b. In what set or how many of total if common?

B. Non-target species

1. Salmonids

a. How many, by species?

b. Largest, smallest and mean haul size

c. Where and what water temperature?

d. Disposition of catch

2. Other fish species

a. How many, by species?

VI. Incidental take

A. Marine mammals

1. How many, by species, by condition?

2. Distribution of take, how many per set?

3. Distribution by size and sex

4. Any calves, lactating or pregnant females?

5. Description of each entanglement (in order by species)

6. Detailed description of any witnessed entanglements, or near entanglements

B. Seabirds

1. How many by species?

2. In how many sets were taken, which ones?

3. Any high concentrations of note?

C. Sea turtles

1. How many, by species?

2. In how many sets were sea turtles taken?

VII. Marine mammal sighting surveys

A. Effort

1. General conditions when effort was collected

2. Observer position for effort

3. Arrangement for obtaining position data

4. Difficulties/compromises

5. How much effort was completed?

B. Marine mammal sightings

1. General

a. How many, by species?

b. Geographical distribution of note

2. For each species taken by the fishery

a. Geographical distribution

b. Group size distribution

c. Behavior

d. Sightings during haul

3. Other marine mammal sightings of note

VIII. Net debris

A. How much was sighted?

B. Where?

C. What kinds?

D. What was done with it?

IX. Figures

A. Cruise track and fishing locations

B. Net configurations

X. Tables

(see formats for the nine required tables below)

Table 1. Set data from gillnet operations during the cruise.

Set number	Date	Time Begin	Time End	Position Latitude	Position Longitude	Set Bearing	Water Temp °C	Wind Dir	Wind Speed	Swell Dir	Swell Height	Weather

Table 2. Haul operations data during the cruise.

Haul number	Date	Time Begin	Time End	Position Latitude	Position Longitude	Set Bearing	Water Temp °C	Wind Dir	Wind Speed	Swell Dir	Swell Height	Weather

Table 3. Catch summary of the _____ cruise.

Species	Haul Number 1	2	3	4	5	6	7	8

Table 4. Summary of marine mammal and sea turtle incidental take observed for __ gillnet sets during the _____ cruise. (Number Dead-Number Released Alive-Number Lost.)

Haul Number	Species

Totals

[1] There was no incidental take for hauls not noted here.

Table 5. Summary of marine mammal entanglements during the _____ cruise.

Haul Number	Date	D, R or L1	Sex	Length (cm)	Net Type	Parts of body entangled	Layers of Webbing	Mesh size (mm)	Corks Included?	Leadline Included?	Nearby Organisms

Table 5 is = or subset of table 4

[1] D, R, or L means Dead, Released alive, or Lost
[2] One of each.

Table 6. Summary of seabird incidental take during the Name of Vessel cruise. Hauls not represented had no take. (Number dead-Number Released Alive-Number Lost)

Haul Number	Species
Totals	

Table 7. Distribution of marine mammal sightings and sighting effort over sea state conditions during the _____ cruise.

	Beaufort Stage							
	0	1	2	3	4	5	6+	Total
Time (hours) on effort								
On effort sightings								
Off effort sightings								
Total sightings								

Table 8. Summary of on and off effort marine mammal sightings during the _____ cruise. (Total sightings - Total animals)

Species	On	Off	Total

Table 9. Net fragments sighted during the _____ cruise.

Date	Lat. (N)	Longitude	Description