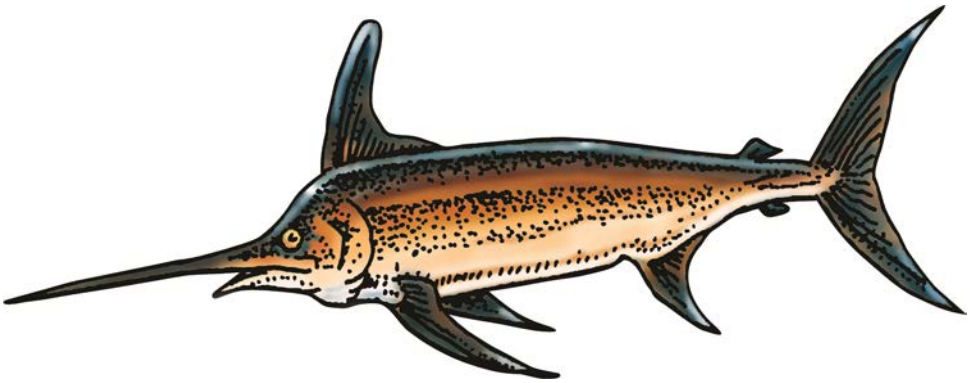
Southwest Region Observer Program
Field Manual
September 2013



Southwest Region
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
United States Department of Commerce

Preface

This manual is intended to provide the SWR Observers in the field with reference of data collection protocols and definitions of each datum to be collected. The Observer will also find guidance in prioritizing the work, and general discussions of expectations and policies. However, this manual is not intended to be a comprehensive observer handbook, and would be of limited use to readers that have not completed the SWR Observer Program training course.

Paperwork Reduction Act Statement for the NMFS Southwest Region Observer Program

Information collected through the observer program is used to: (1) monitor catch and bycatch; (2) understand the population status and trends of fish stocks and protected species, as well as the interactions between them; (3) determine the quantity and distribution of net benefits derived from living marine resources; (4) predict the biological, ecological, and economic impacts of existing management actions and proposed management options; and (5) ensure that the observer programs can safely and efficiently collect the information required for the previous four uses. In particular, these biological and economic data collection programs contribute to legally mandated analyses required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), the National Environmental Policy Act (NEPA), the Regulatory Flexibility Act (RFA), Executive Order 12866 (EO 12866), and other applicable law. Most of the information collected by observers is obtained through “direct observation by an employee or agent of the sponsoring agency or through non-standardized oral communication in connection with such direct observations". Under the Paperwork Reduction Act (PRA) regulations at 5 C.F.R. 1320.3(h)(3), facts or opinions obtained through such observations and communications are not considered to be "information" subject to the PRA. The public reporting burden for responding to the questions that observers ask and that are subject to the PRA is estimated to average 20 minutes per trip, including the time for hearing and understanding the questions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to: NMFS Southwest Region Observer Program, 501 W. Ocean Blvd., Suite 4200, Long Beach, CA 90802. Providing information related to observer and vessel safety is mandatory under regulations at 50 C.F.R. 600.746. However, all other requested information is voluntary. Although you are under no legal obligation to answer non-safety related observer questions, we would appreciate your support as it ensures observer data can be used for its intended purpose. The information collected will be kept confidential as required under Section 402(b) of the MSA (18 U.S.C. 1881a(b)) and regulations at 50 C.F.R. Part 600, Subpart E. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.
OMB Control No. 0648-0593

CONTENTS

INTRODUCTION

AUTHORITY AND GOAL

As a result of national concern for the welfare of marine mammals, the U.S. Congress passed the Marine Mammal Protection Act (MMPA) in l972. Recent amendments to the MMPA require reliable information from a variety of fisheries about the kill of marine mammals, the adequacy of vessel owner reports and possible ways to reduce incidental mortalities.

Under the authority of the MMPA, the National Marine Fisheries Service (NMFS) places biological technicians aboard vessels to collect information on marine species associated with the California drift gillnet fisheries.

OBJECTIVES

To meet the field responsibilities of the MMPA, the following objectives have been established for biological technicians serving as drift gillnet observers:

- ☼ Obtain reliable research and management data on the incidental mortality of marine mammals;
- ☼ Collect fishing effort data;
- ☼ Document the incidental take of non-mammalian protected species;
- ☼ Tally fishes and invertebrates caught by species; and
- ☼ Process selected specimens for life history information.

GUIDELINES

With **safety** and **integrity** as the watchwords of your job, it is of primary importance that you conscientiously follow the guidelines outlined below:

- ☼ It is your responsibility to observe and accurately record biological research data as instructed. Everything you record is available to the vessel operator or his designate and is subject to

legal interpretation. Almost everything you record may be made available as public information. You are not to record extemporaneous comments, editorials or personal opinions. It is not your job to evaluate or interpret data; simply record your observations on the data forms issued.

- ☼ It is your responsibility to maintain open communication with the vessel operator and other vessel personnel to facilitate a clear understanding as to what data are being collected.

- ☼ It is your responsibility to advise the vessel operator of all data items recorded. If he is in disagreement with you, record his views on the original data forms. If he so chooses, the vessel operator may record his own comments on the original data forms.

- ☼ As an observer, you are not an enforcement agent. You are not empowered to write citations, make arrests, or carry out enforcement activities. Your responsibilities require that you make observations and collect data, some of which pertain to U.S. Marine Mammal Regulations. There is no guarantee that your data will not be used as evidence to assess penalties. Legal interpretation is performed by government attorneys.

- ☼ Your responsibility of observing and recording data is to be performed in such a manner as to minimize interference with fishing operations. Likewise, the vessel operator and any other vessel personnel are not to interfere with your duties.

RESPONSIBILITIES

- ☼ Sea assignment readiness is determined by personal fitness, training preparation and staff assessments.

- ☼ Alcohol dependency and illicit drug use are incompatible with observer duties and are not tolerated.

- ☼ Observers are not to keep personal diaries in any form during a cruise assignment. No recording devices, computers, or personal cameras of any type are to be taken aboard vessels.

- ☼ Because specific objectives are mandated by the MMPA, personal research is prohibited aboard vessel assignments.

- ☼ Retaining specimens of any kind for any personal reason is prohibited.

- ☼ Intentionally entering the water from an assigned vessel is prohibited; such activity will compromise personal safety and data collection duties.

- ☼ Observers do not choose vessel assignments, however observers do have the right to refuse deployment on a vessel they perceive as unsafe. The Contractor selects sea assignments through a predetermined sampling plan and confirms that the boats meet minimum U.S. Coast Guard

safety requirements. Any refusal to board a vessel after inspection must be documented and discussed with management to determine the appropriate course of action. Fishing activity dictates vessel departures and arrivals. Since vessel notification requirements limit response time, observers must be prepared for sudden sea assignments of extended and uncertain duration.

- Never leave your assigned vessel prematurely without approval from the Logistics Coordinator, Project Manager, or an acting designate.

- Safeguard the return of your data to your designated office. Your work is a valuable investment; treat it like your wallet.

- **Loss of data or biological samples due to <u>your</u> negligence is Unacceptable.**

- **Observers are <u>not</u> authorized to release their data to anyone. All requests for observer data must be referred to NMFS, Southwest Regional office. However, the vessel operator may view the observers' data forms during the observed trip**

Take Notes Here

SUMMARY OF DUTIES

EMPLOYMENT PURPOSE

When aboard an assigned vessel, observers are to collect objective and accurate data on:

- vessel gear and operations,
- incidental take of marine species, and
- life history parameters.

As an observer, the watchwords are safety and integrity.

GENERAL DUTIES

- Work at sea and ashore from a designated port.
- Work under the supervision of the Logistics Coordinator.
- Collect fisheries research and management data.
- Work at sea aboard commercial fishing vessels.
- Collect data on vessel activity and fishing operations.
- Identify and tally marine mammals and other by-catch species by number and location in the gear.
- Tally marine mammals and by-catch killed by drift gillnets.
- Dissect post-mortem marine mammals and fish as instructed.
- Record marine mammal and fish life history data.
- Review work ashore and enter it into a computer database.

SPECIFIC RESPONSIBILITIES

Observers are to:

- collect objective data on vessel activity, the take of target and non-target species and selected specimen samples;
- perform their duties in such a manner as to minimize interference with fishing operations;
- keep open communication with vessel personnel by informing them about observer duties and collected data;
- use work cameras only for photographing single specimens on the deck;
- obtain permission from the vessel captain before using any boat equipment;
- clean up immediately and thoroughly after completing required dissections;
- collect whole specimens as instructed, provided refrigerated space is available that does not interfere with fishing needs; availability is determined at the discretion of the vessel captain;
- bring issued rain gear, boots, life jackets and survival suit;
- ask the captain about emergency procedures and familiarize themselves with the locations of life rafts, fire extinguishers, and first aid kits;
- share housekeeping routines such as dish washing and head clean-up with the crew.

Observers are not to:

- dictate procedures or direct fishing operations;
- be involved with crew responsibilities such as standing watch or helping with fishing procedures;
- keep personal diaries in any form;

- bring aboard recording devices, computers, or personal cameras of any type;
- compromise data or record personal comments;
- conduct personal research of any kind;
- keep specimens or edible fish of any kind; or
- talk about any boat's business while aboard another or to any fishermen dockside.

Captains are to:

- cooperate with the observer in the performance of the observer's duties;
- ensure safe embarking and debarking of the observer;
- provide observers living quarters comparable to a full crew member;
- provide observers meals, snacks and amenities normally provided to crew members;
- allow the observer access to areas of the vessel necessary to conduct observer duties;
- allow the observer access to communications and navigation equipment, as necessary to perform observer duties;
- notify the observer in a timely fashion when commercial fishing operations are to begin and end;
- provide true vessel locations by latitude and longitude or LORAN coordinates, upon request by the observer;
- bring aboard marine mammals killed during fishing operations for biological processing that are readily accessible to crew members, if feasible and if requested by the observer;
- determine if refrigerated space is available for observer collected whole specimens that does not interfere with fishing needs;
- record personal statements on the back of the observer's original forms, if they disagree with the observer's collected data;

- ☼ comply with other guidelines, regulations or conditions in Certificates that the National Marine Fisheries Service may develop to ensure the effective deployment and use of observers; and

- ☼ ensure, even for trips with observers aboard, that Marine Mammal Authorization Program - Mortality/Injury Reporting Forms are submitted to NMFS as prescribed by U.S. Marine Mammal Regulations.

Captains are not to:

- ☼ ask observers to stand watch or help with fishing operations; or

- ☼ harass, intimidate or attempt to influence observers, or interfere with observer duties.

- ☼ fish without an observer on board the vessel after the owner or agent has been directed to make accommodations available for an observer.

DURING A VESSEL ASSIGNMENT

- ☼ Be a good shipmate; think and react professionally to unfamiliar situations.

- ☼ Share housekeeping routines such as dish washing and head clean up with the crew.

- ☼ Keep open communication and good relations with vessel personnel; inform them of your duties.

- ☼ You are not to be involved with crew responsibilities such as standing watch or aiding with fishing operations.

- ☼ Familiarize yourself with the vessel; especially the locations of life rafts, life jackets, fire extinguisher, Emergency Position Indicating Radio Beacon (EPIRB) and first aid kits.
- ☼ Always be safety conscious.

- ☼ Obtain permission from the captain before using any boat equipment.

- ☼ Keep your equipment as dry as possible and maintain it as instructed.

- ☼ Personal research and retaining specimens of any kind are prohibited.

- ☼ You are not an enforcement agent or an operations expert. You are not to dictate procedures or direct fishing operations.

- If the certificated operator is interested in knowing about the data you have collected, you should show him what you have collected.

- Vessel personnel are not to interfere with observer duties; record incidents of intimidation or interference and report them when you return to your office.

- Process specimens according to instructions. Clean up immediately and thoroughly after completing dissections.

- Collect whole specimens as instructed, provided refrigerated fish hold space is available and does not interfere with fishing needs. Such availability is determined at the discretion of the vessel captain.

- Accurately record objective data. Do not compromise data or record extemporaneous or personal comments.

- "No Data is Better Than Bad Data."

INTERFERENCE AND HARASSMENT

- Document any attempt to interfere with your work, including harassment, by preparing brief, non-inflammatory answers to the questions: Who? What? Where? When? Why? and How?

- Harassment is defined as conduct which has the purpose or effect of unreasonably interfering with the observer's work performance, or which creates an intimidating, hostile or offensive environment.

- Federal law defines sexual harassment as "any unwelcome sexual conduct of a sexual nature which has the purpose or effect of substantially interfering with an individual's work performance or creating an intimidating, hostile, or offensive working environment."

INJURIES

- If you are injured while aboard an assigned vessel, it is important that you record the time of the occurrence, the type and extent of the injury, how it occurred, what treatment you received, by whom, and record the names of any witnesses.

VESSEL SAFETY EXAMINATION CHECKLIST

☼ Observers must complete a Vessel Safety Examination Checklist before departing on any vessel. The purpose of this checklist is to verify that the vessel passed a USCG dockside examination within the past two years and to confirm that essential safety items are present.

TRIP DATA SUMMARY FORM

☼ As a courtesy, and if the vessel operator is interested, observers at the conclusion of their assigned trips may provide a count summary of marine mammals, sea turtles, and sea birds caught while fishing.

☼ For this purpose, a Trip Data Summary form has been developed. The form is divided into two parts; the top half is for the vessel operator; the bottom half, to be completed identically, is for the NMFS Data Coordinator's records, and must be submitted for each trip.

VESSEL SAFETY EXAMINATION CHECKLIST

SWR Observer Program

NMFS, Southwest Region

Observers must verify the condition of each item on the list when embarking a vessel. Please advise the Logistics Coordinator or Project Manager if a vessel does not provide these safety items. DO NOT LEAVE ON A VESSEL YOU FEEL IS UNSAFE

Trip Number: _____ Vessel Name: _____

Observer Name: _____ USCG Commercial Fishing Vessel Safety

Signature: _____ Examination Decal

Date: _____ Issued Date: _____

	Present	Absent	Comments
PFD/Immersion Suit	( )	( )	_____
Ring Life Buoys	( )	( )	_____
Life Raft	( )	( )	_____
Packing Date: _____			_____
Hydrostatic release date: _____			_____
Stowage of Life Raft	( )	( )	_____
Distress Signals	( )	( )	_____
EPIRBS	( )	( )	_____
Fire Extinguishers	( )	( )	_____
First Aid Equipment	( )	( )	_____
Guards for Exposed Hazards	( )	( )	_____
Nautical Charts for fishing area	( )	( )	_____
Compass	( )	( )	_____
Anchor and Radar reflectors	( )	( )	_____
General alarm System	( )	( )	_____
Communication Equipment w/emergency power source	( )	( )	_____
High Water Alarm	( )	( )	_____
Bilge Pump	( )	( )	_____
Electronic Position Fixing Devices	( )	( )	_____
Emergency Instructions	( )	( )	_____

Any additional comments/concerns:

_____

_____

_____

_____

_____

8/06

TRIP DATA SUMMARY
(Captain's Copy)

		-			-				

Observer Name _____

Operator _____ Vessel Name _____

Date Depart _____ Port Depart _____

Date Arrive _____ Port Arrive _____

Days at Sea _____ No. of Sets _____

No. MM's Brought Aboard _____ No. Whole MM's Brought Back _____

Protected Species Counts

	CETACEANS	PINNIPEDS	OTTERS	TURTLES	BIRDS
ALIVE					
DEAD					
INJURED					
UNKNOWN					

Submitted as Accurate _____ 9/06

FOLD AND SEPARATE HERE

TRIP DATA SUMMARY
(Office Copy)

		-			-				

Observer Name _____

Operator _____ Vessel Name _____

Date Depart _____ Port Depart _____

Date Arrive _____ Port Arrive _____

Days at Sea _____ No. of Sets _____

No. MM's Brought Aboard _____ No. Whole MM's Brought Back _____

Protected Species Counts

	CETACEANS	PINNIPEDS	OTTERS	TURTLES	BIRDS
ALIVE					
DEAD					
INJURED					
UNKNOWN					

Submitted as Accurate _____ 9/06

AFTER A VESSEL ASSIGNMENT

- Observers are responsible for returning equipment and data to their office and are held accountable for issued gear and manuals. Observer gear is **not** to be left unattended in parked vehicles. To avoid being charged for field gear which has become unserviceable, bring the equipment back to the office.

- **Loss of data or biological samples due to <u>your</u> negligence is Unacceptable.**

POST-CRUISE QUESTIONNAIRE

- Each observer completes a Post-Cruise Questionnaire and ensures that all questions have been answered and explanations provided.

- The Logistics Coordinator will review the questionnaire for observer performance and instances of intimidation or interference.

- All employee reports of injuries are documented by the Logistics Coordinator in Long Beach.

DATA REVIEW & ENTRY

- Observers review their data for completeness and accuracy prior to entering it into the database.

- Observers enter their data into a database at their office.

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DATA COLLECTION INSTRUCTIONS

GENERAL INSTRUCTIONS

- ☼ If the information requested is not available or not applicable, leave the data or code box blank.
- ☼ Write only 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 crossed out with a single line and the new entry written above in blue pencil. Write a brief note in the margin explaining the change.
- ☼ Print legibly.
- ☼ Observe and accurately record descriptive and quantitative data with explicit notes and explanations. **Record data as they occur, trust nothing to memory.**
- ☼ Record times as four digits using the 24 hour clock and local time, e.g., 5:30 P.M. is encoded as 1730.
- ☼ MARINE MAMMALS ARE TOP PRIORITY. Never allow collection of secondary data to interfere with the collection of marine mammal mortality data.
- ☼ If data are not available in the proper units, write the measure and units in the margin or comments section for later conversion (e.g. lat. & long. from LORAN lines or depth in fathoms from depth in feet).

DATA COLLECTION PRIORITIES

The primary emphasis is to obtain reliable information about marine mammal mortality and entanglement. Therefore, a data collection hierarchy has been established and is described below. Observers are expected to know what to accomplish first. If work is interrupted or curtailed, this will help protect the top priority tasks.

1. Record vessel and trip identifying information on each form used.
2. Tally non-fish killed by species: marine mammals, sea turtles, and seabirds.
3. Place non-fish specimens aside for processing.

4. Identify areas where incidental marine mammals, turtles and birds are caught in gear.

5. Record fishing position.

6. Complete gear description.

7. Tally fishes and invertebrates caught by species.

8. Identify areas where fish are concentrated in the gear.

9. Place shark and billfish samples aside for processing.

10. Note marine mammals near but not caught in gear.

11. Process non-fish specimens: marine mammals first, turtles second, and birds third.

12. Process shark and billfish specimens.

13. Record fish and invertebrate morphometric data.

PHOTOGRAPHS

Cameras are to be used only to take pictures of single dead cetaceans, dead turtles, unidentified fish or unidentified marine mammals on the deck. Dead identified pinnipeds are not to be photographed. Compose photographs so that the vessel and crew remain anonymous.

Label specimen photographs by printing the trip number, date, and specimen number in **large** block letters on the back of a one-sided data form. Place the specimen, label and a meter stick against a plain background. Orient the camera perpendicular to the specimen to obtain a full side view and fill the view finder with the specimen, then take the picture. Record the camera number, frame numbers, trip number, set number, specimen number, species of animal, and any notes or questions on the appropriate data form and on the Photo Log. Record the trip number on the camera.

Observer Photo Log

*OBSERVER*_____ *CAMERA#*_____

FRAME	TRIP #	SET	SPEC. #	SPECIES	NOTES

TRIP SPECIFICATIONS RECORD

INTRODUCTION

The Trip Specifications Record is used to record unique vessel characteristics and the specifics of the fishing trip.

GENERAL INSTRUCTIONS

This form is completed only once for each observed fishing trip.

DATA ELEMENTS

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Observer Number: The unique three digit number assigned to each observer at the conclusion of training.

Vessel Name: Record the registered name of the vessel. If the vessel has no name, leave this space blank.

Vessel ID Number: The permit number assigned by NMFS to this vessel.

State Plate Number: Record the state vessel registration plate number.

Operator Name: This is the name of the person is in charge during the trip. This is the skipper, most of the time.

Observation Type (Gillnet Only): In the first box, enter the code for the method which best describes the arrangements made for you to ride this vessel:

- **1 - Pre-net-set:** If arrangement for observation was made prior to setting of the nets i.e., days before, and this trip was selected on a systematic sampling plan.
- **2 - S / Post-net-set:** If arrangement for observation was made after the nets were set, and this trip was selected on a systematic sampling plan.

☼ **3 - R / Post-net-set:** If arrangement for observation was made after the nets were set, and this trip was selected on a random sampling plan.

☼ **4 - Other:** Arrangement for observation was not made as described above. Describe how and why this vessel was selected in the comments section.

In the second box, enter the code for the place where you made your observations.

☼ **1 - On board.**

☼ **2 - From other vessel.**

Port of Departure: The port of departure is the port from which the vessel leaves to begin your observed trip. The two or three letter codes are listed with the Logistic Coordinator.

Depature date: The date the observed vessel first leaves port

Departure Time: The time the observed vessel first leaves port

Port Stops: These are the ports that you may stop at between sets. Record the date and time the port stop begins and the date and time the port stop ends

Port of Arrival: This is the port in which the vessel lands at the end of your observed trip. The two or three letter port code is listed with the Logistic Coordinator.

Arrival Date: The date the observed vessel arrives in port at the end of the trip.

Arrival Time: The time the observed vessel arrives in port at the end of the trip.

TRIP SPECIFICATIONS RECORD

TRIP NUMBER. [ ][ ][-][ ][ ][-][ ][ ][ ][ ]

OBSERVER # [ ][ ][ ][ ]

VESSEL NAME [ ]

VESSEL LENGTH [ ][ ][ ]

VESSEL ID # [ ][ ][ ][ ][ ][ ][ ][ ]

STATE PLATE # [ ][ ][ ][ ][ ]

OPERATOR NAME [ ]

Observation Type (GILLNET ONLY)

[ ]
1. Pre-net-set
2. S/ Post-net-set
3- R/ Post-net-set
4. Other

[ ]
1- On Board
2- From Other Vessel

	PORT	DATE (YYYY MM DD)	TIME (HH MM)
DEPARTURE			

PORT STOPS

BEGIN DATE (YYYY MM DD)	TIME (HH MM)	PORT	END DATE (YYYY MM DD)	TIME (HH MM)

	PORT	DATE (YYYY MM DD)	TIME (HH MM)
ARRIVAL			

COMMENTS

GEAR & SET DATA
Albacore Troll & Bait Boat

INTRODUCTION

The Gear and Set Data Form is used to record the gear configuration of sampled vessels and the location and characteristics of fishing.

GENERAL INSTRUCTIONS

Gear information may be obtained from the vessel operator. If the information requested is not available or not applicable, leave the field blank.

DATA ELEMENTS

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: The set number is equivalent to the day fished on troll or bait boat trips. Enter 01 for the first fishing day, 02 for the second fishing day, ect.

Date: The date fishing occurs. Record the four digits of the year, the two digits representing the month and the two digits representing the day of the month.

Gear Code: Record the style of gear device used to catch the fish.
1 for pole and line (with bait);
2 for jig;
3 for both.

Number of Lines: Record the number of fishing lines used.

Target Species: Record the name(s) and codes(s) for the primary species that the vessel operator plans to catch.

Begin Fishing
Time: Record the local 24-hour time when fishing begins.

Position: Record the Latitude and Longitude at the time the fishing begins. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude

the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude

Environmental Conditions

Water Temperature: Record the surface water temperature in Fahrenheit, as a three digit number, to the nearest tenth of a degree, at the beginning of fishing.

Temperature Type: Record the type of instrument used to measure water temperature.

Code	Type	Description
1	Spirit	Alcohol or mineral spirit-filled thermometer.
2	Mercury	Mercury-filled thermometer.
3	Digital	Digital thermometer.
4	Vessel	Vessel's temperature gauge.
5	Other	Other - describe in notes.

Beaufort: Record the Beaufort Scale number 0 - 9 describing sea conditions at the beginning of fishing operations.

A wind of a given speed blowing for a sufficient time produces a characteristic appearance of the sea's surface. The Beaufort Scale describes the characteristic appearance of the sea associated with each numerical level of the Scale.

Code	Wind/Waves	Description
0	Calm	Sea like a mirror.
1	1-3 KTS. ¼ FT. Waves	Ripples with appearance of scales; no foam.
2	4-6 KTS. ½ FT. Waves	Small wavelets; crests of glassy appearance, not breaking.
3	7-10 KTS. 2 FT. Waves	Large wavelets; crests begin to break; scattered whitecaps.

4	11-16 KTS. 4 FT. Waves	Small waves, becoming longer; numerous whitecaps.
5	17-21 KTS. 6 FT. Waves	Moderate waves, taking longer form; many whitecaps; some spray
6	22-27 KTS. 10 FT. Waves	Larger waves forming; whitecaps everywhere; more spray.
7	28-33 KTS. 14 FT. Waves	Sea heaps up; white foam from breaking waves begins to be blown in streaks.
8	34-40 KTS. 18 FT.	Moderately high waves of greater length; edges of crests Waves begin to break into spindrift; foam is blown in well-marked streaks.
9	41-47 KTS. 23 FT. Waves	High waves; sea begins to roll; dense streaks of foam; spray may reduce visibility.

End Fishing

Time: Record the local 24-hour time when fishing ends.

Position: Record the Latitude and Longitude at the time the fishing ends. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude

Take Notes Here

GEAR AND SET DATA ~
ALBACORE AND BAITBOAT

TRIP NUMBER. ☐☐-☐☐-☐☐☐☐

SET NUMBER ☐☐

DATE (YYYY MM DD) ☐☐☐☐☐☐☐☐

GEAR CODE ☐
1. Pole & Line
2. Troll
3. Both

NO. LINES ☐☐

Target Sp.1 ☐☐☐

Target Sp. 2 ☐☐☐

1) _____

2) _____

BEGIN FISHING

POSITION

TIME (HH MM) ☐☐☐☐

LATITUDE ☐☐☐☐.☐

N/S ☐

LONGITUDE ☐☐☐☐☐.☐

E/W ☐

WATER TEMP. ☐☐.☐

TEMP. TYPE ☐
1- Spirit
2- Mercury
3- Digital
4- Vessel
5- Other

BEAUFORT ☐☐

END FISHING

POSITION

TIME (HH MM) ☐☐☐☐

LATITUDE ☐☐☐☐.☐

N/S ☐

LONGITUDE ☐☐☐☐☐.☐

E/W ☐

Notes:

GEAR & SET DATA
Commercial Passenger Fishing Vessel

INTRODUCTION

The Gear and Set Data Form is used to record the gear configuration of sampled vessels and the location and characteristics of fishing.

GENERAL INSTRUCTIONS

Gear information may be obtained from the vessel operator. If the information requested is not available or not applicable, leave the field blank.

DATA ELEMENTS

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: The set number is equivalent to the day fished on troll or bait boat trips. Enter 01 for the first fishing day, 02 for the second fishing day, ect.

Date: The date fishing occurs. Record the four digits of the year, the two digits representing the month and the two digits representing the day of the month.

Number of Anglers: Record the number of people that are on the boat and fishing.

Target Species: Record the name(s) and codes(s) for the primary species that the vessel operator plans to catch.

Begin Fishing

Time: Record the local 24-hour time when fishing begins.

Position: Record the Latitude and Longitude at the time the fishing begins. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude

Environmental Conditions

Water Temperature: Record the surface water temperature in Fahrenheit, as a three digit number, to the nearest tenth of a degree, at the beginning of fishing.

Temperature Type: Record the type of instrument used to measure water temperature.

Code	Type	Description
1	Spirit	Alcohol or mineral spirit-filled thermometer.
2	Mercury	Mercury-filled thermometer.
3	Digital	Digital thermometer.
4	Vessel	Vessel's temperature gauge.
5	Other	Other - describe in notes.

Beaufort: Record the Beaufort Scale number 0 - 9 describing sea conditions at the beginning of fishing operations.

A wind of a given speed blowing for a sufficient time produces a characteristic appearance of the sea's surface. The Beaufort Scale describes the characteristic appearance of the sea associated with each numerical level of the Scale.

Code	Wind/Waves	Description
0	Calm	Sea like a mirror.
1	1-3 KTS. ¼ FT. Waves	Ripples with appearance of scales; no foam.
2	4-6 KTS. ½ FT. Waves	Small wavelets; crests of glassy appearance, not breaking.
3	7-10 KTS. 2 FT. Waves	Large wavelets; crests begin to break; scattered whitecaps.
4	11-16 KTS. 4 FT. Waves	Small waves, becoming longer; numerous whitecaps.

5	17-21 KTS. 6 FT. Waves	Moderate waves, taking longer form; many whitecaps; some spray
6	22-27 KTS. 10 FT. Waves	Larger waves forming; whitecaps everywhere; more spray.
7	28-33 KTS. 14 FT. Waves	Sea heaps up; white foam from breaking waves begins to be blown in streaks.
8	34-40 KTS. 18 FT.	Moderately high waves of greater length; edges of crests Waves begin to break into spindrift; foam is blown in well-marked streaks.
9	41-47 KTS. 23 FT. Waves	High waves; sea begins to roll; dense streaks of foam; spray may reduce visibility.

End Fishing

Time: Record the local 24-hour time when fishing ends.

Position: Record the Latitude and Longitude at the time the fishing ends. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude

Take Notes Here

GEAR AND SET DATA ~
COMMERCIAL PASSENGER FISHING VESSEL

TRIP NUMBER. ☐☐-☐☐-☐☐☐☐

SET NUMBER ☐☐

DATE (YYYY MM DD) ☐☐☐☐☐☐☐☐

NO. OF ANGLERS ☐☐

Target Sp.1 ☐☐☐

Target Sp. 2 ☐☐☐

1) _____

2) _____

BEGIN FISHING

TIME (HH MM) ☐☐☐☐

POSITION

LATITUDE ☐☐☐.☐ N/S ☐

LONGITUDE ☐☐☐☐☐.☐ E/W ☐

WATER TEMP ☐☐.☐

TEMP. TYPE ☐

1- Spirit
2- Mercury
3- Digital
4- Vessel
5- Other

BEAUFORT ☐☐

END FISHING

TIME (HH MM) ☐☐☐☐

POSITION

LATITUDE ☐☐☐.☐ N/S ☐

LONGITUDE ☐☐☐☐☐.☐ E/W ☐

Notes:

GEAR & SET DATA
Drift Net

INTRODUCTION

The Gear and Set Data Form is used to record the gear configuration of sampled vessels and the location and characteristics of sets. These are the instructions for the DRIFT NET data forms.

GENERAL INSTRUCTIONS

Net information may be obtained from the vessel operator. If the information requested is not available or not applicable, leave the field blank.

DATA ELEMENTS

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: Sets are numbered consecutively for each observed trip beginning with 01. If you board the vessel in the middle of a trip, begin the number sequence for the observed sets with 01, not with the number of the sets that the vessel has already completed. If you board the vessel in the middle of a net pull consider that pull set 01 and record the percentage of the total net that was observed.

Pull Date: The date the net was tended or retrieved. Record the four digits of the year, the two digits representing the month and the two digits representing the day of the month.

Percentage Net Observed: Enter your estimate of the percentage of the net you observed.

> *Note: If you observe different gear components during the net pull, indicate this in the comments section and record new net information on a second Gear and Set Data Form.*

Target Species: Record the name(s) and codes(s) for the primary species that the vessel operator plans to catch.

Position Type: Record the code for the method used to determine the latitude and longitude for this set:

- **1 - Loran:** Latitude and longitude converted from loran readings by the loran system on board the vessel or the computer program in the field office. You must have actually seen the loran readings displayed by the unit on board the vessel. Otherwise use code 4 below.

- **2 - Dead Reckoning:** Latitude and longitude determined from charts at the field station using information such as: time run, course, and vessel speed from port of departure, compass bearings to known land marks, local names and descriptions of fishing locations.

- **3 - Satellite:** Latitude and longitude obtained from navigational systems using satellite.

- **4 - Verbal:** Latitude and longitude, loran readings, or other position information are reported by the vessel operator.

Position 1: This is the location of the vessel when the net setting begins. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude.

Position 2: This is the location of the vessel when the net setting ends. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude.

Position 3: This is the location of the vessel at the time net pull begins. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude.

> **Note:** If latitude and longitude are not directly available from the navigation system on board the vessel, use the notes section at the bottom of the form to record loran readings and/or other notes relevant to the vessel's fishing location.

Environment: Record the one digit code describing the predominant type of environment.

- **1 - Inshore of kelp.**

- **2 - In kelp.** The vessel is considered "in kelp" if the net is deployed within 300 feet or 100 meters of growing kelp.

- **3 - Offshore of kelp.**

- **4 - No kelp.** There is no growing kelp visible at the time the net is deployed.

- **5 - Unknown**. The environment is unknown.

Ship Activity: Record in the code box the one digit code indicating the type of fishing activity.

☼ **1 - Pull/Reset.** The net is retrieved and immediately reset in the same location.

☼ **2 - Pull/Move/Reset.** The net is retrieved and the vessel moves to a new location and resets the net.

☼ **3 - Pull/Bring in.** The net is retrieved and the vessel returns to port.

☼ **4 - Tend only.** The net is not retrieved and the catch is removed by pulling up sections along the anchored net.

☼ **5 - Net lost.** The net cannot be found.

Time & Date

Set Date: Record the month and day that the net was set.

Begin Set Time: Record the local 24-hour time when net setting begins. If you do not observe the set, ask the fisherman for the date and time the net was set.

Water Depth: Record the water depth in fathoms at the time net set begins.

Beaufort: Record the Beaufort Scale number 0 - 9 describing sea conditions at the beginning of setting operations.

A wind of a given speed blowing for a sufficient time produces a characteristic appearance of the sea's surface. The Beaufort Scale describes the characteristic appearance of the sea associated with each numerical level of the Scale.

Code	Wind/Waves	Description
0	Calm	Sea like a mirror.
1	1-3 KTS. ¼ FT. Waves	Ripples with appearance of scales; no foam.
2	4-6 KTS. ½ FT. Waves	Small wavelets; crests of glassy appearance, not breaking.
3	7-10 KTS. 2 FT. Waves	Large wavelets; crests begin to break; scattered whitecaps.

4	11-16 KTS. 4 FT. Waves	Small waves, becoming longer; numerous whitecaps.
5	17-21 KTS. 6 FT. Waves	Moderate waves, taking longer form; many whitecaps; some spray
6	22-27 KTS. 10 FT. Waves	Larger waves forming; whitecaps everywhere; more spray.
7	28-33 KTS. 14 FT. Waves	Sea heaps up; white foam from breaking waves begins to be blown in streaks.
8	34-40 KTS. 18 FT.	Moderately high waves of greater length; edges of crests Waves begin to break into spindrift; foam is blown in well-marked streaks.
9	41-47 KTS. 23 FT.	High waves; sea begins to roll; dense streaks of foam; spray Waves may reduce visibility.

Water Temperature: Record the surface water temperature in Fahrenheit, as a three digit number, to the nearest tenth of a degree, at the beginning of net set.

Temperature Type: Record the type of instrument used to measure water temperature.

Code	Type	Description
1	Spirit	Alcohol or mineral spirit-filled thermometer.
2	Mercury	Mercury-filled thermometer.
3	Digital	Digital thermometer.
4	Vessel	Vessel's temperature gauge.
5	Other	Other - describe in notes.

Cloud Cover: Record the overhead cloud cover at the beginning of net set.

Code		Amount of Cloud Cover
0	-	None
1	-	1/8 of sky covered
2	-	1/4 of sky covered
3	-	3/8 of sky covered
4	-	1/2 of sky covered
5	-	5/8 of sky covered
6	-	3/4 of sky covered
7	-	7/8 of sky covered
8	-	Sky completely covered
9	-	Not recorded due to darkness

Number of Light Sticks: Record the total number of light sticks deployed along the net. If no light sticks are used, record 00. Record light stick color in the notes section.

Floatline Pingers: Record the total number of pingers attached to the floatline. Note: This number must be observed.

Distance to Floatline: Estimate in feet, the maximum distance between a floatline pinger and the floatline.

Pinger Type: Record the one digit code number indicating the type of pinger used on the floatline. If no pingers are used, leave blank. Describe in the notes the "Other" or “Mixed” types of pingers that are used.

☼ **1 - Dukane.** ☼ **3 - Fumunda.**

☼ **2 - Other.** ☼ **4 - Mixed.**

Leadline Pingers: Record the total number of pingers attached to the leadline. Note: This number must be observed.

Distance to Leadline: Estimate in feet, the maximum distance between a leadline pinger and the leadline.

Pinger Type: Record the one digit code number indicating the type of pinger used on the leadline. If no pingers are used, leave blank. Describe in the notes the "Other" or “Mixed” types of pingers that are used.

☼ **1 - Dukane.** ☼ **3 - Fumunda.**

☼ **2 - Other.** ☼ **4 - Mixed.**

Begin Pull Time: Record the local 24-hour time when the fisherman begins to retrieve or tend the net. If you only observe part of the net haul, record the time you begin observing the net haul.

Water Depth: Record the water depth in fathoms at the time the fisherman begins to retrieve the net or the time the fisherman begins tending the net.

Beaufort: Record the Beaufort Scale number 0 - 9 describing sea conditions at the beginning of hauling in operations. See scale above.

Water Temperature: Record the surface water temperature in Fahrenheit, as a three digit number, to the nearest tenth of a degree, at the beginning of the net pull.

Cloud Cover: Record the overhead cloud cover at the beginning of net pull. See scale above.

Main Engine: The yes or no answer to the question: Was the main engine left on all night?

Generator: The yes or no answer to the question: Was a generator engine left on all night?

Sonar: The yes or no answer to the question: Was the sonar left on all night?

Deck Light: The yes or no answer to the question: Were the main deck lights left on all night?

Patrol Net: The yes or no answer to the question: Did the vessel patrol up and down the floatline at night?

Soak Total: Record the elapsed time, rounded to the nearest hour, from the time the net was set to the time it was retrieved or tended. If you were not aboard the vessel at the time the net was set, ask the fisherman for the soak time.

Lost Netting: Record in fathoms the total amount of lost netting. The estimate should be based on fathoms lost along the length of the net. If the depth of the lost area is not from leadline to corkline, record the depth lost in the Notes Section.

Pingers Functioning: During the first haulback of a trip, or the earliest set where conditions are safe, listen to each pinger as it comes aboard. Record (Y/N) whether the pingers are emitting sound.

Net Characteristics

Section #: Record the number of the net section which is described (i.e., 01 is the net section retrieved first and is equivalent to the Start End of the net diagram).

Total Sections: Record the total number of net sections described.

Percent of Net: Record the percent of the net which is described in this section. If gear components change along the length of the net, record the percent with different components and their characteristics in another section. The total percentages should equal 100% or be equal to the Percentage Observed.

Net Type: Record the one digit code indicating the type of net in the code box.

- **1 - Set.** The net is anchored at both ends and fishes on the bottom (no trammeling).
- **2 - Drift.** The net is tied to the vessel at one end and drifts with the current (not anchored).
- **3 - Float.** The net is anchored like a set net but is suspended in mid-water by surface floats.
- **4 - Trammel, 1 panel.** A set net with suspenders between the cork and lead lines to add vertical slack.
- **5 - Trammel, 2 panel.** A set net with two panels that are connected at the lead and cork lines. One panel usually has larger mesh than the other.
- **6 - Trammel, 3 panel.** A set net with three panels that are connected at the lead and cork lines. The two outer panels usually have larger mesh than the inner one.

Net Material: Record the one digit number indicating the material(s) of which the meshes of the net are constructed:

- **1 - Monofilament.** The net is constructed of single fiber nylon.
- **2 - Multi-filament.** The mesh is constructed of nylon or other material, with many fibers wound into twine.
- **3 - Combination.** Describe in the comments the construction of any other type of mesh.
- **4 - Twisted monofilament.** The mesh is constructed of several nylon fibers twisted together.

Material Strength: Record the numerical value for either pounds test or twine size for this section of net. If the operator does not know the netting strength in terms of either of these two measurements, enter any relevant information the operator can provide in the comments section on the front of the form.

Strength Code: Indicate the units associated with the numerical value recorded under Material Strength:

☼ **1 - Lbs. test.** ☼ **2 - Twine size.**

Net Length: Record the length of the net in fathoms. If gear components change, record only the length for this panel and record the characteristics and length of the different panels in other net sections. Net length is the mesh panel only; it does not include the bridle, ground, or up rope lengths. The operator will usually know the lengths of the different panels and the total net length.

Net Depth: Record the depth of the net in meshes. Obtain the number of meshes from the operator if you are unable to count them.

Net Color: Record the one digit code number indicating the color(s) of the net used. Describe in the notes any mixture of colors or other colors used.

☼ **1 - Green** ☼ **2 - Red**
☼ **3 - Blue** ☼ **4 - Brown**
☼ **5 - Other**

Mesh Size: Record the mesh size to the nearest half inch. Mesh size is measured by pulling the opposite knots of a mesh and measuring the distance between the knots as described in the Glossary. For multiple panel nets, record the size of the smaller inside mesh. Mesh sizes may be obtained from the operator. Check several meshes and enter the average in the box.

Extender Length: Record the length in feet of the line which joins the cork line and the surface floats.

Hanging Line Material: Record the one digit code number indicating the composition of the hanging line:

☼ **1 - Synthetic.** Nylon, plastic or a combination of synthetic and natural fibers.

☼ **2 - Natural.** Hemp, cotton or some other natural fiber

Percent Slack: Record the percentage of slack created in the net by meshes on the hanging line. If the operator does not know the percent slack in his/her net, be sure to complete the fields for the number of meshes hanging and the hanging length.

Number of Meshes Hanging: Record the number of meshes, including those not tied to the hanging line, between knots. For a multi-panel trammel net, record this number for the smallest mesh net. Record even if Percent Slack has been completed.

Hanging Length: Record the distance between the knots on the cork line to the nearest inch. Record even if Percent Slack has been completed.

Net Diagram

The segments of the net are equivalent to those in the "location in net" column on the Non-Fish Tally Sheet. If net characteristics vary within a set, indicate the location(s) of the different net types. Start End is the first to come aboard during retrieval, same as section 01.

Every fish need not be depicted on the diagram, only general tendencies or evident groupings need to be recorded. **Target species** should be depicted individually on the diagram using the three digit code.

Marine mammals, sea turtles, and seabirds should be indicated individually using the two letter codes from the Species Codes list.

In cases where mammals or large fish are too wrapped up to determine their position on the vertical plane, indicate their position on the horizontal plane and discuss the entanglement in the comments section

If you know the location of an animal or aggregation of animals along one axis of the net, but not along the other, indicate the axis of which you are unsure by a double ended arrow.

←----------→

Notes: If there was zero catch for this set, write **ZERO CATCH** in the notes section of the net diagram. Use the notes section to record the net section number in which each mammal, turtle, or bird is entangled.

Take Notes Here

Gear and Set Data ~ Drift Net

TRIP NUMBER. ☐☐-☐☐-☐☐☐☐ SET NUMBER ☐☐ PULL DATE (YYYY MM DD) ☐☐☐☐☐☐☐☐

Percentage of Net Observed ☐☐☐ % Target Sp.1 ☐☐☐ Target Sp. 2 ☐☐☐ 1) _____ 2) _____ Position Type ☐
1- Loran 3- Satellite
2- DR 4- Verbal

Begin Set Latitude ☐☐ Deg. ☐☐☐.☐ Min. Longitude ☐☐☐ Deg. ☐☐☐.☐ Min. Environment ☐
1- Inshore of Kelp 4- No Kelp
2- In Kelp 5- Unknown
3- Outside of Kelp

End Set Latitude ☐☐ Deg. ☐☐☐.☐ **Min.** Longitude ☐☐☐ Deg. ☐☐☐.☐ **Min.**

Begin Pull Latitude ☐☐ Deg. ☐☐☐.☐ **Min.** Longitude ☐☐☐ Deg. ☐☐☐.☐ **Min.** Ship Activity ☐
1- Pull / Reset 4- Tend Only
2- Pull / Move / Reset 5- Net Lost
3- Pull / Bring In

Set Date (MM DD) ☐☐☐☐ Begin Set Time ☐☐☐☐ Water Depth ☐☐☐☐ fms Beaufort ☐ Water Temp. ☐☐.☐ Temp. Type ☐ Cloud Cover ☐
1- Spirit
2- Mercury
3- Digital
4- Vessel
5- Other

Number of Lightsticks ☐☐ Floatline Pingers ☐☐ Distance to Floatline ☐☐ ft Pinger Type ☐
1- Dukane 3- Fumunda
2- Other 4- Mixed

Leadline Pingers ☐☐ Distance to Leadline ☐☐ ft Pinger Type ☐
1- Dukane 3- Fumunda
2- Other 4- Mixed

Begin Pull Time ☐☐☐☐ Water Depth ☐☐☐☐ fms Beaufort ☐ Water Temp. ☐☐.☐ Cloud Cover ☐

Main Engine (Y / N) ☐ Generator (Y / N) ☐ Sonar (Y / N) ☐ Deck Light (Y / N) ☐ Patrol Net (Y / N) ☐ Soak Total ☐☐☐ hrs Lost Netting ☐☐☐☐ fms Pingers Functioning ☐ (Y / N)

Notes: _____

Net Characteristics

Section # ☐☐ **OF** **Total Sections** ☐☐

Percent of Net ☐☐☐ %

Net type ☐
1 - Set
2 - Drift
3- Float
4 - Trammel, 1 panel
5 - Trammel, 2 panel
6 - Trammel, 3 panel

Net Material ☐
1. Monofilament
2. Multifilament
3. Combination
4. Twisted Mono.

Strength ☐☐☐

Strength Code ☐
1 - Lb. Test
2 - Twine Size

Net Length ☐☐☐☐ fms

Net Depth ☐☐☐☐ meshes

Net Color ☐
1 Green 4. Brown
2. Red 5. Other
3. Blue

Mesh Size ☐☐.☐ ins

Extender Length ☐☐ ft

Hanging Line Material ☐
1 - Synthetic
2 - Natural

Percent Slack ☐☐ %

Number of Meshes Hanging ☐☐

Hanging Length ☐☐ ins

Section # ☐☐ **OF** **Total Sections** ☐☐

Percent of Net ☐☐☐ %

NetType ☐
1 - Set
2 - Drift
3 - Float
4 -Trammel, 1 panel
5 - Trammel, 2 panel
6 - Trammel, 3 panel

Net Material ☐
1 - Monofilament
2 - Multifilament
3 - Combination
4 - Twisted Mono

Strength ☐☐☐

Strength Code ☐
1 - Lb. Test
2 - Twine Size

Net Length ☐☐☐☐ fms

Net Depth ☐☐☐☐ meshes

Net Color ☐
1- Green 4. Brown
2. Red 5. Other
3. Blue

Mesh Size ☐☐.☐ ins

Extender Length ☐☐ ft

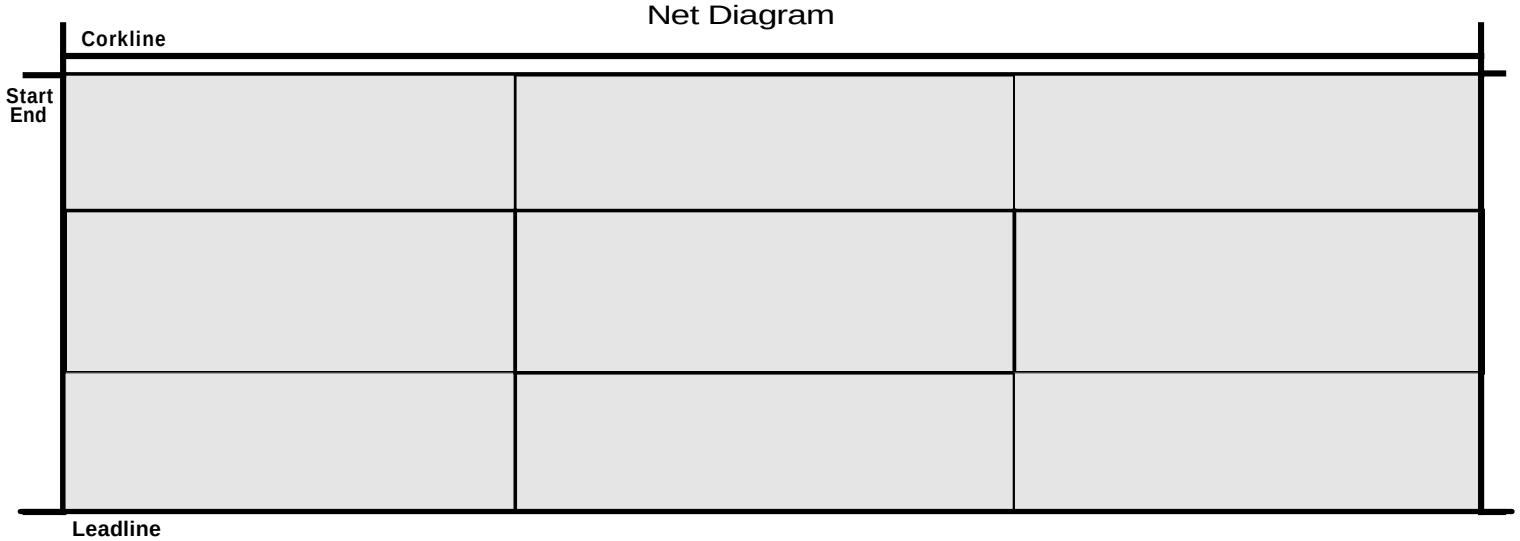
Hanging Line Material ☐
1 - Synthetic
2 - Natural

Percent Slack ☐☐ %

Number of Meshes Hanging ☐☐

Hanging Length ☐☐ ins

Net Diagram



Notes:

GEAR & SET DATA
Purse Seine

INTRODUCTION

The Gear and Set Data Form is used to record the gear configuration of sampled vessels and the location and characteristics of sets.

GENERAL INSTRUCTIONS

Net information may be obtained from the vessel operator. If the information requested is not available or not applicable, leave the field blank.

DATA ELEMENTS

Trip Data

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: Sets are numbered consecutively for each observed trip beginning with 01. If you board the vessel in the middle of a trip, begin the number sequence for the observed sets with 01, not with the number of the sets that the vessel has already completed.

Date: The date the set is performed. Record the four digits of the year, the two digits representing the month and the two digits representing the day of the month.

Set Data

Target Species: Record the name(s) and codes(s) for the primary species that the vessel operator plans to catch.

Fishery Type: Record the type of fishery beign targeted.

1. **C**ostal **P**elagic **S**pecies – these include: anchovy, mackerel, sardine and squid.

2. Highly **M**igratory **S**pecies – for purse seine vessels, tuna only.

Net Characteristics

Net Length: Record the length of the net in fathoms.

Net Depth: Record the depth of the net in fathoms.

Mesh Size: Record the mesh size to the nearest 1/8 inch. Mesh size is measured by pulling the opposite knots of a mesh and measuring the distance between the knots. Check several meshes and enter the average in the box.

Set Characteristics

Set Position: Record the latitude and longitude when the skiff is launched and begins to circle the fish. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude.

Begin Set Time: Record the local 24-hour time when the skiff was launched. If you do not observe the set, ask the fisherman for the date and time the net was set.

End Haul Time: Record the local 24-hour time when the fishing gear is completely aboard the vessel.

Environmental Characteristics

Water Depth:

Record the water depth in fathoms at the time net set begins.

Beaufort: Record the Beaufort Scale number 0 - 9 describing sea conditions at the beginning of net setting.

A wind of a given speed blowing for a sufficient time produces a characteristic appearance of the sea's surface. The Beaufort Scale describes the characteristic appearance of the sea associated with each numerical level of the Scale.

0	Calm	Sea like a mirror.
1	1-3 KTS. ¼ FT. Waves	Ripples with appearance of scales; no foam.
2	4-6 KTS. ½ FT. Waves	Small wavelets; crests of glassy appearance, not breaking.
3	7-10 KTS. 2 FT. Waves	Large wavelets; crests begin to break; scattered whitecaps.

4	11-16 KTS. 4 FT. Waves	Small waves, becoming longer; numerous whitecaps.
5	17-21 KTS. 6 FT. Waves	Moderate waves, taking longer form; many whitecaps; some spray
6	22-27 KTS. 10 FT. Waves	Larger waves forming; whitecaps everywhere; more spray.
7	28-33 KTS. 14 FT.	Sea heaps up; white foam from breaking waves begins to be Waves blown in streaks.
8	34-40 KTS. 18 FT.	Moderately high waves of greater length; edges of crests Waves begin to break into spindrift; foam is blown in well-marked streaks.
9	41-47 KTS. 23 FT.	High waves; sea begins to roll; dense streaks of foam; spray Waves may reduce visibility.

Water Temperature: Record the surface water temperature in Fahrenheit, as a three digit number, to the nearest tenth of a degree, at the beginning of net pull.

Temperature Type: Record the type of instrument used to measure water temperature.

Code	Type	Description
1	Spirit	Alcohol or mineral spirit-filled thermometer.
2	Mercury	Mercury-filled thermometer.
3	Digital	Digital thermometer.
4	Vessel	Vessel's temperature gauge.
5	Other	Other - describe in notes.

Light Boat: Record whether a separate vessel was used to illuminate the water during the set. Put a yes or no in the box provided.

*If there was zero catch for this set, write **ZERO CATCH** in the notes section.*

Gear and Set Data ~ Purse Seine

TRIP NUMBER ☐☐-☐☐-☐☐☐☐ SET NUMBER ☐☐ DATE (YYYY MM DD) ☐☐☐☐☐☐☐☐

Target Sp.1 ☐☐☐ Target Sp. 2 ☐☐☐ 1) _____ 2) _____

Fishery Type ☐
1 - CPS
2 - HMS

Net Length ☐☐☐☐ FMS Net Depth ☐☐☐☐ FMS Mesh Size ☐☐ & ☐/8 ins
(TO THE NEAREST 1/8)

Set Position

Latitude ☐☐ ☐☐.☐ Deg. Min.

Longitude ☐☐☐ ☐☐.☐ Deg. Min.

Time
Begin Set Time ☐☐☐☐
End Haul Time ☐☐☐☐

Water Depth ☐☐☐☐ FMS Beaufort ☐ Water Temp. ☐☐.☐

Temp. Type ☐
1- Spirit
2- Mercury
3- Digital
4- Vessel
5- Other

Light Boat (Y / N) ☐

Notes:

GEAR & SET DATA
Set Gillnet

INTRODUCTION

The Gear and Set Data Form is used to record the gear configuration of sampled vessels and the location and characteristics of sets.

GENERAL INSTRUCTIONS

Net information may be obtained from the vessel operator. If the information requested is not available or not applicable, leave the field blank.

DATA ELEMENTS

Trip Data

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: Sets are numbered consecutively for each observed trip beginning with 01. If you board the vessel in the middle of a trip, begin the number sequence for the observed sets with 01, not with the number of the sets that the vessel has already completed. If you board the vessel in the middle of a net pull consider that pull set 01 and record the percentage of the total net that was observed.

Pull Date: The date the net was tended or retrieved. Record the four digits of the year, the two digits representing the month and the two digits representing the day of the month.

Set Data

Percentage Net Observed: Enter your estimate of the percentage of the net haul you observed.

Target Species: Record the name(s) and codes(s) for the primary species that the vessel operator plans to catch.

Begin Pull Position: This is the location of the vessel when net pull begins. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of minutes (one digit) of longitude.

Note: If latitude and longitude are not directly available from the navigation system on board

the vessel, use the notes section at the bottom of the form to record loran readings and/or other notes relevant to the vessel's fishing location.

Position Type: Record the code for the method used to determine the latitude and longitude for this set:

- **1 - Loran:** Latitude and longitude converted from loran readings by the loran system on board the vessel or the computer program in the field office. You must have actually seen the loran readings displayed by the unit on board the vessel. Otherwise use code 4 below.

- **2 - Dead Reckoning:** Latitude and longitude determined from charts at the field station using information such as: time run, course, and vessel speed from port of departure, compass bearings to known land marks, local names and descriptions of fishing locations.

- **3 - GPS:** Latitude and longitude obtained from navigational systems using satellite.

- **4 - Verbal:** Latitude and longitude, loran readings, or other position information are reported by the vessel operator.

Environment: Record the one digit code describing the predominant type of environment.

- **1 - Inshore of kelp.**

- **2 - In kelp.** The vessel is considered "in kelp" if the net is deployed within 300 feet or 100 meters of growing kelp.

- **3 - Offshore of kelp.**

- **4 - No kelp.** There is no growing kelp visible at the time the net is deployed.

- **5 - Unknown**. The environment is unknown

Orientation to Shore: Record the one digit code indicating the position of the net relative to the shoreline. If this cannot be determined, or if the shoreline is not visible, record the compass orientation of the net, e.g. “net set northeast to southwest.” in the Notes Section.

- **1 - Parallel.**
- **2 - Perpendicular**.
- **3 - Diagonal.**
- **4 - Unknown**.

Distance Offshore: If distance offshore can be determined from a radar unit on board the vessel or a nautical chart, record the distance in nautical miles and tenths from the net end closest to the shore. If you are unable to get distance from the closest end, but have a distance from another position along the net, record the information in the Notes Section.

Time & Date

Set Date: Record the month and day that the net was set.

Begin Set Time: Record the local 24-hour time when the net was set. If you do not observe the set, ask the fisherman for the date and time the net was set.

Begin Pull Time: Record the local 24-hour time when the fisherman begins to retrieve or tend the net. If you only observe part of the net haul, record the time you begin observing the net haul.

Water Depth:

☼ Record the water depth in fathoms at the time net pull begins.

Beaufort: Record the Beaufort Scale number 0 - 9 describing sea conditions at the beginning of hauling operation.

A wind of a given speed blowing for a sufficient time produces a characteristic appearance of the sea's surface. The Beaufort Scale describes the characteristic appearance of the sea associated with each numerical level of the Scale.

0	Calm	Sea like a mirror.
1	1-3 KTS. ¼ FT. Waves	Ripples with appearance of scales; no foam.
2	4-6 KTS. ½ FT. Waves	Small wavelets; crests of glassy appearance, not breaking.
3	7-10 KTS. 2 FT. Waves	Large wavelets; crests begin to break; scattered whitecaps.
4	11-16 KTS. 4 FT. Waves	Small waves, becoming longer; numerous whitecaps.
5	17-21 KTS. 6 FT. Waves	Moderate waves, taking longer form; many whitecaps; some spray

6	22-27 KTS. 10 FT. Waves	Larger waves forming; whitecaps everywhere; more spray.
7	28-33 KTS. 14 FT. Waves	Sea heaps up; white foam from breaking waves begins to be blown in streaks.
8	34-40 KTS. 18 FT. Waves	Moderately high waves of greater length; edges of crests begin to break into spindrift; foam is blown in well-marked streaks.
9	41-47 KTS. 23 FT. Waves	High waves; sea begins to roll; dense streaks of foam; spray may reduce visibility.

Water Temperature: Record the surface water temperature in Fahrenheit, as a three digit number, to the nearest tenth of a degree, at the beginning of net pull.

Temperature Type: Record the type of instrument used to measure water temperature.

Code	Type	Description
1	Spirit	Alcohol or mineral spirit-filled thermometer.
2	Mercury	Mercury-filled thermometer.
3	Digital	Digital thermometer.
4	Vessel	Vessel's temperature gauge.
5	Other	Other - describe in notes.

Number of Pingers: Record the total number of pingers deployed along the net. If no pingers are used, record 00.

Type of Pinger: Record the one digit code number indicating the type of pinger used. Describe in the notes if different types of pingers are used.

- ☼ **1 - Netmark 1000.**
- ☼ **2 - Other.**
- ☼ **3 - Fumunda**
- ☼ **4 - Mixed**

Water Depth Final:

☼ Record the water depth in fathoms at the time the net is completely aboard or at the time the fisherman finishes tending the net.

Ship Activity: Record in the code box the one digit code indicating the type of fishing activity.

- ☼ **1 - Pull/Reset.** The net is retrieved and immediately reset in the same location.
- ☼ **2 - Pull/Move/Reset.** The net is retrieved and the vessel moves to a new location and resets the net.
- ☼ **3 - Pull/Bring in.** The net is retrieved and the vessel returns to port.
- ☼ **4 - Tend only.** The net is not retrieved and the catch is removed by pulling up sections along the anchored net.
- ☼ **5 - Net lost.** The net cannot be found.

Soak Total: Record the time, rounded to the nearest hour from the time the net was set, to the time it was retrieved or tended. If you were not aboard the vessel at the time the net was set, ask the fisherman for the soak time.

Lost Netting: Record in fathoms the total amount of lost netting. The estimate should be based on fathoms lost along the length of the net. If the depth of the lost area is not from leadline to corkline, record the depth lost in the Notes Section.

Net Characteristics

Section #: Record the number of the net section which is described (i.e., 01 is the net section retrieved first and is equivalent to the Start End of the net diagram).

of

Total Sections: Record the total number of net sections described.

Percentage of Net: Record the percentage of the net which is described in Section 1. If gear components change along the length of the net, record the percentage observed with different components and their characteristics in Section 2. The total percentages should equal 100% or be equal to the Percentage Observed.

Net Type: Record the one digit code indicating the type of net in the code box.

- ☼ **1 - Set.** The net is anchored at both ends and fishes on the bottom (no trammeling).

☼ **2 - Drift.** The net is tied to the vessel at one end and drifts with the current (not anchored).

☼ **3 - Float.** The net is anchored like a set net but is suspended in mid-water by surface floats.

☼ **4 - Trammel, 1 panel.** A set net with suspenders between the cork and lead lines to add vertical slack.

☼ **5 - Trammel, 2 panel.** A set net with two panels that are connected at the lead and cork lines. One panel usually has larger mesh than the other.

☼ **6 - Trammel, 3 panel.** A set net with three panels that are connected at the lead and cork lines. The two outer panels usually have larger mesh than the inner one.

Net Material: Record the one digit number indicating the material(s) of which the meshes of the net are constructed:

☼ **1 - Monofilament.** The net is constructed of single fiber nylon.

☼ **2 - Multi-filament.** The mesh is constructed of nylon or other material, with many fibers wound into twine.

☼ **3 - Combination.** Describe in the comments the construction of any other type of mesh.

☼ **4 - Twisted monofilament.** The mesh is constructed of several nylon fibers twisted together.

Material Strength: Record the numerical value for either pounds test or twine size for this section of net. If the operator does not know the netting strength in terms of either of these two measurements, enter any relevant information the operator can provide in the comments section on the front of the form.

Strength Code: Indicate the units associated with the numerical value recorded under Material Strength:

☼ **1 - lb. test.** ☼ **2 - Twine size.**

Net Length: Record the length of the net in fathoms. If gear components change, record only the length for this panel and record the characteristics and length of the different panels on other Gear and Set Data Forms. Net length is the mesh panel only; it does not include the bridle, ground, or up rope lengths. The operator will usually know the lengths of the different panels and the total net length.

Net Depth: Record the depth of the net in meshes. Obtain the number of meshes from the operator if you are unable to count them.

Mesh Size: Record the mesh size to the nearest half inch. Mesh size is measured by pulling the opposite knots of a mesh and measuring the distance between the knots as described in the Glossary. For multiple panel nets, record the size of the smaller inside mesh. Mesh sizes may be obtained from the operator. Check several meshes and enter the average in the box.

Mesh Size (Multi-Panel Trammel Only): Record the mesh size to the nearest half inch of the outside panel. Mesh size is measured by pulling the opposite knots of a mesh and measuring the distance between the knots as described in the Glossary. Mesh sizes may be obtained from the operator. Check several meshes and enter the average in the box.

Suspender Length: Record the length in feet of the line joining the lead and cork lines.

Hanging Line Material: Record the one digit code number indicating the composition of the hanging line:

- **1 - Synthetic.** Nylon, plastic or a combination of synthetic and natural fibers.
- **2 - Natural.** Hemp, cotton or some other natural fiber

Percent Slack: Record the percentage of slack created in the net by meshes on the hanging line. If the operator does not know the percent slack in his/her net, be sure to complete the fields for the number of meshes hanging and the hanging length.

Number of Meshes Hanging: Record the number of meshes, including those not tied to the hanging line, between knots. For a multi-panel trammel net, record this number for the smallest mesh net. Record even if Percent Slack has been completed.

Hanging Length: Record the distance between the knots on the cork line to the nearest inch. Record even if Percent Slack has been completed.

Net Diagram

The segments of the net are equivalent to those in the "location in net" column on the Non-Fish Tally Sheet. If net characteristics vary within a set, indicate the location(s) of the different net types.

Every fish need not be depicted on the diagram, only general tendencies or evident groupings

need to be recorded. **Target species** should be depicted individually on the diagram using the three digit code.

Marine mammals, seabirds, and sea turtles should be indicated individually using the two letter codes from the species list beginning on page 105.

In cases where mammals or large fish are too wrapped up to determine their position on the vertical plane, indicate their position on the horizontal plane and discuss the entanglement in the comments section

If you know the location of an animal or aggregation of animals along one axis of the net, but not along the other, indicate the axis of which you are unsure by a double ended arrow.

←----------→ ◘

*If there was zero catch for this set, write **ZERO CATCH** in the notes section of the net diagram.*

TAKE NOTES HERE

Gear and Set Data ~ Set Net

TRIP NUMBER ☐☐-☐☐-☐☐☐☐ SET NUMBER ☐☐ PULL DATE (YYYY MM DD) ☐☐☐☐☐☐☐☐

Percentage Net Observed ☐☐☐ %

Target Sp. 1 ☐☐☐ Target Sp. 2 ☐☐☐ 1) _____ 2) _____

Begin Pull Position

Latitude ☐☐ ☐☐.☐ Deg. Min.

Longitude ☐☐☐ ☐☐.☐ Deg. Min.

Position Type ☐
1- Loran 3- Satellite
2- DR 4- Verbal

Environment ☐
1- Inshore of Kelp 4- No Kelp
2- In Kelp 5- Unknown
3- Outside of Kelp

Orientation to Shore ☐
1- Parallel 4 - Unknown
2- Perpendicular
3- Diagonal

Distance Offshore ☐☐.☐ nms

Set Date (MM DD) ☐☐☐☐

Begin Set Time ☐☐☐☐

Begin Pull Time ☐☐☐☐

Water Depth ☐☐☐☐ fms

Beaufort ☐

Water Temp. ☐☐☐☐

Type ☐
1- Spirit
2- Mercury
3- Digital
4- Vessel
5- Other

Number of Pingers ☐☐

Pinger Type ☐
1- Netmark 1000
2- Other
3- Fumunda
4- Mixed

Water Depth Final ☐☐☐☐ fms

Ship Activity ☐
1- Pull / Reset
2- Pull / Move/Reset
3. Pull / Bring In
4- Tend Only
5- Net Lost

Soak Total ☐☐☐ hrs

Lost Netting ☐☐☐☐ fms

Notes:

Net Characteristics

Section # ☐☐ **OF** **Total Sections** ☐☐ **Percent of Net** ☐☐☐ %

Net Type ☐
1 - Set, 2 - Drift, 3- Float, 4 - Trammel, 1 panel, 5 - Trammel, 2 panel, 6 - Trammel, 3 panel

Net Material ☐
1. Monofilament
2. Multifilament
3. Combination
4. Twisted Mono.

Strength ☐☐☐

Strength Code ☐
1 - Lb. Test
2 - Twine Size

Net Length ☐☐☐☐ fms

Net Depth ☐☐☐☐ meshes

Mesh Size ☐☐.☐ ins

Mesh Size (Multi-Panel Trammel Only) ☐☐.☐ ins

Suspender Length ☐☐ ft

Hanging Line Material ☐
1 - Synthetic
2 - Natural

Percent Slack ☐☐ %

Number of Meshes Hanging ☐☐

Hanging Length ☐☐ ins

Section # ☐☐ **OF** **Total Sections** ☐☐ **Percent of Net** ☐☐☐ %

Net Type ☐
1 - Set, 2 - Drift, 3 - Float, 4 -Trammel. 1 panel, 5 - Trammel. 2 panel, 6 - Trammel, 3 panel

Net Material ☐
1 - Monofilament
2 - Multifilament
3 - Combination
4 - Twisted Mono.

Strength ☐☐☐

Strength Code ☐
1 - Lb. Test
2 - Twine Size

Net Length ☐☐☐☐ fms

Net Depth ☐☐☐☐ meshes

Mesh Size ☐☐.☐ ins

Mesh Size (Multipanel Trammel Only) ☐☐.☐ ins

Suspender Length ☐☐ ft

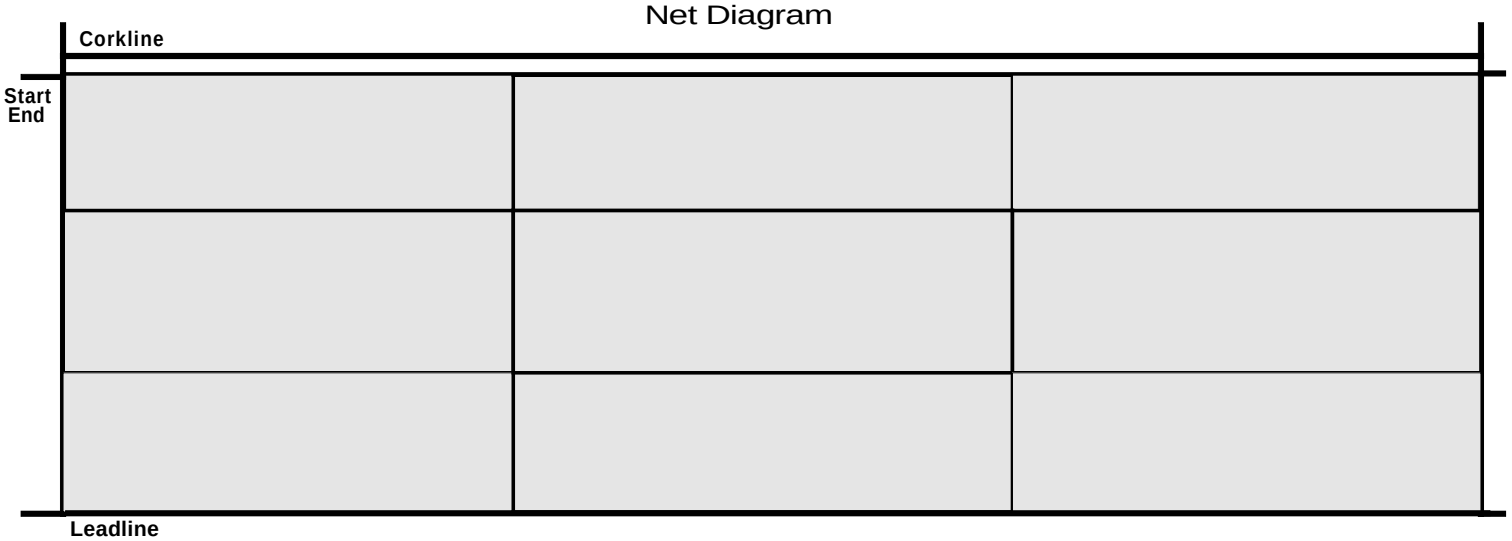
Hanging line Material ☐
1 - Synthetic
2 - Natural

Percent Slack ☐☐ %

Number of Meshes Hanging ☐☐

Hanging Length ☐☐ ins

Net Diagram



Notes:

CATCH TALLY SHEET

INTRODUCTION

The Catch Tally Sheet is listed by species of the total number of fish and invertebrates captured and their disposition. The data are used to determine success rates for target species and the extent of involvement of non-target species in the fishery.

GENERAL INSTRUCTIONS

Use the common names from the Species Code list for the species of fish caught. Abundant species may be tallied with a hand counter. **If catch is tallied using hash marks, sum the marks, enter and circle the total.** The sum of all the disposition categories excluding damaged should equal the total catch for each species. If you run out of space for tallying a species, continue on another line.

Possible indications of marine mammal depredation of the catch are: tooth rake marks on the bodies of fish; fish with their belly sections bitten out and the skin torn off the carcass; and fish heads with the bodies bitten off. Describe in detail in the Notes Section those factors which you believe indicate marine mammal depredation.

DATA ELEMENTS

Trip Data

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: Sets are numbered consecutively for each observed trip beginning with 01. If you board the vessel in the middle of a trip, begin the number sequence for the observed sets with 01, not with the number of the sets that the vessel has already completed.

Marine Mammal Damage: Record a "Y" in this field if you observe fish which you believe have been damaged by marine mammals or if you have observed marine mammals in the act of depredating the catch. Record a "N" if you do not believe the catch has been depredated by marine mammals or you are unsure of the source of damage.

Number of Albacore with Gillnet Markings - (*Albacore Troll/Baitboat Only*) –Record the total percentage, of all the albacore caught, that have gillnet markings on them.

Catch Data

Species Name: Record the common name of the species caught. If more species or individuals are caught than there are lines for, record the data on another Catch Data Tally Sheet.

Species Code: Enter the three digit species code from the Species Code list for all fish and invertebrates. Note that there are codes for unidentified and other identified animals.

Units: Record the units involved during the measurement of the total catch. This is only performed while observing in the purse seine fishery.

1. Ton- if the catch is recorded in tons
2. Pounds- if the catch is recorded in pounds
3. Single- if only individuals are counted and no weight is recorded. This will be a whole number.

Total: Record the total number of individuals of each species caught in the net.

Disposition: Indicate the condition and fate of all individuals by recording the number of individuals in each of the following categories:

Kept - any part of the fish kept by the fishermen for sale or personal consumption.

Returned - individuals of any species that are returned to the environment, retained by the observer for processing, or fall out of the net.

Alive - Alive indicates that the animals swam away when released from the gear with minimal or no visible signs of physical damage. In the case of invertebrates, the animal should show obvious signs of muscular activity.

Dead - Dead indicates that the animal does not swim away after release from the net. There is no visible muscular activity and the animal may be stiff or limp (freshly dead).

Unknown - The animal was returned but the observer is unable to determine whether it was alive or dead, or the animal was returned in a condition not described above. Describe any Unknown disposition animals in the Notes Section.

Number Damaged: Record the total number of any fish species damaged (including both shark and marine mammal damage) before removal from the net.

Marine Mammal (MM) Damaged: Record the total number of any fish species damaged by marine mammals before removal from the net.

Notes

Use this section to describe damaged animals, animals with unknown disposition, photo frame numbers, camera number and other notes on the catch.

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Catch Tally Sheet

TRIP NUMBER

		-			-				

SET NUMBER

MM DAMAGE (Y/N)

Number of Albacore With Gillnet Markings *(Albacore Troll / Bait Boat)*

	SPECIES NAME (Fish and Invertebrates)	Sp. Code	**Units 1. Ton 2. Lbs 3. Single Purse Seine Only**	Total	DISPOSITION				DAMAGED	MM DAMAGED
					Kept	Returned				
						Alive	Dead	Unknown		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										

	SPECIES NAME (Fish and Invertebrates)	Sp. Code	**Units 1. Ton 2. Lbs 3. Single Purse Seine Only**	Total	DISPOSITION				DAMAGED	MM DAMAGED
					Kept	Returned				
						Alive	Dead	Unknown		
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										

Notes:

NON-FISH TALLY SHEET

INTRODUCTION

The Non-Fish Tally Sheet is a record by species of the total number of marine mammals, sea turtles and seabirds captured while fishing and their disposition. The data are used to determine the extent of involvement of non-target species in the fishery.

GENERAL INSTRUCTIONS

An entry on this form should be completed for every marine mammal or sea turtle that has been captured. Live marine mammals or sea turtles observed becoming entangled in the net during net pull should also be recorded on a Sighting Record. If a marine mammal or sea turtle is brought aboard the vessel or biopsied alongside the vessel, complete a Life History Form.

Record all captured seabirds.

Describe the identifying characteristics of each animal that is recorded on this form in the Notes Section.

DATA ELEMENTS

Trip Data

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: Sets are numbered consecutively for each observed trip beginning with 01. If you board the vessel in the middle of a trip, begin the number sequence for the observed sets with 01, not with the number of the sets that the vessel has already completed.

Catch Data

Species Name: Record the common name of the species caught. If more individuals are caught than there are lines for, record the data on another Non-Fish Tally Sheet.

Species Code: Enter the two or three letter species code from the Species Code list.

Location in Net Horizontal (*Gillnet Only*): Record the one digit code indicating the animal's position relative to total length of the net as it is retrieved. (Must match location on Gear and Set Form, Net Diagram)

- **1** - Found in the first third of net
- **2** - Found in the middle third of net
- **3** - Found in the final third of net
- **4** - Position unknown or impossible to determine

Location in Net Vertical (*Gillnet Only*): Record the one digit code indicating the animal's position relative to total depth of the net. (Must match location on Gear and Set Form, Net Diagram)

- **1** - Found near the cork line, or in the upper third of the net
- **2** - Found mid-net, in middle third of the net
- **3** - Found near the lead-line, or in lower third of the net
- **4** - Position unknown or impossible to determine

Condition: Record the letter code indicating the condition of each animal removed from the net.

- **D** - An animal removed from the net in a postmortem state. Animals will show a lack of muscular activity and may float passively at or below the water's surface.
- **A** - An animal released from the net that can swim or fly normally. It is likely that the animal will have minor cuts and abrasions from being entangled. Describe the extent of these superficial injuries in the Notes Section.
- **I** - An animal removed from the net with obvious physical injury or with attached netting. An injured animal may lie at the surface, breathing irregularly or swim or fly in an abnormal manner. Fully describe the extent and nature of the injuries in the Notes Section.
- **U** - An animal lost, released, or escaped from the net whose condition you were not able to determine.

Sex: For cetaceans, pinnipeds and otters determine the sex and record an "F" for female or an "M" for male. Record a "U" if you were unable to determine the sex of the animal. In the case of marine mammals, record the reason why sex was not determined in the Notes Section.

Specimen Number: Record your three letter code and consecutive four digit number for each specimen collected whole or dissected. Begin with 0001 and continue serially on successive cruises. All bird specimen numbers will have a "B" recorded after the fourth digit. All turtles will have a "T" recorded between the three letter code and the numbers.

Tag: Record a "Y" if the animal had a tag attached to it, a "N" if there is no tag. Describe in the Notes Section any characteristics of the tag (shape, color, length, number and location on the animal).

The Following Pinger Data is for Gillnet Only

Pinger Distance: Record the distance, in feet, from the entangled animal to the next pinger that comes aboard during net retrieval.

Pinger Type: Record the type of the next pinger that comes aboard during net retrieval.

☼ **1 - Dukane.** ☼ **2 - Other.** ☼ **3 - Fumunda.**

Pinger Location: Record whether the next pinger that comes aboard during net retrieval is attached to the floatline or the leadline of the net.

☼ **1 - Floatline.** ☼ **2 - Leadline.**

Pinger Functioning?: Record (Y/N) whether the next pinger that comes aboard during net retrieval is emitting sound.

Notes

Record in this section:

☼ descriptions of damage to animal;

☼ descriptions of anything unusual, such as markings or scars on the animal, parasites, etc;

☼ tag information;

☼ camera and photo frame numbers; and

Note: Photographs should be taken on the deck of all single dead cetaceans, sea turtles and any specimen which is unidentified and can not be brought back. Dead identified pinnipeds are not to be photographed.

☼ specific identifying characteristics that led to your identification of the animal.

Non-Fish Tally Sheet

TRIP NUMBER

		-			-				

SET NUMBER

	Species Name	Sp. Code	Location (GN Only)		Condition	Sex	Specimen Number	Tag Y/N	Pinger Distance (ft)	Pinger Type	Pinger Location	Pinger Functioning (Y/N)	Notes
			H	V									
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Location
1 - First 3rd/upper 3rd
2 - Middle 3rd
3 - Final 3rd/lower 3rd
4 - Unknown

Condition
D - Dead
A - Alive
I - Injured
U - Unknown

Sex
M - Male
F - Female
U - Unknown

Pinger Type
1 - Dukane
2 - Other
3 - Fumunda

Pinger Location
1 - Floatline
2 - Leadline

	Species Name	Sp. Code	Location (GN Only)		Condition	Sex	Specimen Number	Tag Y/N	Pinger Distance (ft)	Pinger Type	Pinger Location	Pinger Functioning (Y/N)	Notes
			H	V									
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													
32													
33													
34													
35													
36													
37													
38													
39													
40													

Location
1 - First 3rd/upper 3rd
2 - Middle 3rd
3 - Final 3rd/lower 3rd
4 - Unknown

Condition
D - Dead
A - Alive
I - Injured
U - Unknown

Sex
M - Male
F - Female
U - Unknown

Pinger Type
1 - Dukane
2 - Other
3 - Fumunda

Pinger Location
1 - Floatline
2 - Leadline

FISH & INVERTEBRATE MEASUREMENT DATA

INTRODUCTION

The Fish and Invertebrate Measurement Data Form contains information used for length frequency analyses and sex ratio determinations. The form is used to collect data only on specifically identified species of invertebrates and fishes.

GENERAL INSTRUCTIONS

Record data on the following species:

- albacore tuna
- bigeye tuna
- bluefin tuna
- skipjack tuna
- yellowfin tuna
- California barracuda
- white seabass
- Pacific bonito
- yellowtail
- opah

- California halibut
- lingcod
- spotted sand bass
- barred sand bass
- kelp bass
- Pacific salmon (all species)
- spiny lobster
- dungeness crab

For albacore troll/baitboat and CPFV data, record the measurements in this data form and only measure the following species: all tuna species, Pacific bonito and Yellowtail

No measurements are taken during purse seine observing.

DATA ELEMENTS
Trip Data

Trip Number: The unique ten digit number assigned by the Logistics Coordinator. In the first block, record "D" for drift. After the first dash, enter "LB" for Long Beach. After the second dash, enter the four digit sequential number.

Set Number: Sets are numbered consecutively for each observed trip beginning with 01. If you board the vessel in the middle of a trip, begin the number sequence for the observed sets with 01, not with the number of the sets that the vessel has already completed. If you board the vessel in the middle of a pull consider that pull set 01.

Measurement Data

Species Name: Record the common name listed on the Species Code list of the fish or invertebrate being processed.

Species Code: Record the three digit code from the Species Code list for each animal listed.

Length: Record the length, to the nearest centimeter, of the following species:

Fork Length (snout to center of tail fork) for:

- Pacific bonito
- yellowtail
- albacore tuna
- bigeye tuna
- bluefin tuna
- skipjack tuna
- yellowfin tuna
- opah

Total Length (snout to tip of tail) for:

- white seabass
- California halibut
- lingcod
- spotted sand bass
- barred sand bass
- kelp bass
- California barracuda
- Pacific salmon (all species)

Carapace Length (rear edge eye socket to carapace end) for:
- spiny lobster

Carapace Width (edge to edge in front of spines) for:
- dungeness crab

See Appendix E in the back of this field manual for an illustrated measurement example on lobsters and crabs.

Sex: Record the sex of all species. Use "M" for male, "F" for female and leave it blank for unknown.

Disposition: Record the one digit code indicating the disposition of fish and invertebrates processed:

☼ **1** - Kept (* not damaged)

☼ **2** - Kept (* damaged)

☼ **3** - Returned dead (* not damaged)

☼ **4** - Returned dead (* damaged)

☼ **5** - Returned alive

☼ **6** - Returned alive (** tagged)

☼ **7** - Finned (sharks only): dorsal, pectoral or other fins removed by fisherman prior to discarding.

☼ **8** - Dispatched (sharks only): shark is intentionally killed by fisherman prior to discarding.

☼ **9** - Returned unknown: animal was returned, but you were unsure of its condition or the condition cannot be classified as alive or dead.

** Note: "damage" refers to damage done to the fish while in the net or on the hook, it does not refer to damage done by the fisherman. Crabs that are crushed by the fisherman and kept are code 1. Fish with bite marks are code 2 or code 4.*

** For sharks - record the presence of any pre-existing tag, regardless of the disposition. Note the tag number and description including color, construction and type.

- **Alive:** The animal swam away with minimal or no visible signs of physical damage. For invertebrates, the animal shows signs of muscular activity.

- **Dead:** The animal does not swim away, floats at or below the surface or sinks. For invertebrates, there is no sign of muscular activity.

- **Unknown:** The animal swims away with cuts, deep abrasions or swim bladder everted. For invertebrates, appendages are missing but muscular activity is present.

Notes: Record anything unusual about the processed animals. Record the frame and camera number of any photographs taken.

Take Notes Here

Fish and Invertebrate Measurement Data

TRIP NUMBER

		-			-				

SET NUMBER

	Species Name	Sp. Code	LENGTH (CM)	SEX	DISP. CODE	NOTES, PHOTO FRAME & CAMERA *
1						
2						
3						
4						
5						
6						
7						
a						
9						
10						
I I						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Disposition Codes

1 - kept, not damaged
2 - kept, damaged
3 - returned dead. not damaged
4 - returned dead, damaged
5 - returned alive
6. returned Alive, tagged
7. fined, shark only
8. dispatched, shark only
9. returned unknown

Sex Codes

M - male
F - female
U - unknown

	Species Name	Sp. Code	LENGTH (CM)	SEX	DISP. CODE	NOTES, PHOTO FRAME & CAMERA *
1						
2						
3						
4						
5						
6						
7						
a						
9						
10						
I I						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Disposition Codes

1 - kept, not damaged
2 - kept, damaged
3 - returned dead. not damaged
4 - returned dead, damaged
5 - returned alive
6. returned Alive, tagged
7. fined, shark only
8. dispatched, shark only
9. returned unknown

Sex Codes

M - male
F - female
U - unknown

SHARK & BILLFISH LIFE HISTORY DATA

INTRODUCTION

Data on these forms are used to establish basic life history parameters for certain species of sharks and billfish. Analysis of these data provides information on sex ratio, sexual maturity, length frequency, fecundity and age.

GENERAL INSTRUCTIONS

Different measurements and samples are required depending on the species processed. An animal is considered processed when requested life history samples are collected, or at least one valid straight-line measurement is taken. Process priority species first, and other species as time permits. Priority species in the drift net fishery are thresher sharks, shortfin mako sharks, and billfish. Rare and uncommon species such as megamouth, large female white and mako sharks have precedence over standard collections.

SHARK and BILLFISH DATA ELEMENTS

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Set Number: The two digit number which corresponds to the set number recorded on the gear and set form which the processed animal was caught.

Species: The common name, listed on the Species Code list, of the shark or billfish being processed. Sharks are recorded at the top of this form and billfish (most commonly swordfish and striped marlin) are recorded in the bottom section.

Code: The three digit code, listed on the Species Code list, which corresponds to the common name of the shark or billfish being processed.

Specimen Number: The assigned three letter code and consecutive four digit number recorded for each shark or billfish that had life history specimens collected. Append an "S" to the specimen number of all sharks and billfish processed.

SHARK LIFE HISTORY DATA

Shark Sampling Protocol

Collect ovaries, fetuses and vertebrae from all pregnant female sharks. Pregnancy is indicated when eggs present in ovary are enlarged and appear yellow and the uterus is enlarged, or when elongated egg capsules are present in the oviduct or uterus. Collect ovaries, uterus and vertebrae from non-pregnant females when the fork length is equal to or greater than the length listed below. Collect vertebrae from all male sharks with fork length equal to or greater than the length listed below. Refer to Appendix B, figures 1a and 1b for diagrams of the male urogenital system, and figures 2a and 2b for female.

Minimum lengths (cm) for collection of life history samples, non-pregnant female or male sharks:

Species	Code	Fork Length (cm)
Blue	167	>= 200
Shortfin Mako	151	>= 200 **
Longfin Mako	938	All
Common Thresher	155	pregnant females only
Bigeye Thresher	147	>= 200
Pelagic Thresher	148	All

Other sharks: Collect photos, biopsies, vertebrae and mature female reproductive material from rare or unusual specimens (including megamouth, white, 6- & 7-gill, hammerhead, prickly).

Collect vertebrae from all pelagic threshers and longfin makos.

** Collect un-opened stomachs, reproductive tracts, vertebrae, and photos from all mako sharks greater than 200 cm fork length. Collect and freeze all whole mako sharks under 60 cm total. Photograph tooth detail and collect sample teeth if possible from these large mako specimens.

***Collect biopsies from all sharks

Shark Data Elements

Sex: Indicate the sex of the specimen by recording an "F" for female or an "M" for male.

Length: Record the fork length, as a straight-line measurement to the nearest centimeter, for all mako (151), common thresher (155) and blue shark (167) specimens processed. When fork length is not possible, record the total and/or alternate (Dorsal 1 to Dorsal 2) length. Record the total, fork

and alternate lengths of all other shark specimens processed. Accurate total or fork length measurements cannot be obtained from sharks after the tail has been removed. Record clasper length for all male sharks. Refer to Appendix B for diagrams of the following measurements:

- **Total length:** Straight-line measurement from the tip of snout to tip of tail.
- **Fork length:** Straight-line measurement from the tip of snout to fork in tail.
- **Dorsal 1-Dorsal 2 length:** Straight-line measurement from **origin** (leading edge) of the first dorsal fin to the **origin** of the second dorsal fin.
- **Clasper length:** For male sharks, straight-line measurement from the tip of the clasper to the crotch between claspers.

Collected Y/N: Record a "Y" if you collected any specimens (then record specimen type in the Notes section). If No specimens were collected, record an "N".

Maturity Data: Record a "Y" for Yes or "N" for No only if you are sure. It is not always easy to determine the proper answer to each of the maturity questions. If you are not sure of an answer or you did not check, leave blank. Refer to Appendix B for diagrams of the male and female urogenital system.

For male sharks:

- If the claspers are calcified, stiff and hard, record a "Y" for yes; if not record a "N".
- If claspers rotate forward with a definite "elbow" action, record a "Y", if the claspers bend forward but do not actually rotate record a "N".
- If sharks are dressed in the field, determine the presence of seminal fluid by milking the seminal vesicle toward the claspers. Record the presence of seminal fluid with a "Y".

For female sharks:

- If developing eggs in the ovary are enlarged and yellow, record a "Y"; if not, record a "N".
- If uterus is enlarged record a "Y"; if not, record a "N".
- If eggs, elongated egg cases, embryos or fetuses are present in the uterus record a "Y"; if not, record a "N".

BILLFISH LIFE HISTORY DATA

Billfish Sampling Protocol

Billfish life history data collection is required for all billfish. Biopsies and photographs should be taken of all sizes of striped marlin, blue marlin, black marlin, sailfish, and shortbilled spearfish. Length measurements of all marlin is considered a high priority, and should be collected whenever possible.

Billfish Data Elements

Length: Obtain the measurements listed below for all marlin. Measure half girth and posterior eye orbit-to-fork length for all swordfish possible. If swordfish have been dressed before collecting measurements, record the cleithrum to fork length. Refer to Appendix B, figure 3 for diagrams of the measurements below:

- **Half-Girth:** Measure from the anterior insertion of the dorsal fin to the anterior insertion of the left pectoral fin. Take the measurement before the fish is dressed.

- **Fork length:** Straight-line measurement from the tip of **lower** jaw to fork in tail.

- **Eye to fork:** Straight-line measurement from the posterior margin of eye orbit to the fork in tail.

- **Cleithrum to fork:** Straight-line measurement from the inside leading edge of the cleithrum to the fork in tail. The cleithrum is the bony structure which anchors the pectoral girdle. It is the bony anterior margin of the body after head removal, and is light in color and slightly concave.

Collected - Y/N: Record a "Y" if you collected any specimens (then record specimen type in the Notes section). If No specimens were collected, record an "N".

Comments: Include any unusual information regarding individual sharks or billfish, their condition (e. g. injuries), appearance, behavior, parasite infestations, reproductive condition, data collection problems or missing data etc. Identify tagged specimens here and record the tagging information. Field notes are encouraged and appreciated.

Shark/Billfish Life History Data

TRIP NUMBER

		-			-				

SET NUMBER

Shark Species	Code	Sex	Lengths (cm)				Collection		Maturity Y/N					
									Males			Females		
		M / F	Total	**Fork**	Dors1 -Dors2	**Clasper**	Y / N	Specimen Number	Claspers Calcified	Claspers Rotate Forward	Seminal Fluid Present	Developing Eggs in Ovary	Enlarged Uterus	Eggs, Capsules or Fetus in Uterus

Billfish	Code	**Half Girth**	Fork Length	**Eye to Fork**	Cleith. to Fork	Collect Y/N	Specimen Number

Comments:

SEA TURTLE LIFE HISTORY FORM

INTRODUCTION

The Sea Turtle Life History Form (STLHF) is used for recording biological data on sea turtles processed by scientific technicians. These data will be used to determine the number, species, size and condition of sea turtles involved in the gillnet fishery in the eastern Pacific. Other data are recorded on the movements and preferred habitats of the various populations of sea turtles. These data are critical to the development of conservation and recovery strategies for these marine reptiles.

GENERAL INSTRUCTIONS

Complete a STLHF every time a sea turtle is caught during fishing operations. You should not expect to be able to identify every turtle, especially at first. If you are not sure of the number of scutes on the carapace, or you cannot take accurate measurements, leave the data blank, or record it as unknown. Take photographs and skin biopsies of all captured turtles.

With a little experience, sea turtles seen close up are generally easy to identify. Refer to the dichotomous key on page 88.

DATA ELEMENTS

Trip Data

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Specimen Number: Record your three letter observer code before the "T" and the three digit consecutive number after the "T". Your turtle specimen numbers in this fishery begin with 001 and continue sequentially.

Date: The date the turtle was processed. Record the last two digits of the year, the two digits representing the month, and the two digits representing the day.

Set Number: Record the set number from the Gear and Set Data; include a leading zero to make this set number three digits.

Latitude: Record the degrees (two digits), and minutes (two digits) of latitude at the time of capture.

Longitude: Record the degrees (three digits), and minutes (two digits) of longitude at the time of capture.

> *Note: If position information is Loran or dead reckoning, record these numbers in the ADDITIONAL COMMENTS section.*

Species: Record the two letter code from the Species Code list which corresponds to the species of the captured turtle in the code box. If you are unsure of the species, leave the box blank.

Identification

Number of Left Costal Scutes: Count the number of costal scutes on the left side of the carapace and record the number in the code box.

Number of Right Costal Scutes: Count the number of costal scutes on the right side of the carapace and record the number in the code box.

Number Vertebral Scutes: Count the number of scutes on the midline of the carapace and record the number in the code box.

Number Inframarginal Scutes: Count the number of scutes on either side of the plastron. If the number of inframarginal scutes on each side differs, enter the higher number in the box, and record the other the back of the form.

Overlapping Scutes: Are there overlapping scutes on the dorsal surface? Record a 1 for yes, 2 for no, or 3 for unknown.

Inframarginal Pores: Are there pores on the ventral inframarginal scutes? Record a 1 for yes, 2 for no, or 3 for unknown.

1 Pair Prefrontal Scales: Does the turtle have one pair of prefrontal scales? Record a 1 for yes, 2 for no, or 3 for unknown.

Lacks Bony Shell: Does the turtle lack a bony shell? Record a 1 for yes, 2 for no, or 3 for unknown.

Dorsal Coloration: What is the dorsal coloration of the turtle? Record a 1 for orange/red, 2 for grayish, or 3 for other/unknown.

Dimensions

Take measurements in centimeters, to the nearest 0.5 cm, using a tape measure, **not** the calipers used for measuring dolphins. Consult the illustrations on the back of the form for guidance. If epibiota affect any of these measurements, record the details on the back of the form.

Carapace Length: Record the distance between the center edge of the nuchal scute and the posterior edge of the carapace, following the curvature of the dorsal center line. If there is a notch between the two posterior marginal scutes, measure the distance to the rear most point of the scutes. For turtles with a keel running down the center of the carapace (leatherbacks, and juvenile olive ridleys and loggerheads), measure to one side of the median keel, not on top of it.

Carapace Width: Record the maximum distance between the lateral edges of the carapace, measured over the curvature of the shell.

Tail Length: Record the distance between the posterior most point of the carapace and the tip of the tail. If the stretched tail does not extend beyond the carapace, enter "0000".

Condition of Turtle

Record in the code box the number corresponding to the fate of the turtle. In the notes section, record specific notes about any damage to the turtle.

Previously Dead [1]: The turtle was already dead when it was sighted or captured.

> *Note: A **previously dead** turtle will usually have rotten tissue around the eyes and vents, and it may be bloated and foul smelling. It also may have sloughing scutes and scales.*

Released Unharmed [2]: You observed the turtle returned to the sea alive and uninjured. This could apply to entangled sea turtles.

Released Injured [3]: The turtle was injured as a result of fishing operations, or by vessel personnel. "Injured" is an animal removed from the gear with obvious physical injury or with gear attached.

Killed Accidentally [4]: The turtle died due to injuries incurred during fishing operations, or was returned to the sea while comatose.

Escaped [5]: You observed the turtle leaving the gear or deck unaided after capture or entanglement, with no apparent injuries.

Treated as Catch [6]: The turtle was not previously dead and was sacrificed for market, table, or other use.

Other/Unknown [7]: The final fate of the turtle involved in the set is unknown or whose condition after leaving the gear or deck was unobserved.

Describe Any Injuries: If you make any notes in this section of the form, record a 1 for yes in the code box; if not, record a 2 for no.

Photos Taken? If you took photographs of the turtle, record a 1 for yes in the code box; if not, record a 2 for no. Record the camera and frame numbers on the back of the form.

Samples Collected? If you collect biopsies (see Specimen Collection section for Sea Turtle, Biopsy sample instructions), record a 1 for yes in the code box; if not record a 2 for no. Describe the sample taken on the back of the form.

Position in Net (*Gillnet Only*)

Horizontal: In the box, record the one digit code indicating the animal's position in the net relative to the length of the net as it is retrieved.

- **1 -** Found in the first third of the net.
- **2 -** Found in the middle third of net.
- **3 -** Found in the final third of net.
- **4 -** Position unknown or impossible to determine

Vertical: In the box, record the one digit code indicating the animal's position relative to the depth of the net.

- **1 -** Found near the cork line, or in the upper third of the net.

☼ **2 -** Found mid-net, in middle third of the net.

☼ **3 -** Found near the lead line, or in lower third of the net.

☼ **4 -** Position unknown or impossible to determine.

Tags

Tags Present When Captured: If the turtle has been tagged, record a 1 for yes in the code box and record tag numbers in the six digit code boxes. Right justify tag numbers; leading zeroes are not necessary. If there are no tags on the turtle, record a 2 for no, or a 3 for unknown.

Tag Type: If the tag is metal, record a 1 in the code block. If the tag is plastic, record a 2.

Tag Number: Record the tag number of any tag found on this turtle.

Tags Removed: Did you remove the tag? Record a 1 for yes, 2 for no. Only unreadable tags or those that are about to fall off should be removed. Tags may also be removed from dead turtles.

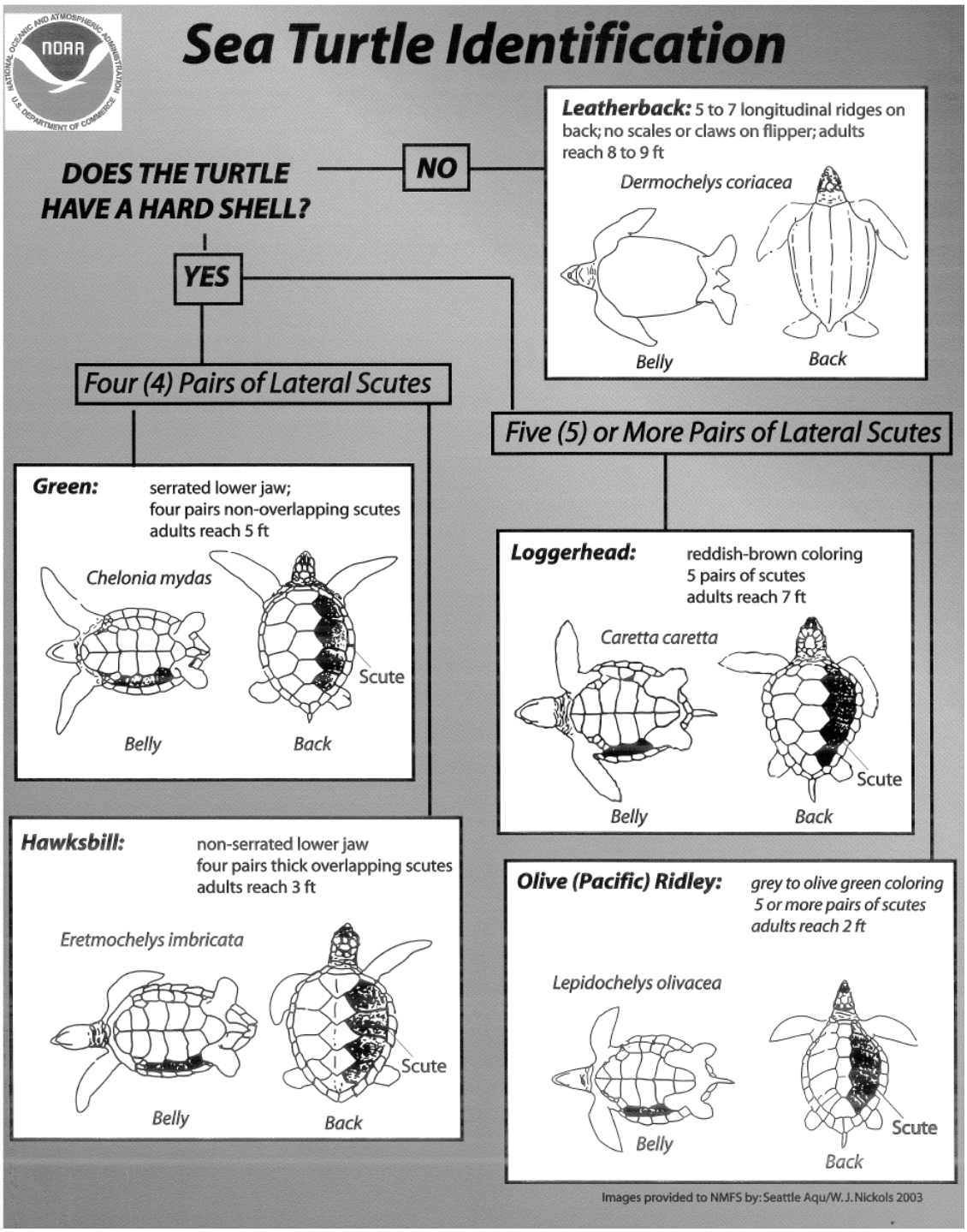
Address: On this line, print the return address on the tag(s).

Tags Applied By Observer: Did you apply a tag(s) to the turtle? Record a 1 for yes, 2 for no.

Tag Type: If the tag is metal, record a 1 in the code block. If the tag is plastic, record a 2.

Tag Number: Record the tag number of any tag you attached to this turtle.

SEA TURTLE DICHOTOMOUS KEY



NOAA

SEA TURTLE
LIFE HISTORY FORM

U.S. DEPT. OF COMMERCE

SET #

DATE (YYYY, MM, DD)

TRIP ___-___ ____ SPECIMEN ___T___

LATITUDE ____N____ LONGITUDE ____W____

SPECIES:

OLIVE RIDLEY [LV] GREEN / BLACK [CM] LEATHERBACK [DC]
HAWKSBILL [ET] LOGGERHEAD [CC] UNIDENTIFIED [LIT]

IDENTIFICATION:

NUMBER OF:
LEFT COSTAL SCUTES
RIGHT COSTAL SCUTES
VERTEBRAL SCUTES
INFRAMARGINAL SCUTES

OVERLAPPING SCUTES? YES[1] NO [2] UNK[3]
INFRAMARGINAL PORES? YES[1] NO [2] UNK[3]
I PAIR PREFRONTAL SCALES? YES[1] NO [2] UNK[3]
LACKS BONY SHELL? YES[1] NO [2] UNK[3]
DORSAL COLORATION: ORANGE / RED [1] GRAYISH [2] UNK / OTHER [3]

DIMENSIONS (cm):

CARAPACE LENGTH (curved) ___.
CARAPACE WIDTH (curved) ___.
TAIL LENGTH ___.

POSITION IN NET:

HORIZONTAL
[1] FOUND IN FIRST THIRD OF NET
[2] FOUND IN MIDDLE THIRD OF NET
I 3] FOUND IN FINAL THIRD OF NET
[4] POSITION UNKNOWN

VERTICAL
[1] FOUND IN UPPER THIRD OF NET
[2] FOUND IN MIDDLE THIRD OF NET
I 3] FOUND IN LOWER THIRD OF NET
[4] POSITION UNKNOWN

CONDITION OF TURTLE:

PREVIOUSLY DEAD [1]
RELEASED UNHARMED [2]
RELEASED INJURED [3]
KILLED ACCIDENTALLY [4]
ESCAPED FROM NET [5]
TREATED AS CATCH [6]
OTHER / UNKNOWN [7]

DESCRIBE ANY INJURIES RESULTING FROM INCIDENTAL CAPTURE OR 'OTHER' CONDITION:

YES NO
[1] [2]

TAGS:

1. TAGS PRESENT WHEN CAPTURED: YES NO UNK [1] [2] [3]
PLASTIC [1] METAL [2]
TAG # TAG #
TAG(S) REMOVED? YES NO [1] [2]

ADDRESS: _____

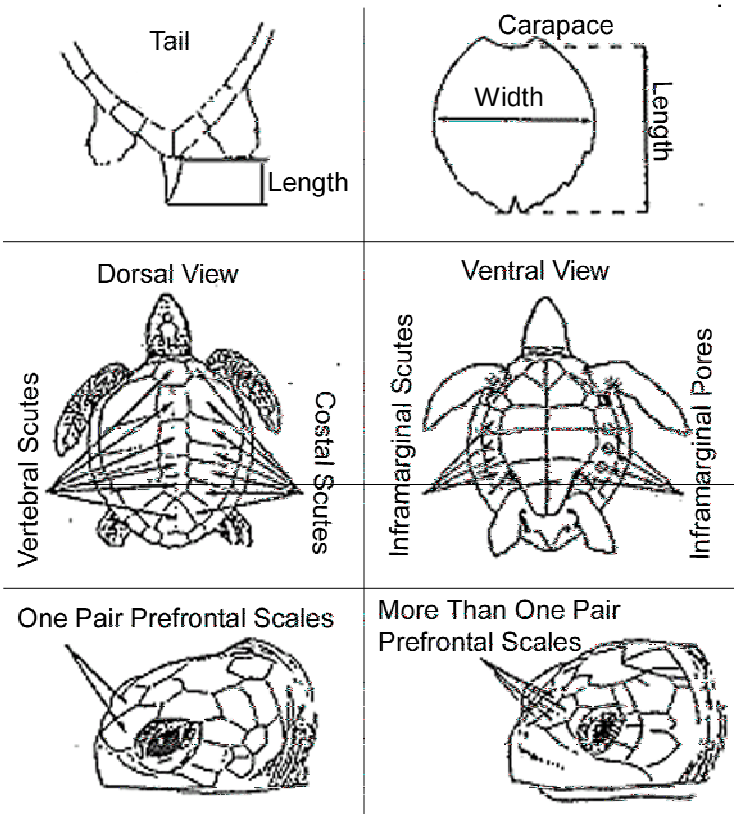
2. TAGS APPLIED BY OBSERVER: YES NO [1] [2]
PLASTIC [1] METAL [2]
TAG # TAG #

PHOTOS Taken?

SAMPLES COLLECTED? YES [1] NO [2] (describe on back)

NOTES: Use back of form for notes on any abnormalities, diseases, epibiota, signs of shark attack and the diagnostic characteristics observed when identifying specimens not brought aboard.

ADDITIONAL COMMENTS



MARINE MAMMAL LIFE HISTORY FORM

INTRODUCTION

The Marine Mammal Life History Form (MMLH) is used to record the biological data from specimens processed by observers. Emphasis is on obtaining baseline reproductive data of coastal marine mammal species for which little information is available. These data are used to estimate age at sexual maturity, birth rates, gestation periods, calving interval, life span and sex ratios. The life history data together with the mortality and population abundance data will be used to ascertain whether changes in population abundance are due to activities of the fishery.

The MMLH is designed for volume specimen processing in the field, allowing the observer to write a minimum of information by checking off blocks in the upper "field" section of the form. The related shaded blocks are coded after review and verification of the forms and the collected specimen parts by lab personnel. Collected specimen materials are processed in the lab, and the data are then recorded in the lower "lab" section of the MMLH.

GENERAL INSTRUCTIONS

Whenever possible, collect the entire carcass of cetaceans, sea otters, Steller sea lions, and fur seals. Assign each animal a specimen number, identify the species (or stock if appropriate), determine sex, measure total length, maximum girth, flipper length (pinnipeds only), and collect a tissue biopsy. Record this information on the MMLH.

If the whole carcass is collected, mark the "YES" box next to carcass under the section "Were these Collected?". Otherwise dissect the specimen and collect the requested specimen material. Dissection techniques may be reviewed in *Small Cetacean Dissection and Sampling:* NOAA-TM-NMFS-SWFC-198.

If you cannot collect a particular sample or measurement, explain why in the ADDITIONAL COMMENTS section.

Complete only the "In Field" portion of the form. Do not mark the shaded boxes.

Dissection priority is as follows:

Sex
Length
Girth
Rear Flipper Length (pinnipeds only)
Carcass
Head
Gonads (ovaries or testes)
Teeth
Tissue Biopsy
Stomach
Blubber
Adrenals
Fetus
Fetus Biopsy
Other - Check special instructions

DATA ELEMENTS

Specimen Number: Record your three letter code and consecutive four digit number for each specimen biopsied, sexed and measured, collected whole or dissected.

Cruise Number: Record the unique ten digit number assigned by the Logistics Coordinator.

Date: Date the net was tended or retrieved. Record the last two digits of the year, the two digits representing the month, and the two digits representing the day.

Set Number: Sets are numbered consecutively for each observed trip beginning with 01. If you board the vessel in the middle of a trip, begin the number sequence for the observed sets with 01, not with the number of the sets that the vessel has already completed.

Latitude: Record the degrees (two digits), minutes (two digits) and tenths of latitude at the time of capture.

Longitude: Record the degrees (three digits), minutes (two digits) and tenths of longitude at the time of capture.

Species: Record the scientific name of the specimen.

Sex: Mark the box representing the sex of the specimen.

Length: For cetaceans, record to the nearest centimeter, the length from the tip of the upper jaw to the notch of the tail fluke. For pinnipeds, record to the nearest centimeter, the length from the tip of the snout to the end of the tail.

> *Note: If the animal cannot be straightened out due to rigor mortis, record the curvilinear length along the animal's backbone.*

Curvilinear: If the length of the animal was determined by a curvilinear measurement mark the "Y" box, if not mark "N".

Girth: For cetaceans, record to the nearest centimeter the girth measured just anterior to the leading edge of the dorsal fin. For *Lissodelphis borealis* and pinnipeds, measure girth at the axilla, just posterior to the insertion of the flippers.

Rear Flipper Length: For PINNIPEDS, record the distance in centimeters from the anterior insertion of the **right** rear flipper to the tip of the first toe.

Lactating: Is there any indication of lactation? Mark the appropriate box. If the specimen is a male, leave this box blank.

Fetus M/F: Mark the appropriate box indicating the sex of any fetus ≥ 25 cm.

Fetus Length: Record in centimeters and tenths the length of any fetus ≥ 25 cm.

> *Note: If the animal cannot be straightened out due to rigor mortis, record the curvilinear length along the animal's backbone.*

Curvilinear: If the length of the fetus was determined by a curvilinear measurement mark the "Y" box, if not mark "N".

Were These Collected?

Mark the box or boxes for each specimen processed indicating which items you have collected. If the question is not relevant to the sex of the specimen, leave the boxes blank.

Carcass: Did you tag and store the whole specimen in the ship's freezer or cooler?

Head: Did you collect, tag and package the head? Leave blank if the whole carcass was collected.

Teeth: Did you remove, tag and store a jaw sample? Leave blank if the head or carcass was collected.

Stomach: Did you remove, tag, package and place the stomach in a cooler or freezer? Leave blank if the whole carcass was collected.

Blubber: Did you collect a 10 cm by 10 cm section of skin, blubber and underlying muscle? (cetacean, dorsal side - pinniped, ventral side) Leave blank if the whole carcass was collected.

Tissue Biopsy: Did you cut a 2 cm by 4 cm section of skin or use a biopsy dart to collect a sample? (cetacean, dorsal body surface - pinniped, rear flipper)

Ovaries: Did you remove the reproductive tract with ovaries intact, tag the left horn of the uterus, and store in the cooler or freezer? Leave blank if the whole carcass was collected.

Fetus: Did you collect a fetus <25cm long? Leave blank if the fetus was ≥ 25 cm or the whole carcass was collected.

Fetus Biopsy: Did you collect a skin biopsy from a processed fetus ≥ 25cm?

Testis: Did you remove, tag and store the right testis with epididymis? Leave blank if the whole carcass was collected.

Adrenals: Did you collect the adrenal glands from this specimen? Leave blank if the whole carcass was collected.

Other: Did you collect any items not specifically listed? Describe what you collected in the ADDITIONAL COMMENTS section. Leave blank if the whole carcass was collected.

Photos: Did you take any photographs of this specimen? Record the camera and frame numbers in the ADDITIONAL COMMENTS section.

Identification

Diagnostic Characteristics: List at least five of the diagnostic characteristics you used to identify this animal.

Sketch: Sketch the features you saw and used to identify this animal.

ADDITIONAL COMMENTS: Use this section to record any supplemental information pertinent to this specimen.

MARINE MAMMAL LIFE HISTORY FORM

SPECIMEN # (1–7)

NOAA FORM 88-

CARD 1 | CRUISE # (8–9, 11, 13–16) | YR (17) MO (19) DAY (21) | SET # (23) | LATITUDE (25–29) | N/S 1 (30) | LONGITUDE (30–36) | E/W 2 (37)

SPECIES: _____ (38–39) SEX: M [ ] F [ ] 40

LENGTH (cm) (41–44) CURVILINEAR? Y [ ] N [ ] 45 GIRTH (cm) (46–49) FLIPPER LENGTH (cm) (50–52)

LACTATING?: Y [ ] N [ ] 53 FETUS: M [ ] F [ ] 54 FETUS LENGTH (cm) (55–58) CURVILINEAR? Y [ ] N [ ] 59

WERE THESE COLLECTED? :

	YES	NO			YES	NO			YES	NO		
CARCASS	[ ]	[ ]	60	HEAD	[ ]	[ ]	61	TEETH	[ ]	[ ]	62	
STOMACH	[ ]	[ ]	63	BLUBBER	[ ]	[ ]	64	BIOPSY	[ ]	[ ]	65	
OVARIES	[ ]	[ ]	66	FETUS	[ ]	[ ]	67	FETUS BIOPSY	[ ]	[ ]	68	
TESTIS	[ ]	[ ]	69	ADRENALS	[ ]	[ ]	70	OTHER	[ ]	[ ]	71	
PHOTOS	[ ]	[ ]	72									

COMMENTS: _____

DIAGNOSTIC CHARACTERISTICS:

1
2
3
4
5

SKETCH THE ANIMAL:

N FIELD ↕ LAB

CARD 2

8	9 TOTAL WEIGHT (gm)	15 L GONAD w/epi (gm)	21 L GONAD w/o epi(gm)	27 R GONAD w/epi (gm)	33 R GONAD w/o epi(gm)	39 Ln (mm) RIGHT TESTIS	SG	E

44 TUBULE DIAM (µm)	47 FOLL DIAM (mm)	50 CL	51 53 55 C.L. DIAMS. (mm)	57 1 59 2 61 3 63 4 65 5 67 6 C.A. IN LEFT OVARY	69 1 71 2 73 3 75 4 C.A. IN RIGHT OVARY

CARD 3

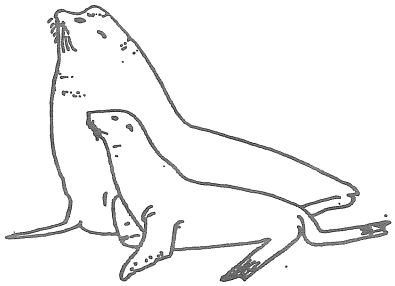
8	9 5 11 6 CA. IN RT. OV.	13 CA (L)	15 CA (R)	17 TOT CORP C.A.+C.L	19 PG	20 FETUS WEIGHT (gm)	26 MD	27 GLGs	30 1 33 2 ADRENAL WTS (gm)

C.A. diams. (mm) by Type

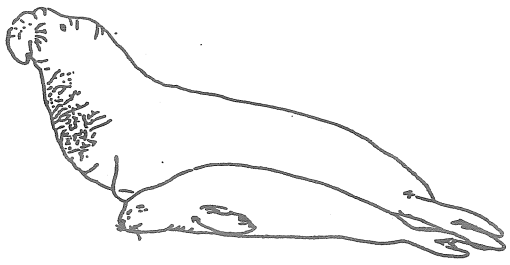
1	2	3	4	5	6

NOTES :

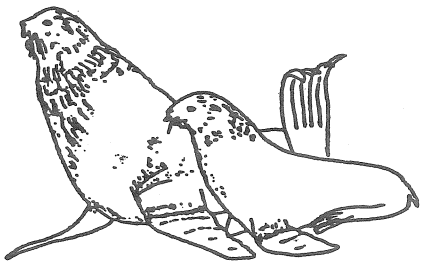
Steller Sea Lion
(Eumatopias jubatus)
M. to 13'/1800#; F. to 9'/600#; external ear flaps; long foreflippers; gap between 4th and 5th post canine teeth; short, stiff hair, brown to blonde; no distinct sagittal crest.



California Sea Lion
(Zalophus californianus)
M. to 8'/800#; F. to 6'/600#; external ear flaps, long foreflippers; M. prominent sagittal crest-light top knot; short, stiff hair, dark brown to light tan.



Northern Elephant Seal
(Mirounga angustirostris)
M. to 16'/4000#; F. to 10'/2000#; M. large, pendulous nose; F. "roman nosed"; short foreflippers; hind flippers angled backwards; 1st and 5th hind toes noticeably longer than others; minute ear hole; 4 incisors upper jaw.



Northern Fur Seal
(Callorhinus ursinus)
M. to 7'/650#; F. to 5'/130#; very long hind flippers; short, pointed snout; fur on foreflippers stops abruptly at wrist; soft underfur/course guard hairs; external ear flaps.

Guadalupe Fur Seal
(Arctocephalus townsendi)
M. to 8.5'/650#; F. to 6'/270#; very long hind flippers; fur extends onto foreflippers; "collie-like" face-dished in profile; soft underfur/course guard hairs; external ear flaps.

Harbor Seal
(Phoca vitulina)
M./F. to 6'/300#; spotted/blotchy coat-variable coloration; short foreflippers; hind flippers angled backwards; large ear hole; sharp nails near ends of toes; round head; 6 incisors upper jaw.

ADDITIONAL COMMENTS: _____

SPERM WHALE INTERACTION FORM

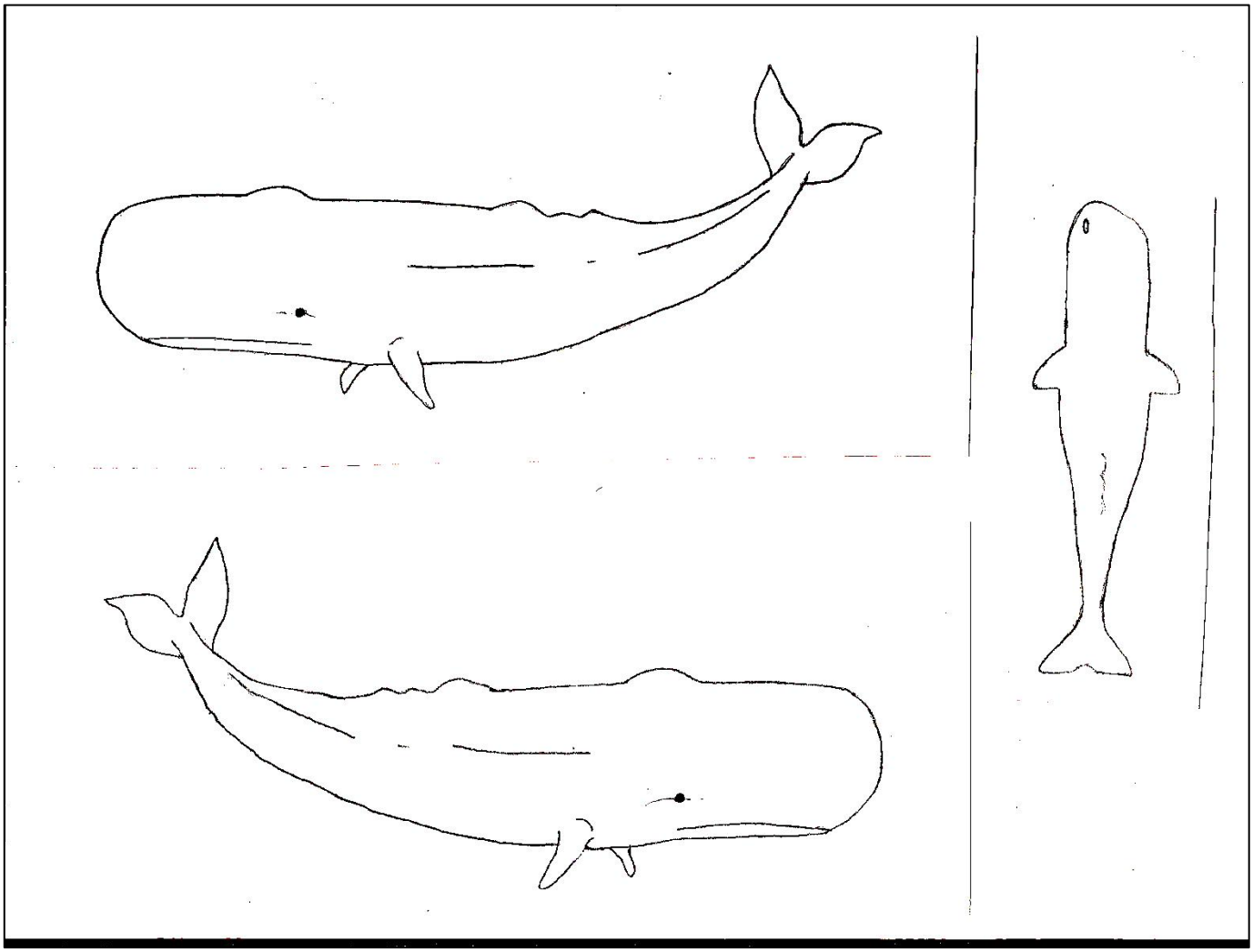
TRIP # _ _ _ _ _ _ _ _ SET # _ _ SPECIMEN # _ _ _ _ _ _ _ _

Circle YES, NO or UNK (Unknown)

1. Was more than one sperm whale entangled? YES NO UNK
2. Is the sperm whale dead? (If YES, Skip to # 9) YES NO UNK
3. Did live animal self-release? YES NO UNK
4. Was human intervention required for live animal release? YES NO UNK
5. Gear left on animal after release? YES NO UNK
   (If YES, go to #6 and #7, if NO skip to #8)
6. a. Gear Loosely wrapped? YES NO UNK
   b. Visible gaps between the gear and body? YES NO UNK
   c. Does gear move when the whale moves? YES NO UNK
7. a. Gear tightly wrapped? YES NO UNK
   b. Does it indent the skin? YES NO UNK
   c. Can whale swim or move? YES NO UNK
   d. Is whale having trouble moving? YES NO UNK
   e. Is appendage near the gear discolored? YES NO UNK
8. a. Are there any lacerations on the whale's body? YES NO UNK
   b. Are there multiple lacerations? YES NO UNK
   c. How Many? :_____
   d. Is/are the laceration(s) old (See instructions for description)? YES NO UNK
      (If YES or UNK, Skip to #9)
   e. Is/are the laceration(s) caused by the gear? YES NO UNK
      (If NO, Skip to #9)
   f. Is skin removed or damaged at the site of the laceration(s)? YES NO UNK
   g. Is blood visible? YES NO UNK
   h. Is blubber visible? YES NO UNK
   i. Provide an estimate of how deep the laceration(s) is/are in inches. _____
   j. Is/are the laceration(s) penetrating the body? YES NO UNK
   k. Is bone visible? YES NO UNK
   l. Is the bone damaged? YES NO UNK.
   m. Is bone damage caused by laceration? YES NO UNK
   n. Is a flipper, dorsal fin, or fluke partially severed or missing? YES NO UNK

SPERM WHALE INTERACTION FORM

9. Draw and describe gear, lacerations and other injuries below:



Describe the interaction with the sperm whale including (gear, lacerations and other injuries):

SIGHTING RECORD

INTRODUCTION

This form is used to record sightings of **live** marine mammals, turtles and protected seabirds and to document any interactions between these animals and the fishing vessel or gear. It is not used to record seabird sightings, with one important exception. Any and all sightings of **Brown Pelicans** (during fishing activity only) are recorded on the form. This form should also be used to document any interactions between **Brown Pelicans** with the fishing gear. Documentation of marine mammal, turtle and pelicans with fishing gear and vessels is used to quantify incidental or intentional take of these animals. These data are also used for analyses of distribution.

Interaction data are high priority items. However, documentation of interactions should not compromise the data you collect on marine mammals and turtles captured by the gear.

Marine mammal, turtle and protected seabird sighting data for animals not interacting with the gear or vessel are low priority. Do not allow searching for marine mammals to interfere with observing fishing activities or documenting interactions between animals and the gear.

GENERAL INSTRUCTIONS

This form documents an interaction or sighting involving as many as three species of animals. If several species are in the area, but do not form a group, they should be treated as separate sightings or interactions. In this case, complete a separate data form with a unique sighting number for each cohesive group of animals. If the sighting or interaction involves more than three species, use additional forms as needed. In this case, record the same sighting number on each additional form.

Sighting

A sighting is the initial observation of a single marine mammal or turtle or a group of marine mammals or turtles. A group is defined as an association of animals behaving in a similar or unified manner. Groups may contain several different species of animals engaged in similar behaviors or traveling together (e.g. a school of dolphins traveling as a cohesive group in the same direction; a number of sea lions and white-sided dolphins milling and feeding together over the same area; or a diffuse group of Risso's dolphins traveling in the same direction or milling over the same general area).

Separate sightings may include situations where distinct groups of animals pass each other or cross paths during their individual activities. Defining a sighting can be very subjective at times, especially if animals are moving between groups or groups are splitting and fusing. Generally, in these situations, you would begin another sighting form if a new, distinct group of animals came into play. With experience, you will be able to sense cohesiveness within marine mammal groups.

Turtles infrequently associate in groups. If several turtles are visible in the same area, classify them as a single sighting or interaction and describe the association in the Narrative Section.

Brown Pelicans will frequently be at the docks, in the harbor or you may see them on the way to the fishing ground. If the gear is not in the water and fishing is not occurring, do not report these sightings. Brown Pelican sightings should only be reported while the fishing gear is deployed.

Interaction

An interaction occurs when marine mammals, turtles or protected seabirds come within 100 meters of the boat or net. In the situation where a sighting becomes an interaction, the sighting and the interaction are considered one event. Evidence of animals interacting with the gear or catch includes: observation of animals at the net; animals stealing fish from the net; and evidence of fresh marine mammal damage to the catch. Use as many data forms as necessary to document the event; all forms receive the same sighting number.

DATA ELEMENTS

Trip Number: The unique ten digit number assigned by the Logistics Coordinator.

Sighting Number: The consecutive two digit number corresponding to this sighting or interaction. Begin with sighting 01 on each observed trip.

Date: The date this sighting or interaction occurred. Record the four digits of the year, the two digits representing the month, and the two digits representing the day of the month.

Set Number: This set number is the same as the set number recorded on the Gear and Set Data form for this set. If the vessel activity is other than net retrieval, leave this field blank.

Position: The position of the vessel at the time of the sighting. If the net is being retrieved, the position may be obtained from the Gear and Set Data form. Record the degrees (two digits), minutes (two digits), and tenths of a minute (one digit) of latitude. Record the degrees (three digits), minutes (two digits), and tenths of a minute (one digit) of longitude. If latitude and longitude are not

available on board the vessel, use the Narrative Section to record information which will allow you to determine the position later at the field office.

Loran: If latitude and longitude are not available, record the loran readings for this sighting on the line below the prompt.

Time Begin: Record the local 24 hour time when the interaction or sighting begins. If a sighting becomes an interaction, record the time at which the sighting became an interaction in the Narrative Section.

Time End: Record the local 24 hour time when the interaction or sighting ends.

Vessel Activity: Record the activity of the vessel at the time of sighting:

- **1 -** Net Retrieval - During net retrieval only. Must have a set number.
- **2 -** Net Set - During net setting or while net is set.
- **3 -** Drifting - Drifting, not fishing.
- **4 -** Motoring
- **5 -** Other. Describe any other activity in the Narrative Section.
- **6** – Trolling – Vessel is actively trolling with jigs
- **7** – Pole and Line Fishing – Vessel is actively fishing with pole & line

Gear Encounter: If you observe behavior that would lead you to believe the species recorded above is interacting with the gear or catch, record a "Y" for yes in this box; if not, record an "N" for no.

Closest Distance to Vessel: Record in meters, the closest distance any animal came to the vessel during the time of the sighting or interaction.

Closest Distance to Gear: Record in meters, the closest distance any animal came to the fishing gear during the time of the sighting or interaction.

Deterrents

Firearm: If the vessel operator uses any firearm as a deterrent, record a "Y" for yes; if not, record an "N" for no. Describe the use of this deterrent and the animal's reaction to it in the Narrative Section.

Seal Bomb: If the vessel operator uses seal bombs as a deterrent, record a "Y" for yes; if not, record an "N" for no. Describe the use of this deterrent and the animal's reaction to it in the Narrative Section.

Other: If the vessel operator uses any other form of deterrent, record a "Y" for yes; if not, record an "N" for no. Describe the use of this deterrent and the animal's reaction to it in the Narrative Section.

Species 1

Species Name: Record the common name of the first species observed. If this is not known, print "unidentified" coupled with the closest taxonomic classification you are certain pertains to the animal (e.g., unidentified phocid).

Species Code: Record the code from the Species Code list.

Best Estimate: Record your best estimate of the number of individuals of this species (four digits).

High: Record your high estimate of the number of individuals of this species (four digits).

Low: Record your low estimate of the number of individuals of this species (four digits).

Injured: Record the number of individuals of this species (three digits) that are clearly injured as a result of an interaction.

> *Note: An injured animal is one that has sustained an obvious physical injury. Levels of injury may range from potentially life-threatening (cranial gunshot wound) or serious (profuse bleeding, loss of limbs, loss of an eye, gunshot wound) to moderate (limited bleeding with associated tissue loss, broken limbs). An injured animal may lie at the surface, breathing irregularly. It may appear to swim abnormally, listing to one side, or weakly swimming at or near the water's surface. Animals that are released from the net with netting attached should be classified as injured. If you categorize an animal as injured, describe its injuries in the Narrative Section.*

If the animal releases itself or is released from the net by fishermen and can swim normally, it should not be recorded as injured. It is likely that the animal will have minor cuts and abrasions from entangling in the net. Describe the extent of these superficial injuries in the Narrative Section.

Dead: Record the number of animals of this species that are clearly dead as a result of this interaction.

Note: Any animal in an obvious post mortem state is defined as dead. Dead animals will show a lack of muscular activity and may float passively at or below the water's surface. Marine mammals and turtles are very robust and have a tremendous healing capacity. Unless you actually see an animal die of its injuries, classify it as injured.

List Identifying Characteristics: List all identifying characteristics you saw which led to your identification of this species.

Sketch Identifying Characteristics: Sketch the animal using the identifying characteristics you observed to make your species identification.

Narrative

Describe concisely the behavior of the animals during the sighting or interaction. In the case of an interaction, describe carefully the use of any deterrents. Include times of particular events, or observations. Use this section to explain any information that you feel could not be adequately documented in the coded information on the front of the form.

Species 2

Species Name: Record the common name of the second species observed. If this is not known, print "unidentified" coupled with the closest taxonomic classification you are certain pertains to the animal (e.g., unidentified phocid).

Record data elements Species Code, Best Estimate, High, Low, Injured and Dead as described for Species 1 above.

List Identifying Characteristics: List all identifying characteristics you saw which led to your identification of this species.

Sketch Identifying Characteristics: Sketch the animal using the identifying characteristics you observed to make your species identification.

Species 3

Species Name: Record the common name of the second species observed. If this is not known, print "unidentified" coupled with the closest taxonomic classification you are certain pertains to the animal (e.g., unidentified phocid).

Record data elements Species Code, Best Estimate, High, Low, Injured and Dead as described for Species 1 above.

List Identifying Characteristics: List all identifying characteristics you saw which led to your identification of this species.

Sketch Identifying Characteristics: Sketch the animal using the identifying characteristics you observed to make your species identification.

Additional Notes/Sketches

Use this section for notes or sketches that could not be included in the Narrative Section or boxes for diagrams.

Sighting Record

TRIP NUMBER ☐☐-☐☐-☐☐☐☐ SIGHTING # ☐☐ DATE (YYYY MM DD) ☐☐☐☐☐☐☐☐ SET NUMBER ☐☐

Position - Latitude ☐☐ Deg. ☐☐.☐ Min. Position - Longitude ☐☐☐ Deg. ☐☐.☐ Min. Loran: _____

Time Begin ☐☐☐☐ Time End ☐☐☐☐ Vessel Activity ☐

1- Net Retrieval
2- Net Set
3- Drifting
4- Motoring
5- Other
6- Trolling
7- Pole & Line

Gear Encounter (Y/N) ☐

Closest Distance to Vessel ☐☐☐ **Meters** Closest Distance to Gear ☐☐☐ **Meters**

Deterrent(s) Used (Y/N) ☐ **Fire arm** ☐ **Seal Bomb** ☐ Other

---

Species 1 Species Name _____ Sp. Code ☐☐

Best Estimate ☐☐☐☐ High ☐☐☐☐ Low ☐☐☐☐ Injured ☐☐☐ Dead ☐☐☐

List Identifying Characteristics:

_____
_____
_____
_____
_____
_____
_____

Sketch Identifying Characteristics:

Narrative:

_____
_____
_____
_____
_____
_____
_____
_____
_____

Species 2

Species Name _____ Sp. Code ☐☐

Best Estimate ☐☐☐☐ High ☐☐☐☐ Low ☐☐☐☐ Injured ☐☐☐ Dead ☐☐☐

List Identifying Characteristics:

_____

_____

_____

_____

_____

_____

_____

Sketch Identifying Characteristics:

Species 3

Species Name _____ Sp. Code ☐☐

Best Estimate ☐☐☐☐ High ☐☐☐☐ Low ☐☐☐☐ Injured ☐☐☐ Dead ☐☐☐

List Identifying Characteristics:

_____

_____

_____

_____

_____

_____

_____

Sketch Identifying Characteristics:

Addtional Notes / Sketches:

SPECIMEN COLLECTION

GENERAL INSTRUCTIONS

Process dead animals in the following order: cetaceans, pinnipeds, sea otters, sea turtles, sea birds, fish and invertebrates.

Specimen numbers are to be assigned only to specimens that have been sexed and measured or biopsied while in the water.

The priorities of sample collection are as follows:

- ☼ Collect data on sex, length, girth, flipper length from all marine mammal specimens.
- ☼ Collect the entire carcass of cetaceans, sea otters, Steller sea lions, and fur seals.
- ☼ If the entire carcass cannot be collected, bring back the heads of cetaceans, Steller sea lions, and fur seals.
- ☼ Collect gonads, teeth, tissue biopsy, stomachs, blubber and underlying muscle, adrenal glands from all dissected marine mammals.
- ☼ Collect fetus <25 cm and skin biopsy from fetus > or = 25 cm.
- ☼ Collect tissue biopsies and photos from all sea turtles. Collect descriptive and tag data on sea turtles. Discard all sea turtles after processing; retain any tags.
- ☼ Discard all seabirds, even if you are unable to identify them.
- ☼ Record fish and invertebrate measurements of the species specified on the Fish and Invertebrate Data Form.
- ☼ Record and collect shark measurements, gonads and vertebrae.
- ☼ Record and collect billfish measurements. Take photographs of striped marlin, blue marlin, black marlin, sailfish, and shortbilled spearfish.

COLLECTION REQUIREMENTS

Each sample is to be individually tagged and labeled. The label is to have the following information: specimen number, species of animal, cruise number, and sample identification (e.g. stomach). If many samples are collected from the same animal and placed into a common plastic bag, ensure that each part is properly tagged and labeled. Label the plastic bag with a large tag clearly stating its contents.

Label whole specimens with tags through the lower jaw, inside the blow hole, and the anus. Carve the specimen number into the carcass if possible.

Straight line body lengths are measured using a measuring stick and calipers; a measuring tape is used for curvilinear body measurements.

Biopsy samples: Collect a section of skin tissue, 2 cm by 4 cm, from each marine mammal and place it into the vial, being sure all tissue is submerged. Leave off as much blubber as possible. Vials contain dimethyl sulfoxide (DMSO). Avoid contact with this solution. Although DMSO is not toxic, it can be an irritant that will penetrate skin and draw other chemicals along with it.

a. Use a fresh blade and gloves for each sample taken to avoid contamination of the samples.

b. Insert a label with the specimen number, cruise number, and species of animal written with a pencil into the collection vial.

c. Label the outside of the vial with a permanent marker.

d. Store at room temperature. **Do Not Freeze.**

Cetaceans

Tag carcasses or samples with the appropriate specimen number. A specimen number is assigned to all animals that are at least biopsied, or measured and sexed, and have data recorded on a life history form. Fetuses are assigned the same specimen numbers as their mothers. Append an "F" to fetal biopsy specimen numbers.

Dissection methods are described in *Small Cetacean Dissection and Sampling: A Field Guide:* NOAA-TM-NMFS-SWFC-198.

Whenever feasible, collect the whole animal. If the whole dolphin or porpoise cannot be retained, retain the head. Do not remove a jaw section and take all other required samples.

If circumstance prohibits collection of the entire head, collect the jaw along with the other required samples.

Pinnipeds

Whenever feasible, collect the entire carcasses of Steller sea lions, northern fur seals and Guadalupe fur seals.

Head: If the entire carcass can not be collected, collect heads from Steller sea lions, northern fur seals and Guadalupe fur seals. Collect heads from all tagged or branded pinnipeds.

Teeth: Collect undamaged the upper and lower canine teeth. To insure that the entire canine root is collected, the jaws should be cut between the 3rd and 4th post- canine (premolar) teeth on both the left and right sides. Another reference point for this cut is just in front of the orbital arch (the eye socket) and angled slightly back. The jaw section can be stored dry or frozen. Do not place the jaw in formalin or alcohol. **Note:** Teeth and jaw samples from cetaceans are collected and preserved using a different method.

Blubber: Collect a 4 inch square section of skin, blubber and underlying muscle from the **ventral** side of the animal. Do not take blubber from the head or limbs. Wrap the sample in aluminum foil (shiny side out) and place in a plastic bag with the specimen label both inside and on the outside. Put the sample in the freezer or cold storage. Do not put the sample in formalin or alcohol.

Stomach: Collect stomachs from all pinnipeds. Make sure the bag is labeled both inside and out with the specimen number. Freeze as soon as possible. Do not store in alcohol or formalin.

Sea Turtles

Biopsy samples: Collect a section of skin tissue, 2 cm by 4 cm, from each sea turtle. Skin dorsal of the hind flippers is the preferred area to biopsy. However, if for some reason it is not possible to sample this region, skin in the ventral pectoral area, at the base of the front flippers, may be used. Place the skin tissue into a Whirl-Pak plastic bag. Add ordinary table salt, being sure to cover all tissue.

a. Use a fresh blade and gloves for each sample taken to avoid contamination of the samples.

b. Insert a label with the specimen number, cruise number, and species of animal written with a pencil into the collection vial.

c. Label the outside of the Whirl-Pak bag with a permanent marker.

SPECIMEN LOG

TRIP NUMBER _____ OBSERVER NAME _____

SET#	SPECIMEN#	SPECIES	SAMPLE TYPE	DATE IN	LOCATION

DATA REVIEW

GENERAL INSTRUCTIONS

Prior to data entry each form should be checked carefully for Vessel Codes, Observer Codes, Port Codes, and Species Codes. When editing at your office, use a blue pencil to cross out the current entry and write in the new one. Explain why the change was made in the margin and initial the form. Do not erase or obliterate the field data and be sure to use a blue pencil.

DATA CHECKS

Check the following data items on the top line of all forms:

Trip Number: Check all data forms to ensure you entered the correct trip number.

Date: Check all data forms to be sure that the date is encoded correctly.

Set Number: Set numbers should begin with the number 01 for a given trip and follow consecutively. Check for missing numbers and duplicates.

Trip Specifications Record

Vessel Name: Verify the spelling of the vessel name.

Vessel Permit Number: Verify the Vessel Permit Number.

State Plate Number: Verify the vessel's State Plate Number.

Port of Departure and Landing: Enter and verify the port code of the port of departure and landing.

Gear and Set Data Form

Percent Net Observed: If you observed the whole net, this should equal 100%. If you only observed a portion of the net, this should equal the percentage observed.

Target Species: Verify the codes and spelling of the target species.

Latitude and Longitude: If latitude and longitude were not available at the time of the set, calculate the position from the Loran readings using the conversion program. Calculate dead reckoning positions from your notes.

Environment: Be sure "In Kelp" was recorded only if there was a kelp bed within 300 ft. "In Kelp" should not be recorded if there was only floating kelp in the area.

Water Depth: Water depth should be recorded in fathoms.

Date: Verify that the month and day are the date the net was set.

Begin Set Time: If you did not observe or were unable to ascertain the time of the setting of the net, leave this field blank.

Begin Pull Time: This is the time observation began even if only a portion of the net was observed.

Soak Total Time: If the net was set overnight, make sure that the total hours are correct.

Ship Activity: Verify the code entered is correct.

Lost Netting: If any netting was lost, check that this code block was completed.

Percentage Net: Verify that the percentage equals 100 or that the total of the sections filled out equals 100.

Net Type: Verify that the code entered represents the type of net observed.

Material: Verify that the code entered represents the type material observed.

Strength: If the operator did not know the twine size or pounds test, this field should be left blank.

Length: If the net is composed of several different gear types, this is not the total length of the net. It is the length of the piece described in this section. Check the other NET CHARACTERISTICS sections to be sure the correct lengths were entered.

Depth: Net depth should be recorded in number of meshes.

Hanging Line Material: Verify that the code used represents the type of material observed.

Mesh Sizes: Verify that the mesh size is entered to the nearest half inch.

Hanging Length: This should be the distance between knots on the corkline to the nearest inch.

Meshes Hanging: This should not exceed two digits. Be sure that dropped meshes are included.

Extender Length: This should be the length of the line joining the corkline to the surface floats.

Catch Tally Sheet

Species Name: Check the spelling of the species name.

Species Code: Verify the species code used.

Total: Recount the hash marks to be sure the total number is accurate.

Disposition: The total of these three fields should equal the total number caught.

Number Damaged: Recount the hash marks to verify the total.

Non-Fish Tally Sheet

Species Name: Check the spelling of the species name.

Species Code: Verify the species code used.

Location: Verify the location in the net with that shown on the net diagram.

Condition: Check that only the codes D, A, I, or U are used.

Sex: Check that only the codes M, F, or U are used.

Specimen Number: Verify the specimen number with the one used on the life history form.

Fish and Invertebrate Measurement Data

Species Name: Check the spelling of the species name.

Species Code: Verify the species code used.

Length: This should be in centimeters and not exceed three digits.
Sex: Only an "M", "F" or a "U" should be entered.

Disposition Code: Verify that the disposition code reflects what was done with the fish.

Shark and Billfish Life History Data

Species Name: Check the spelling of the species name.

Species Code: Verify the species code used.

Sex: Only an "M" , "F" or a "U" should be entered.

Length: All lengths should be in centimeters.

Collection: When Y appears in the first column a specimen number must appear in the second. The specimen number must end in an S for sharks and billfish.

Maturity: The fields should only be filled for one sex and should not be filled with N's if the animal was not examined.

Check that the number of sharks and billfish processed is less than or equal to the total recorded for each species on the Catch Tally Sheet.

Sea Turtle Life History Form

Verify that a Sea Turtle Life History Form exists for every instance of sea turtle entanglement.

Specimen Number: Verify that the specimen is correctly numbered in the sequence for turtles.

Position: Verify the position data with that recorded on the Gear and Set Data Form.

Identification: Check that the boxes are completely filled out.

Dimensions: Check that the boxes are completely filled out and that measurements are in centimeters.

Condition: Check to see that the fate of the turtle has been recorded.

Marine Mammal Life History Form

Specimen Number: Check that the number is sequentially correct.

Position: Verify the position data with that recorded on the Gear and Set Data Form.

Species Name (scientific): Check the spelling of the species name.

Sex: Verify that only one box is checked.

Length: This is the length measured to the nearest centimeter. Estimates belong in the ADDITIONAL COMMENTS section. Was the measurement curvilinear?

Girth: Check that measurements are in whole centimeters.

Rear Flipper Length (pinnipeds only): Verify that measurements are recorded in centimeters.

Fetus: Was fetus data collected?

Were These Collected?: Check to see that all required boxes are correctly marked.

Diagnostic Characteristics: Check that the characteristics of this specimen are listed.

Sketch: Check to see that a sketch of the specimen was completed.

Check the Non-Fish Tally Sheet to ensure that this specimen was recorded there and the Gear and Set Data Form to ensure that location in the net was recorded.

Sighting Record

Sighting Number: Verify that this sighting number is in the proper sequence.

Set Number: A set number should only be entered if vessel activity is "net retrieval".

Position: Verify the position data with that recorded on the Gear and Set Data Form.

Identification: Check that the listed characteristics match the sketch and support the identification.

Vessel Activity: Verify the code used is correct.

Deterrent(s): If deterrents were used, verify the type with your notes.

Species Code: Verify the species code with the species name.

GEAR & MAINTENANCE

Observers are responsible for the safe use and maintenance of equipment issued and accountable for lost or damaged gear. Observer gear is **not** to be left unattended in parked vehicles. The following is a list of the equipment that is issued to observers on each trip. All things on the list will accompany the gillnet observers while other fisheries may only require some of the items.

EQUIPMENT LIST

Form holder: Used as a clipboard and stores extra forms, pencils, etc.

Pencils and waterproof marker: Number two pencils are used on the forms and black test scoring pencils on the specimen tags. The felt tip marker is used for luggage labels.

Data Forms: The forms are printed on waterproof paper.

Click counters: Hand held counters are used to record the numbers of individual species entangled in the net.

Tape measure: Used to measure sea turtles and the girth of cetaceans and pinnipeds; the length of fish (except sharks and billfish), and invertebrates.

Measuring stick: Used with moveable caliper jaws to measure total body length of cetaceans, pinnipeds, sea otters, sharks, and billfish.

Sharpening steel: A sharpening steel is used to maintain a sharp cutting edge on the dissection knife.

Knife: The knife is a sturdy, stainless steel boning knife used in dissections.

Loppers: Used to collect jaw/tooth samples from cetaceans and pinnipeds.

Plastic bags: A variety of plastic bags are issued for gonad, blubber, adrenal gland, stomachs, and cetacean heads.

Aluminum foil: Blubber samples are wrapped in aluminum foil (**shiny side out**).

Cable ties: Cable ties are used to tie off stomachs and secure specimen tags to samples.

Body bags: These are used to bring back whole animals, when possible.

Specimen tags: Tags are used to label specimens whether whole animals, tissue or jaw samples. Use test scoring pencils for labeling specimen tags.

Field guides: To assist with species identification; **stow inside, out of the weather.**

Sea Bag: Used to transport and store observer gear

Safety and foul weather gear: Observers are issued an Immersion Suit and a Type I PFD for use when vessel safety is in jeopardy. Both are equipped with emergency strobe lights. Observers are also issued foul weather gear, boots, and rubber gloves.

EPIRB: An Emergency Position Indicating Radio Beacon.

GPS Unit: A handheld global positioning system will be provided to record latitude and longitude. Make sure spare batteries are available for the unit.

Camera: A disposable 35 mm camera is issued for photographing marine mammals, turtles, and specimens which can not be identified or brought back for positive identification.

Five gallon bucket: Used to store and transport the observer's frozen specimens.

Binoculars: A pair of 7x50 binoculars is supplied to aid the observer in marine mammal sightings and identification.

Watch: Issued to ensure that time related data entries are accurate.

Biopsy kit: Used to collect tissue samples. The kit contains a knife handle, a supply of clean blades, a marker for labeling, DMSO vials, and specimen labels.

*****

GEAR MAINTENANCE

It is the observer's responsibility to maintain field gear.

Exposure to seawater promotes corrosion and deterioration. Routine use of 3-in-1 oil or lubricating spray on the metal and moving parts of your equipment will help greatly to keep your gear in operating condition. **Please use them.**

Keep caliper jaws and meter sticks clean and dry. Calibrate with the measuring tape and adjust the stationary end of the caliper jaws as necessary.

Those items that have moving parts are susceptible to rust and corrosion. Tape measures, calipers, and loppers should be rinsed and wiped dry.

Life jackets, clipboards, knives, etcetera should all be cleaned with soap and water and then dried thoroughly. Foul weather gear can be washed in cold water on gentle cycle and line dried. Lubricate the zipper of the immersion suit and inspect the strobe light before every trip. Knives should be sharpened upon return from each trip.

The EPIRB is waterproof with is external antenna installed. Salt build-up on the case or exposed parts may be rinsed using fresh water.

Small bags, ties, and gloves are disposable and should be discarded properly after use. Identification guides and other paper goods should be wiped dry and kept inside.

The biopsy kit should be kept organized. Ensure that the lids are securely tightened on all of the vials. Keep the X-ACTO blades clean and dry. Make sure that the knife handle is rinsed with fresh water after each use to prevent corrosion.

Ensure that the camera and binoculars stay dry. If the binoculars get salt water on them, they should be rinsed with soap and water.

If any piece of equipment becomes unusable, the observer should return it to the Logistics Coordinator for a replacement.

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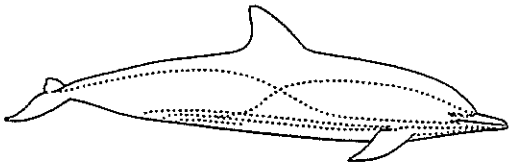
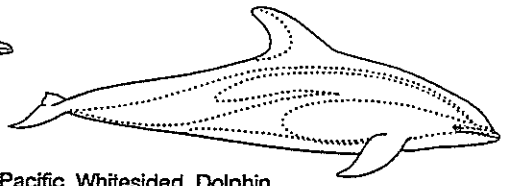
APPENDIX A

The following drawings and diagrams are of external and internal characteristics of cetaceans and pinnipeds. These drawings are for reference while working with the Non-Fish Tally Sheet, the Marine Mammal Life History Form and the Sighting Record.

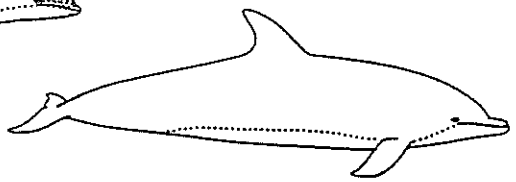
PHYSICAL DESCRIPTIONS OF CETACEANS



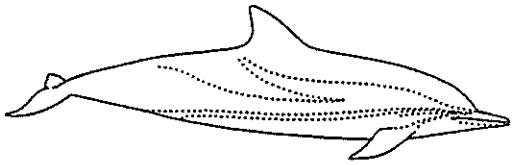
Common Dolphin *(Delphinus delphis)* to 8'; long well defined beak; tall, falcate to triangular dorsal fin midback; dark cape, "hourglass" pattern on side- yellowish anteriorally, gray posteriorly



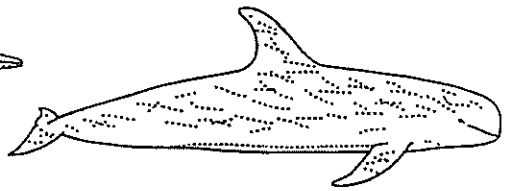
Pacific Whitesided Dolphin *(Lagenorhynchus obliquidens)* to 7.5'; short distinct beak; hooked, bicolored dorsal fin; typically black dorsally with light "suspenders"; light gray thoracic patch, white ventral surface



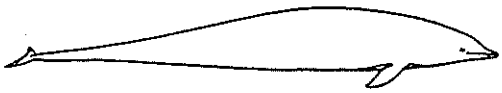
Bottlenose Dolphin *(Tursiops truncatus)* to 12'; short heavy beak; distinct melon; tall, falcate dorsal fin midway down back; generally nondescript coloration; dark dorsally lighter ventrally, "Flipper"



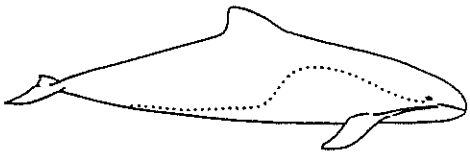
Striped Dolphin *(Stenella coeruleoalba)* to <9'; slender body; long, prominent beak; moderately falcate dorsal fin; black lateral stripes from eye to flipper and eye to anus; white V-shaped 'shoulder blaze' originating behind eye, narrows to a point below and behind the dorsal fin



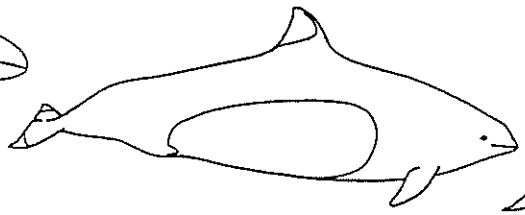
Risso's Dolphin *(Grampus griseus)* to 12'; square-ish head; vertical crease down face; long flippers; prominent dorsal fin midway on back; variable color- black to white, many scars on body, head often white, flippers and fin dark



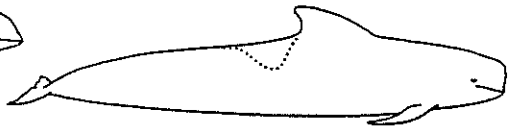
Northern Right Whale Dolphin *(Lissodelphis borealis)* to 9'; no dorsal fin; long, skinny body; small but distinct beak; shiny black with white hourglass pattern on ventral



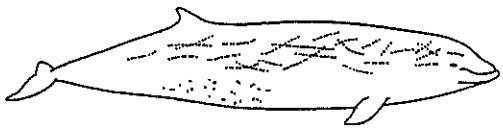
Harbor Porpoise *(Phocoena phocoena)* to 6'; no beak; triangular dorsal fin; no clearly defined coloration pattern- usually dark gray/brown dorsally, fading to gray-white ventrally



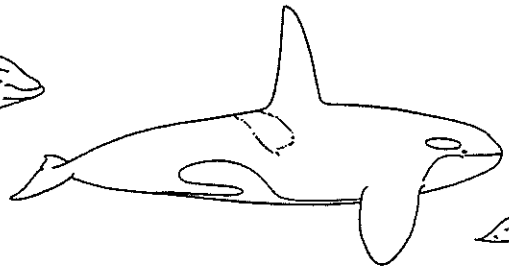
Dall's Porpoise *(Phocoenoides dalli)* to 7'; stocky body; distinctive postanal keel; shiny black with bright white flank patch; white "frosting" on the edges of the dorsal fin and flukes



Pilot Whale *(Globicephala macrohynchus)* to 15'; bulbous head; heavy dorsal fin anterior 1/3 of back; long thin flippers; shiny black color; can have gray saddle patch behind dorsal, gray-white 'anchor patch' on ventral surface

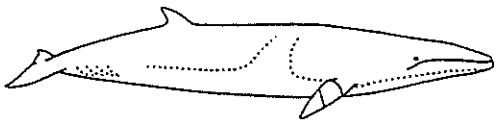


Cuvier's Beaked Whale *(Ziphius cavirostris)* to 24'; small head; "goose-beaked" face; 1 pair throat grooves; small dorsal fin, posterior 1/3 of body; small flippers; color variable, often light dorsally and scarred; may have one pair of teeth-lower jaw



Killer Whale *(Orcinus orca)* to 30'; minimal beak; prominent dorsal fin midway on back; paddle-like flippers; shiny black dorsally, white ventrally; white eye patch, gray saddle behind dorsal fin

Gray Whale *(Eschrichtius robustus)* to 46'; 2 blowholes; mottled gray; patches of barnacles and whale lice on body; dorsal ridge (not fin) posterior 1/3 of body; narrow rostrum; 2-5 deep throat creases



Minke Whale *(Balaenoptera acutorostrata)* to 30'; 2 blowholes; sharp head, medial rostral ridge; tall, falcate dorsal fin- posterior 1/3 of back; black or dark gray dorsally; white flipper band

Mesoplodon Spp. (Genus: *Mesoplodon*) to 18'; small head; distinct beak; no medial notch in flukes; jawline has exagerated arch; 1 pair of throat grooves; small triangular or falcate dorsal fin, just posterior of midback; variable coloration, often scarred; small, elliptical flippers; pair of mandibular teeth, usually erupted in males only

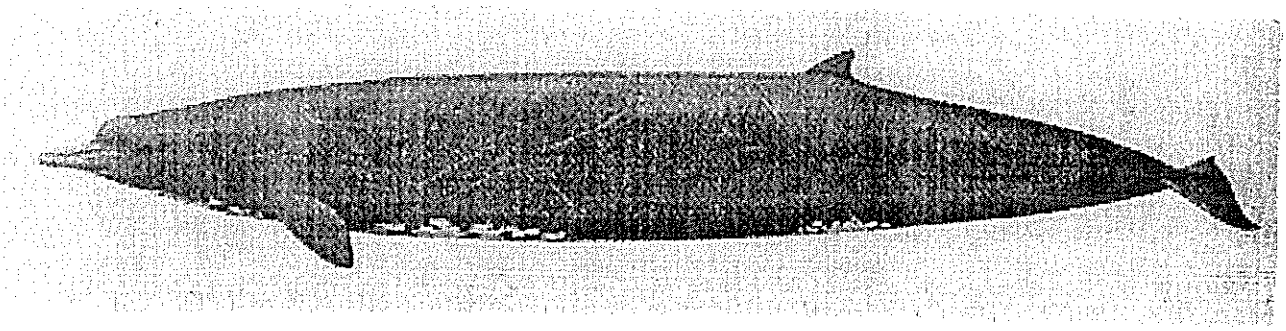


Fig. 1: Baird's beaked whale, *Berardius bairdii.*

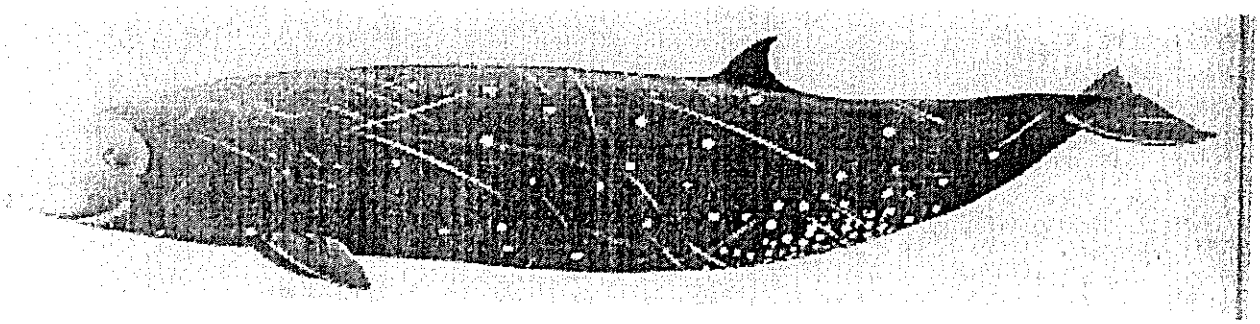


Fig. 2: Cuvier's beaked whale, *Ziphius cavirostris.*

Reproduced from FAO Species Identification Guide. Marine Mammals of the World.

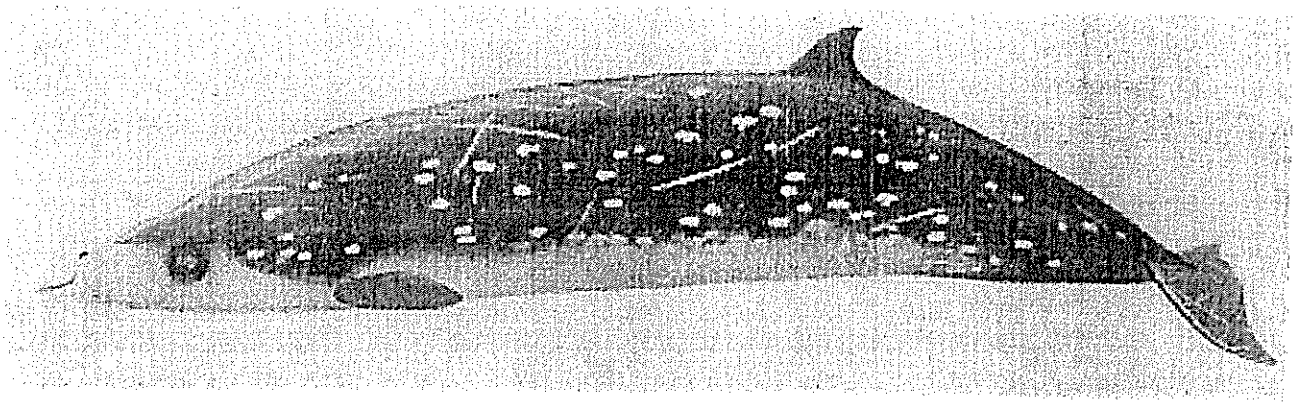


Fig. 3: Blainville's beaked whale, *Mesoplodon densirostris*.

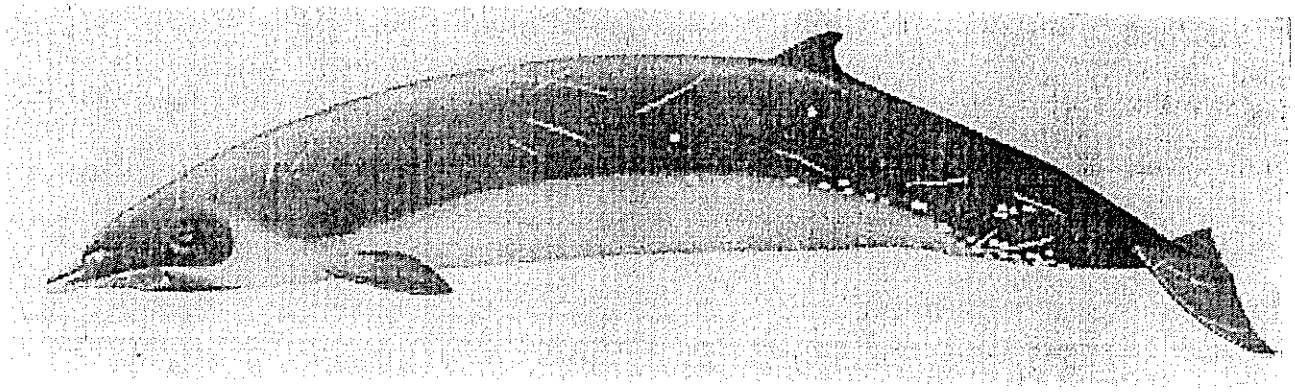
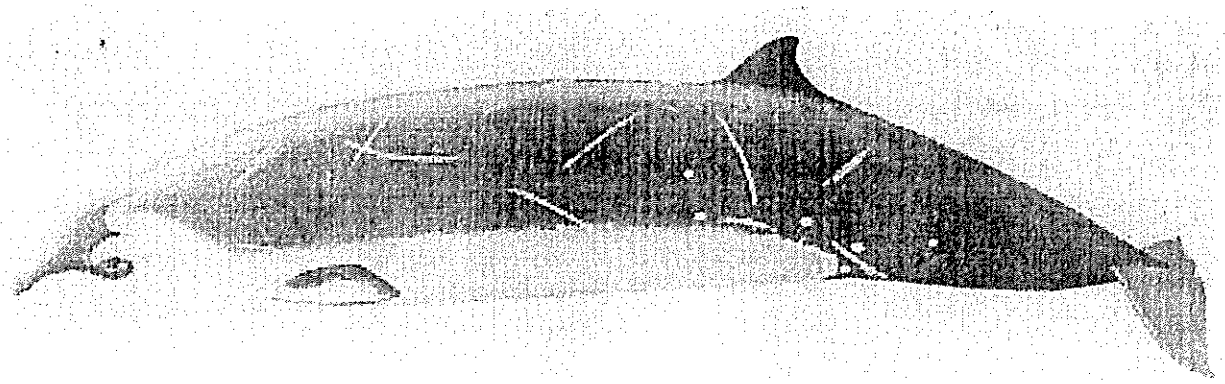


Fig. 4: Ginkgo-toothed beaked whale, *Mesoplodon ginkgodens*.



Reproduced from FAO Species Identification Guide. Marine Mammals of the World.

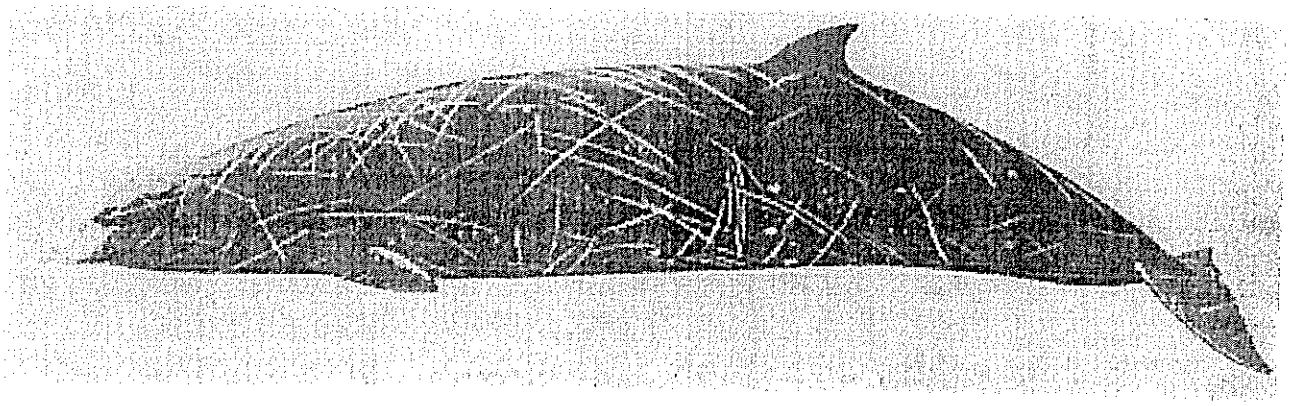


Fig. 6: Hubbs' beaked whale, *Mesoplodon carlhubbsi*.

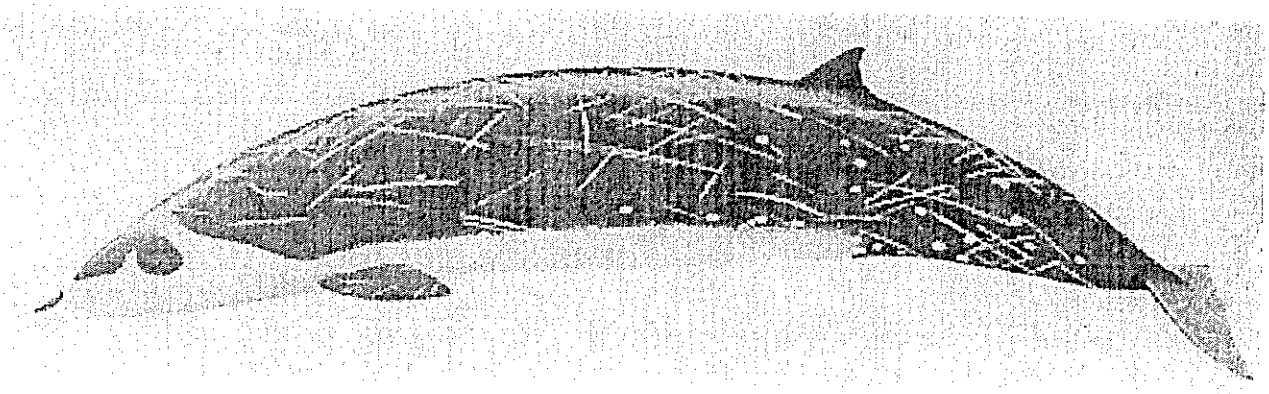


Fig. 7: Stejneger's beaked whale, *Mesoplodon stejnegeri*.

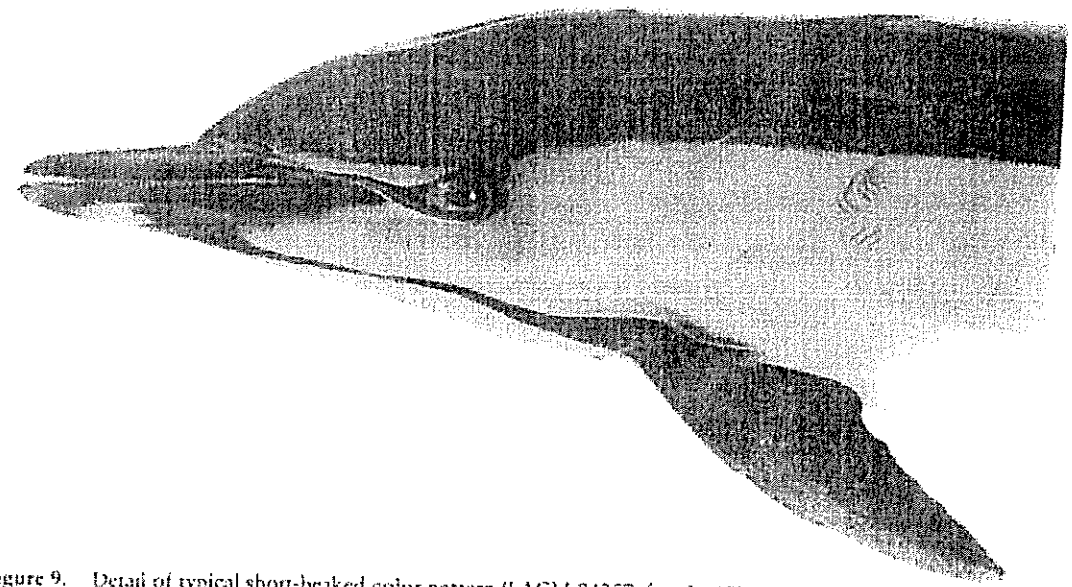
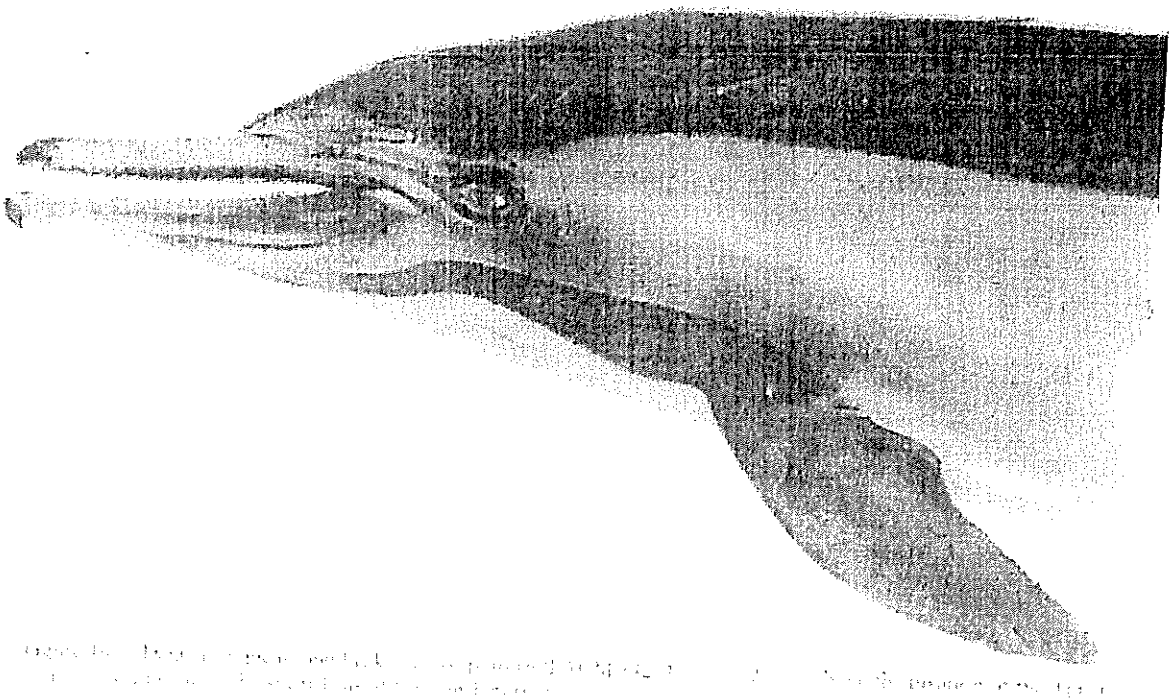
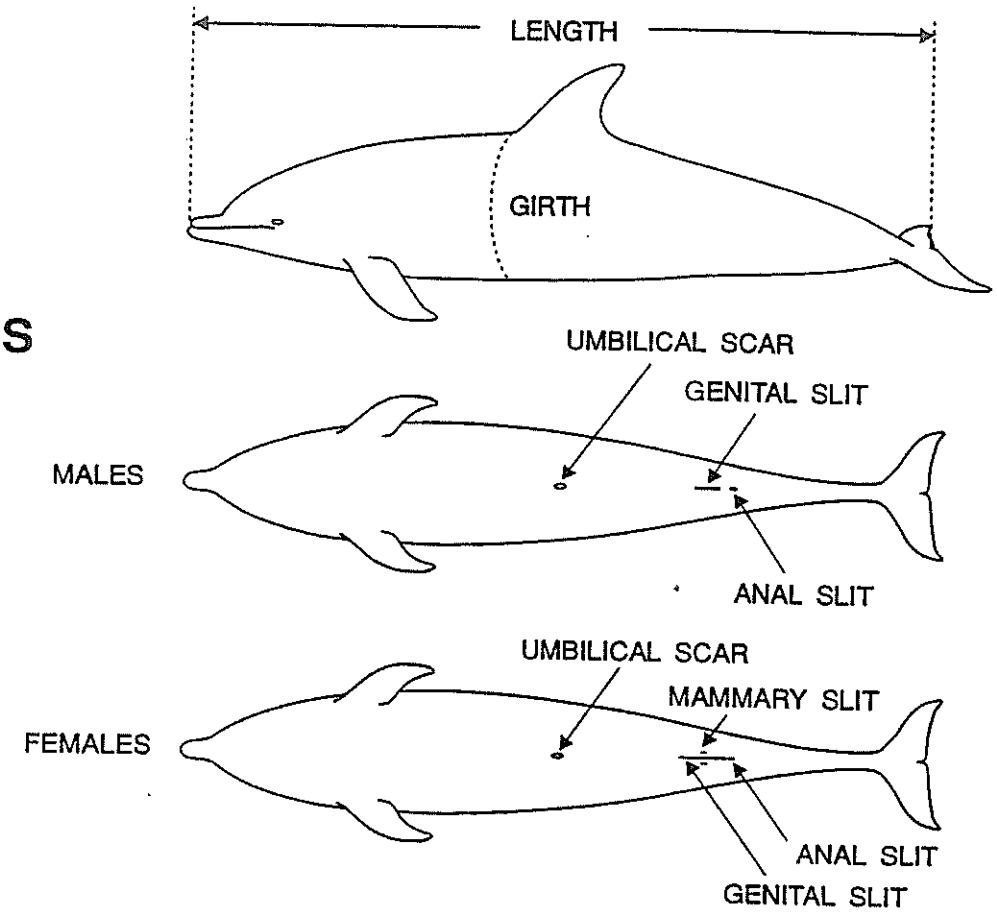


Figure 9. Detail of typical short-beaked color pattern (LACM 84257, female, 187 cm). Note position of flipper stripe and where it meets with lip patch.

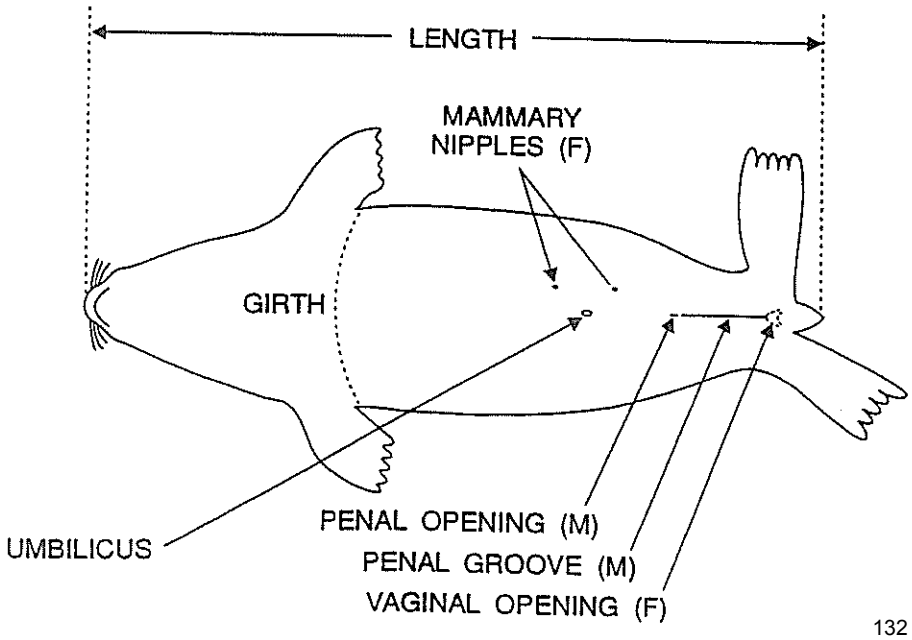


STANDARD MEASUREMENTS AND EXTERNAL CHARACTERISTICS FOR SEXING CETACEANS AND PINNIPEDS

CETACEANS



PINNIPEDS



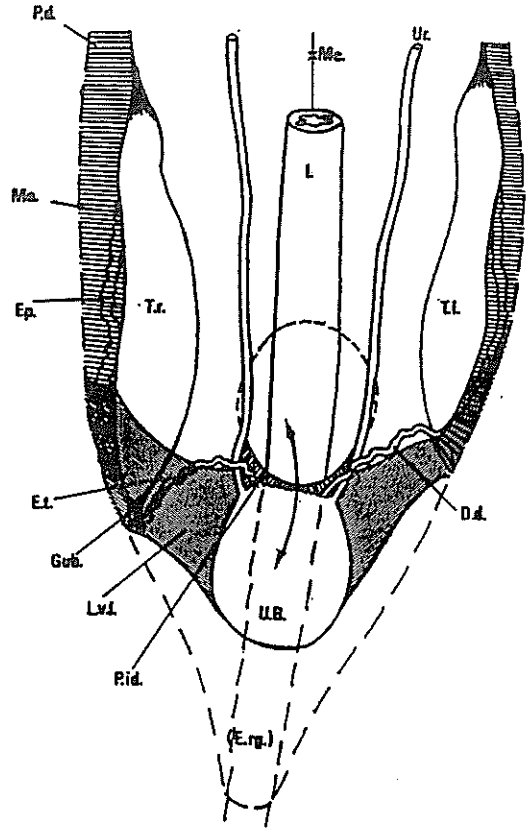


FIG. 4. Drawing of the ventral aspect of some organs in the most posterior portion of the abdominal cavity, as seen in a *Tursiops truncatus*, of 2·44 m ("Bert"). The urinary bladder (U.B.) has been drawn down over some 180°.
D.d.: ductus deferens. E.rg.: excavatio rectogenitalis. E.t.: pouch in which the posterior part of the testis is situated. Ep.: epididymis. Gub.: gubernaculum testis. I.: intestine (rectal part). L.v.l.: ligamentum vesicae laterale. Mc.: mesocolon. Mo.: mesorchium. P.d.: plica interdeferentialis. T.l.: left testis. T.r.: right testis. U.B.: urinary bladder. Ur.: ureter.

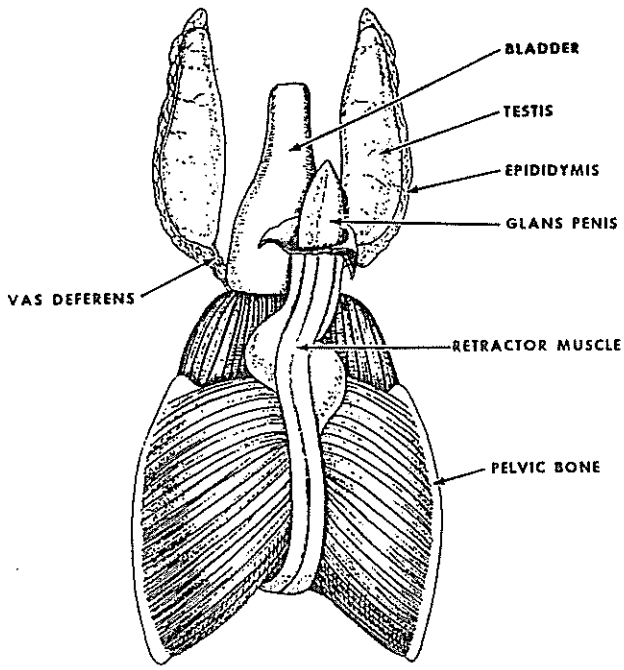


Figure 4–14. Ventral view of the reproductive organs of a male Atlantic bottlenosed dolphin (porpoise), *Tursiops truncatus*. (Drawn by Barbara Stolen Irvine from dissections by Robert F. Green.)

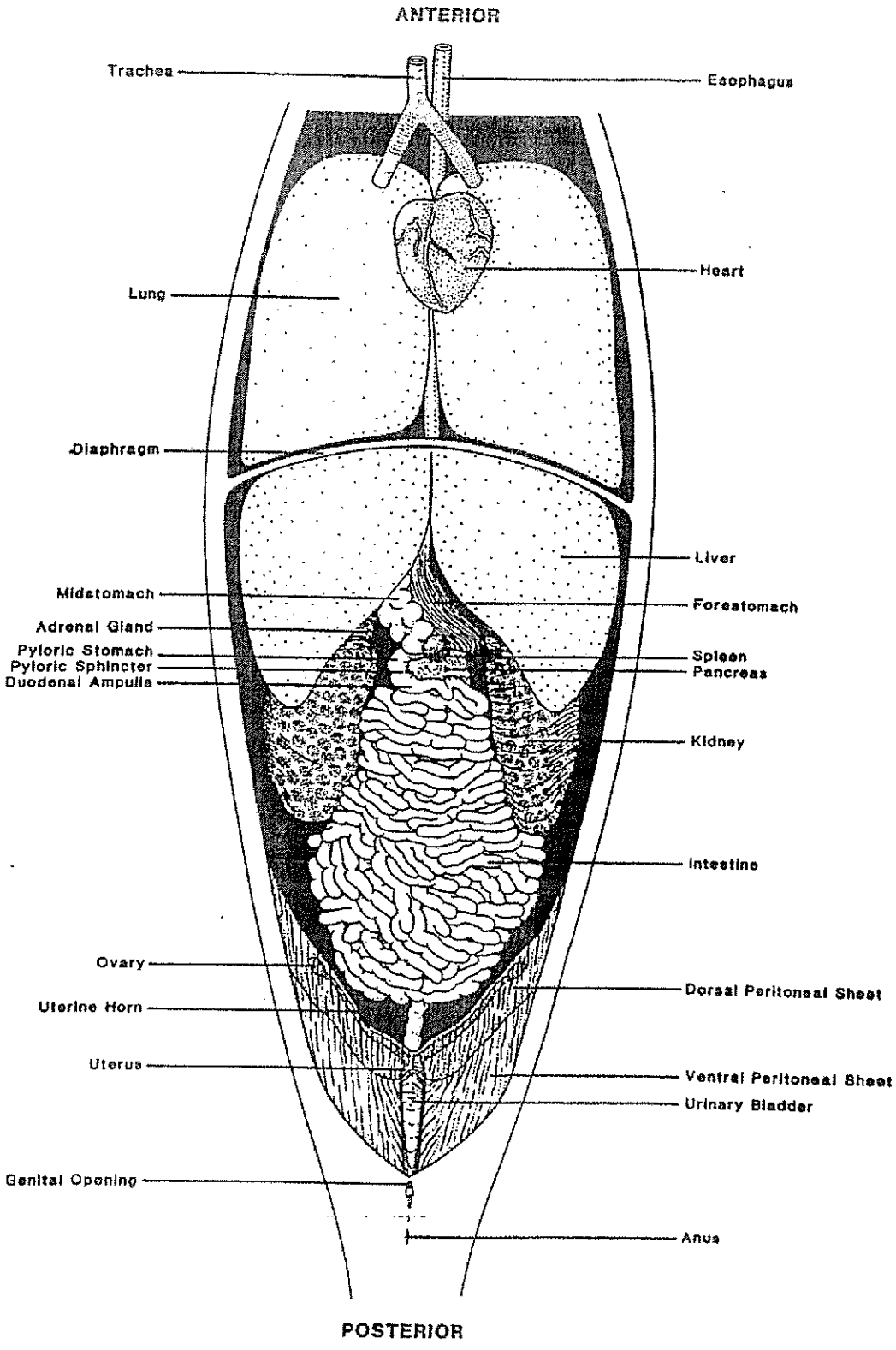


Figure 12. Line drawing showing organization of internal anatomy of a female dolphin in ventral view (length protracted).

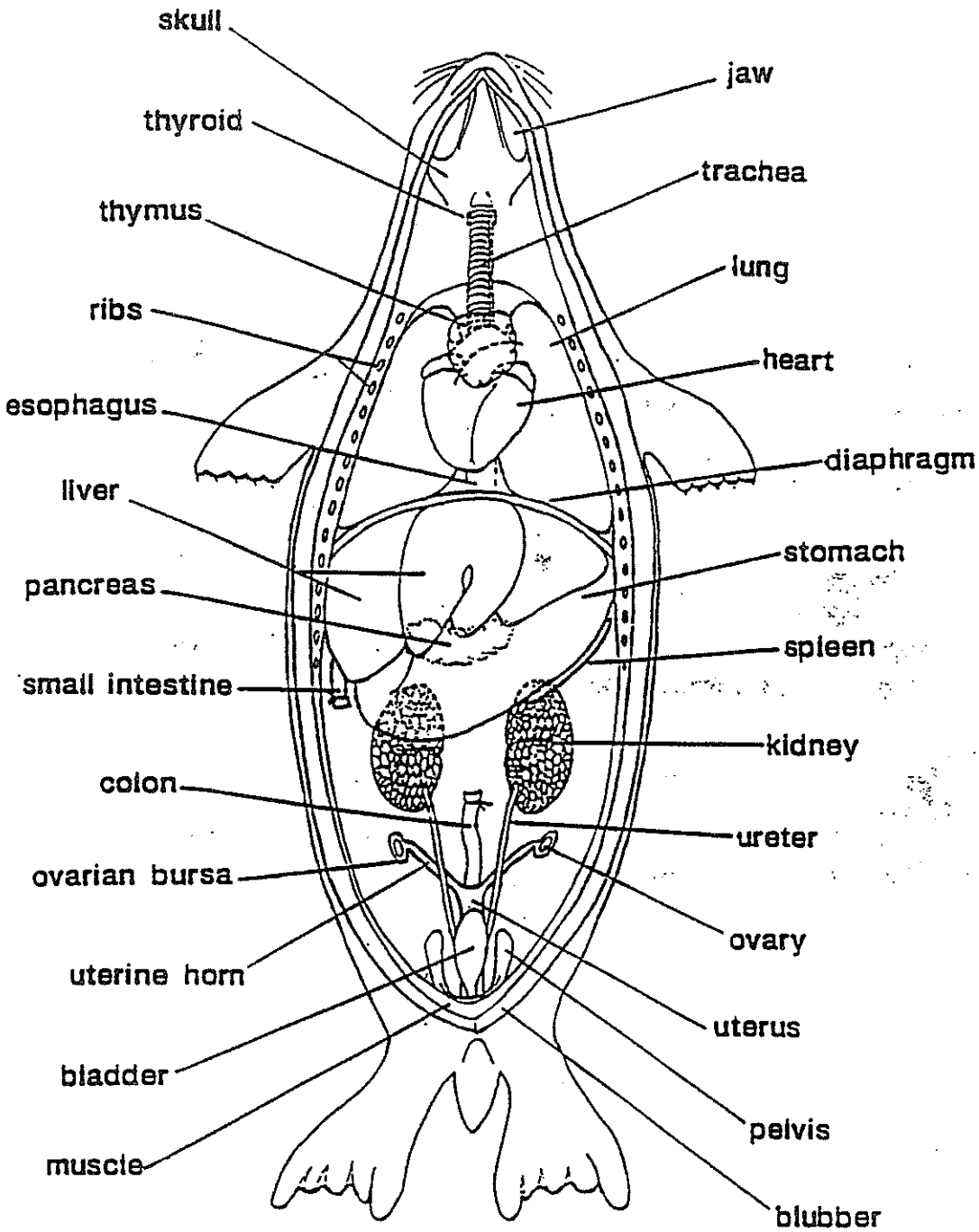


Figure 4.—Some of the internal features of a juvenile female *Monachus schauinslandi*; the intestines and rib cage have been removed, and the diaphragm trimmed to the midline. Note that the broken lines indicate those structures (or portions of structures) obscured by other parts.

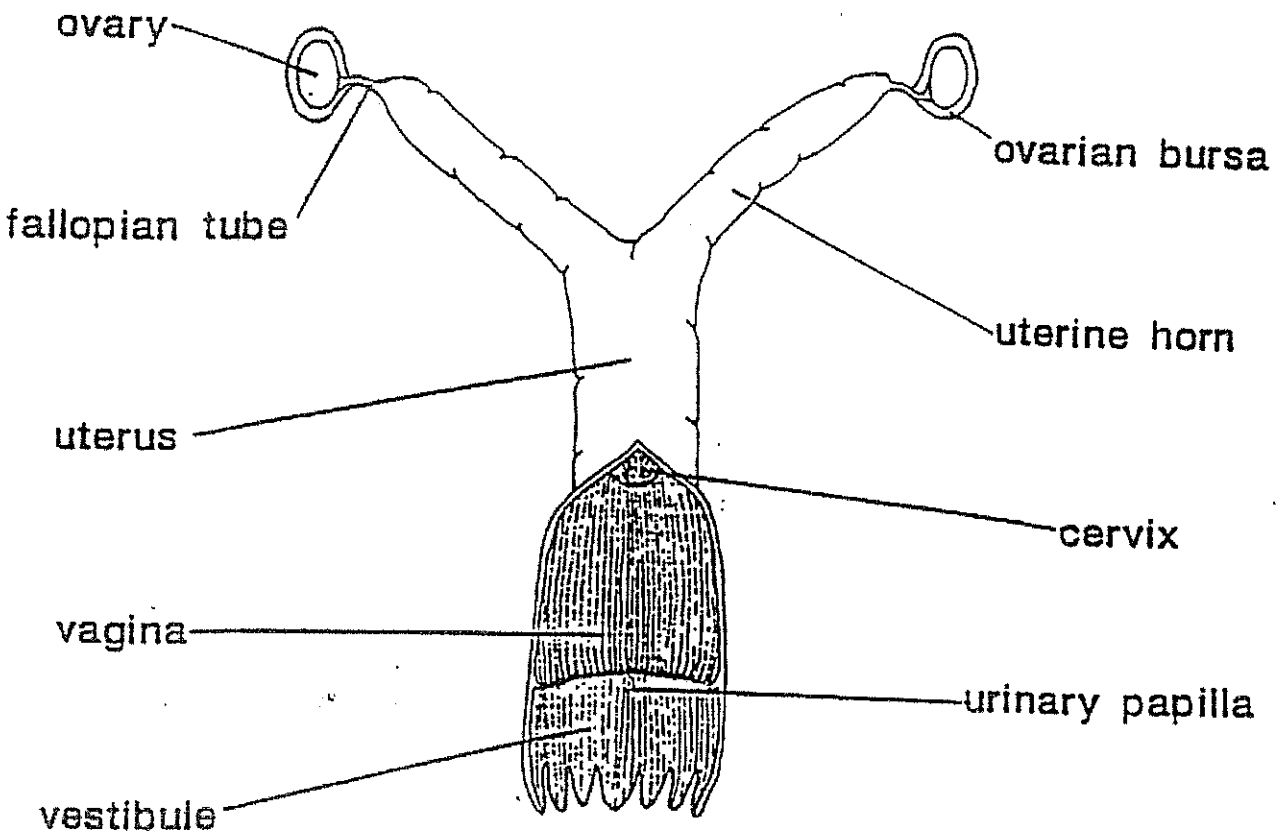


Figure 8.–The female reproductive system from a juvenile phocid with the cervix, vagina, and vestibule revealed.

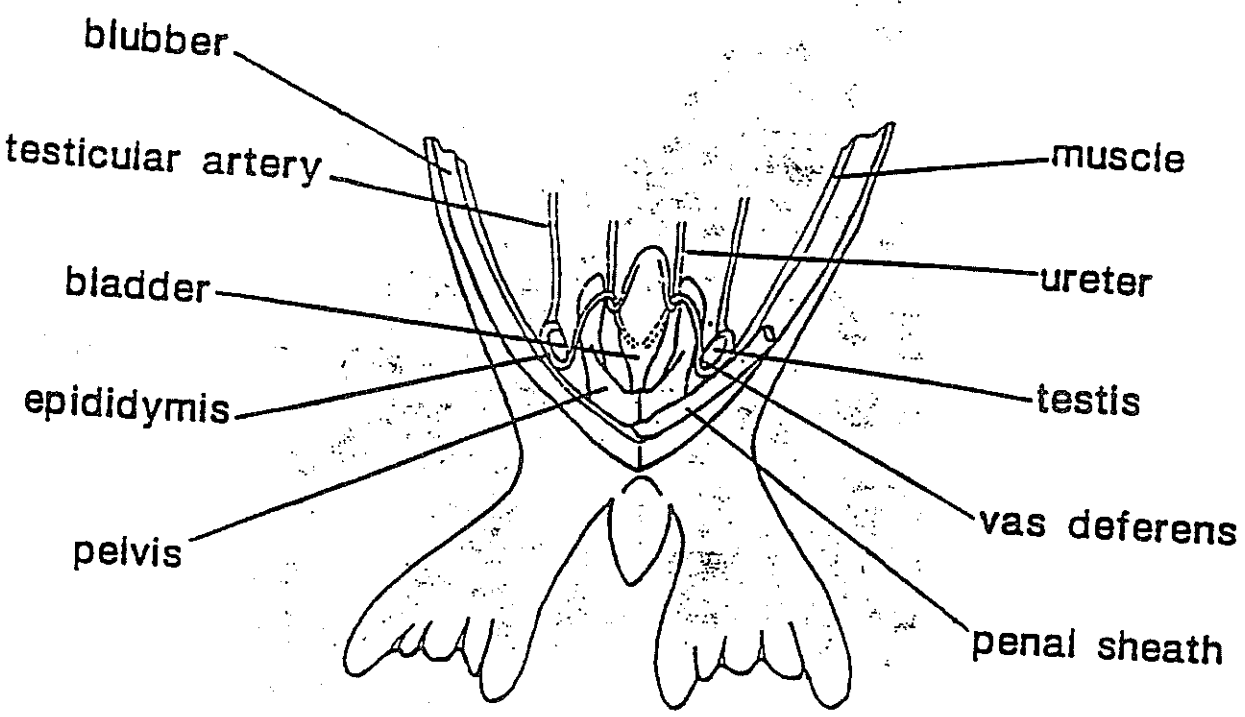
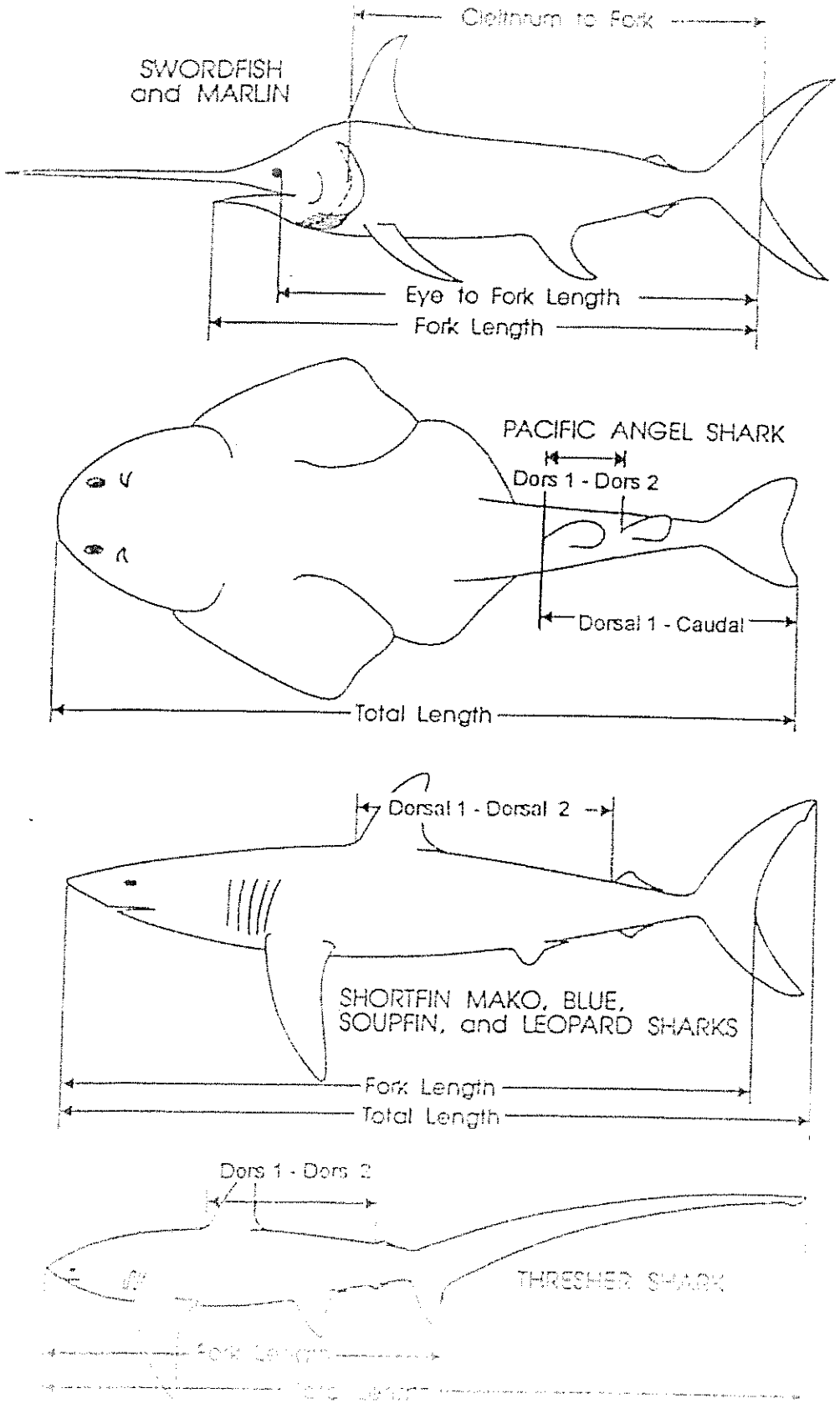
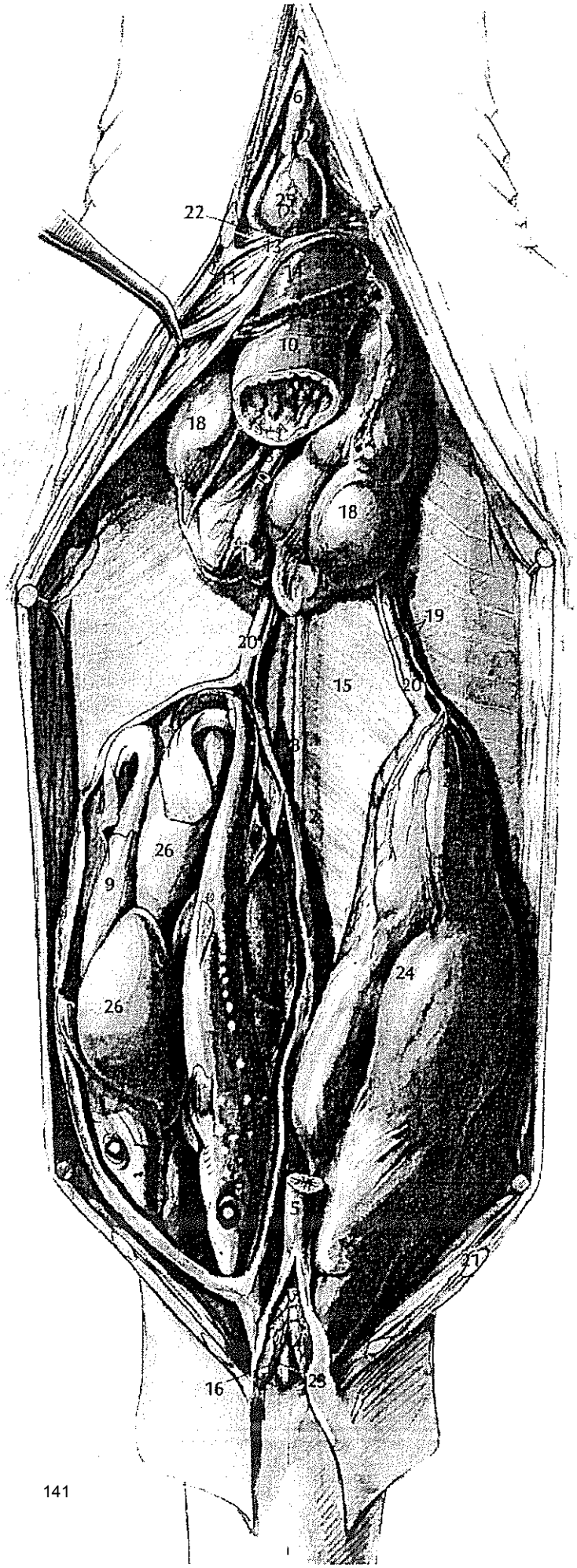


Figure 10.–The reproductive organs in a juvenile male *Monachus schauinslandi*.

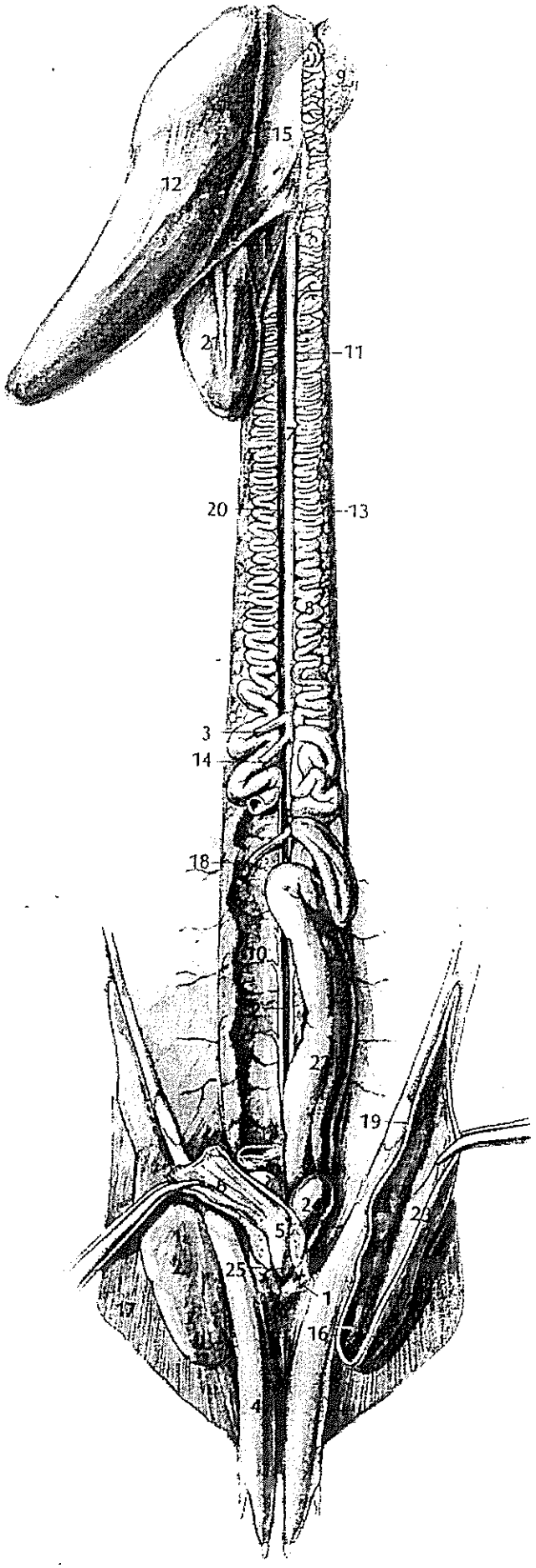
APPENDIX B

The following pages are drawings of external and internal characteristics of sharks and billfish. The drawings are for reference while working with the Shark and Billfish Life History Form and the Fish and Invertebrate Measurement Data Form.


Cleithrum to Fork
SWORDFISH
and MARLIN
Eye to Fork Length
Fork Length
PACIFIC ANGEL SHARK
Dors 1 - Dors 2
Dorsal 1 - Caudal
Total Length
Dorsal 1 - Dorsal 2
SHORTFIN MAKO, BLUE,
SOUPFIN, and LEOPARD SHARKS
Fork Length
Total Length
Dors 1 - Dors 2
THRESHER SHARK

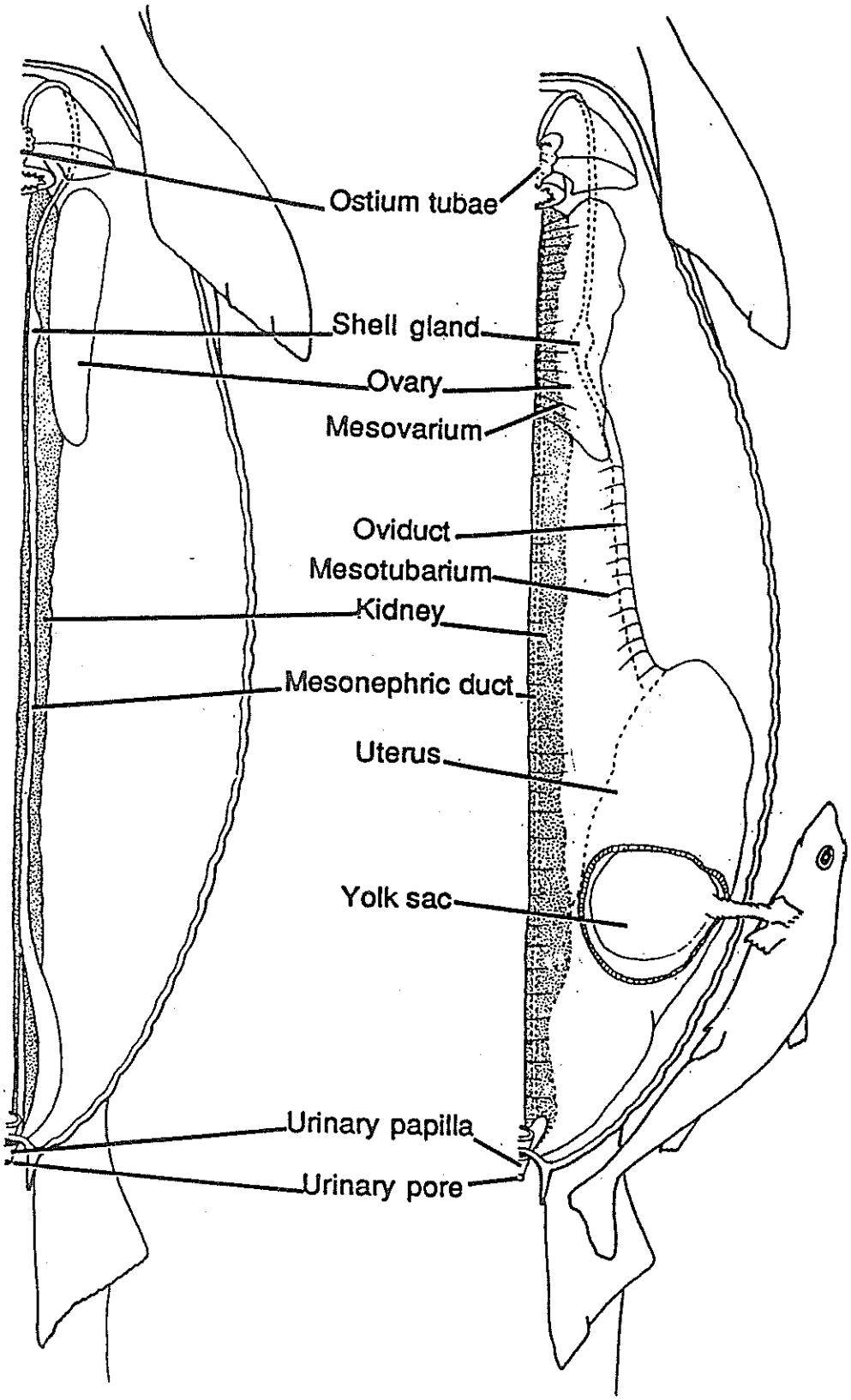


1 abdominal pore
2 atrium
3 celiac artery
4 cloaca
5 colon
6 conus arteriosus
7 coracoid bar
8 dorsal aorta
9 embryo within uterus
10 esophagus
11 falciform ligament
12 kidney (dorsal to mesotubarium)
13 left oviduct
14 liver
15 mesotubarium
16 opening of uterus into cloaca
17 ostium of oviducts
18 ovary containing eggs
19 oviducal arteries
20 oviduct
21 puboischiac bar
22 transverse septum
23 urogenital papilla
24 uterus containing embryos
25 ventricle
26 yolk sac

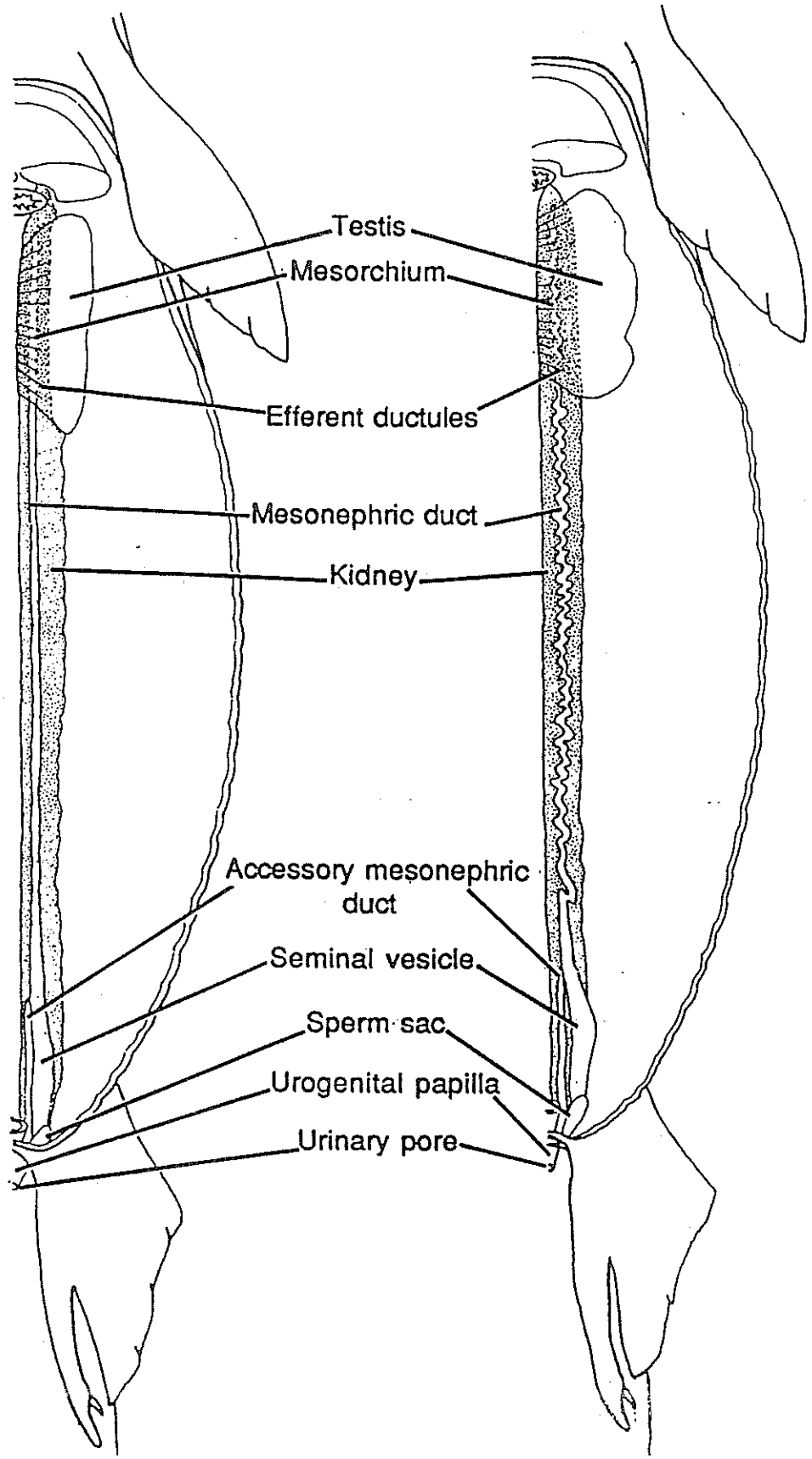


THE MALE UROGENITAL SYSTEM

1 abdominal pore
2 accessory urinary duct
3 anterior mesenteric artery
4 clasper
5 cloaca
6 colon
7 dorsal aorta
8 ductus deferens
9 epididymis
10 kidney (opisthonephros)
11 left posterior cardinal vein
12 left testis
13 Leydig's gland
14 lienogastric artery
15 mesorchium
16 opening of siphon into clasper tube
17 pelvic fin
18 posterior mesenteric artery
19 puboischiac bar
20 right posterior cardinal vein
21 right testis
22 seminal vesicle
23 siphon
24 sperm sac
25 urogenital papilla



Ventral cutout view of the urogenital systems from immature and mature female spiny dogfish, *Squalus acanthias*.

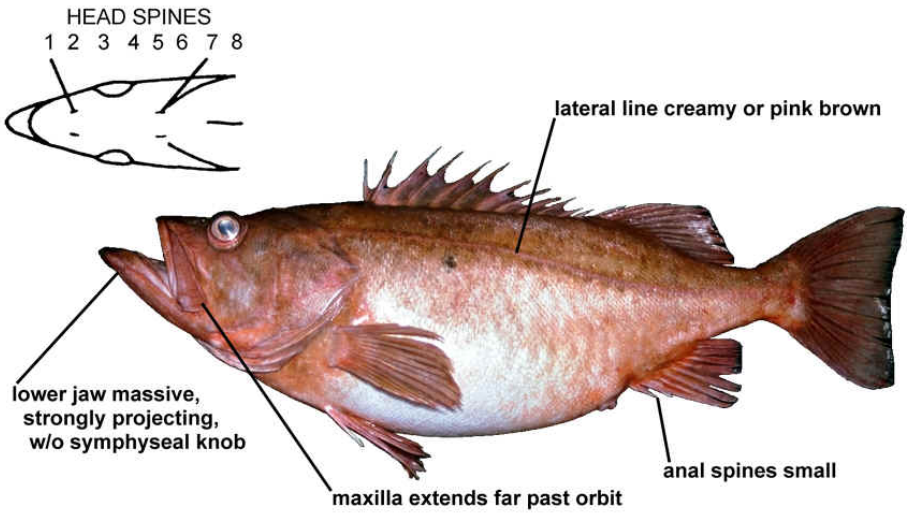


Ventral cutout view of the urogenital systems from immature and mature male spiny dogfish, *Squalus acanthias*.

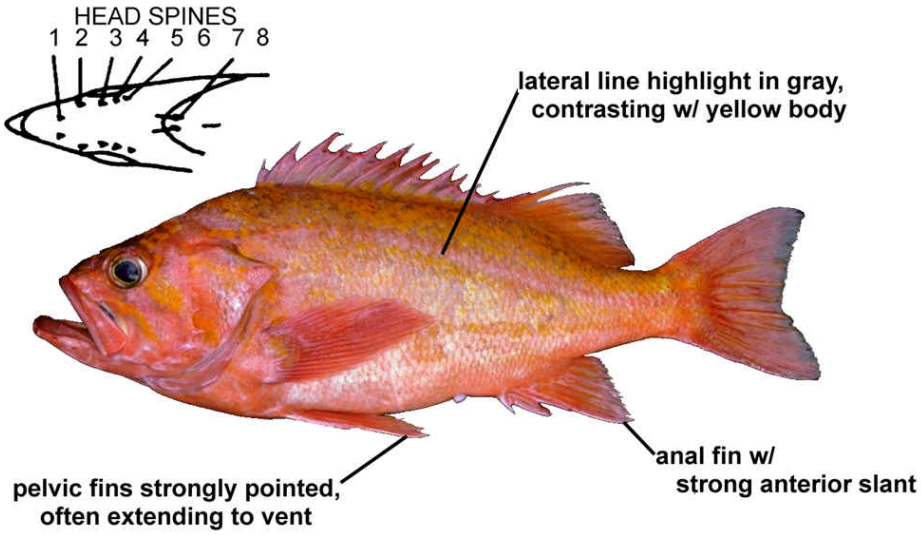
APPENDIX C

These are pictures of rockfish that are considered to be overfished. It is important to learn these for correct identification in the field.

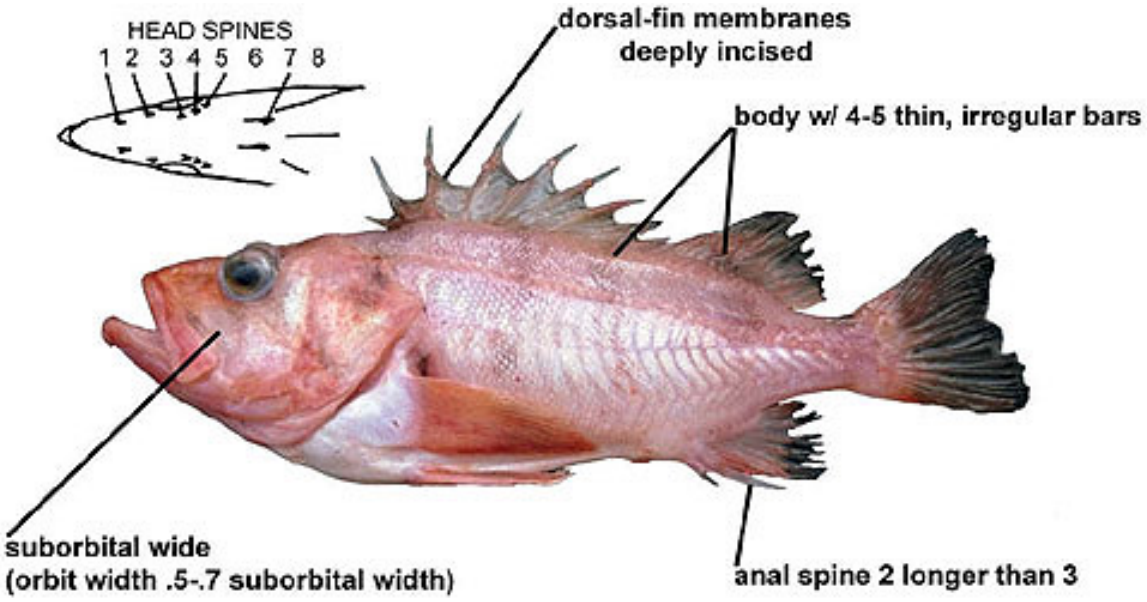
The following rockfish are images taken from the California Department of Fish and Game website. See http://www.dfg.ca.gov/mrd/index_library.html for more details.



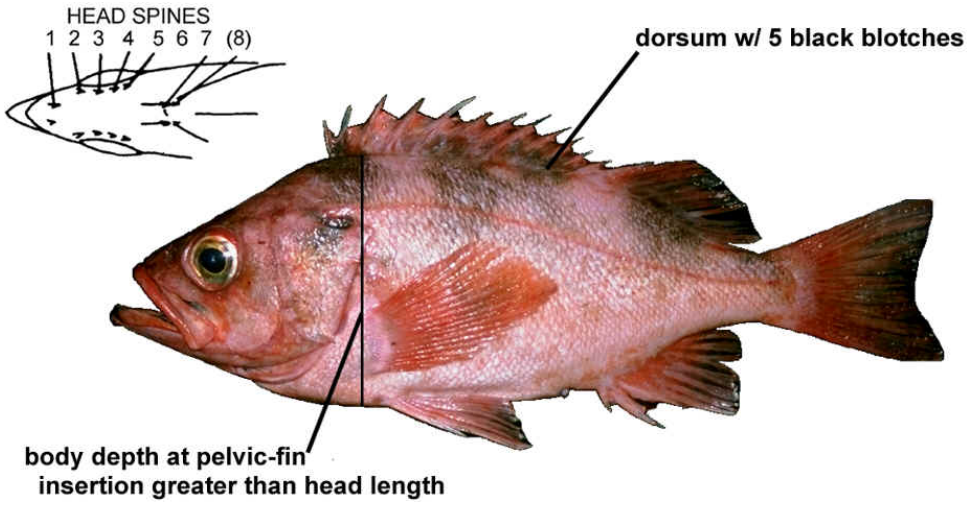
Boccacio



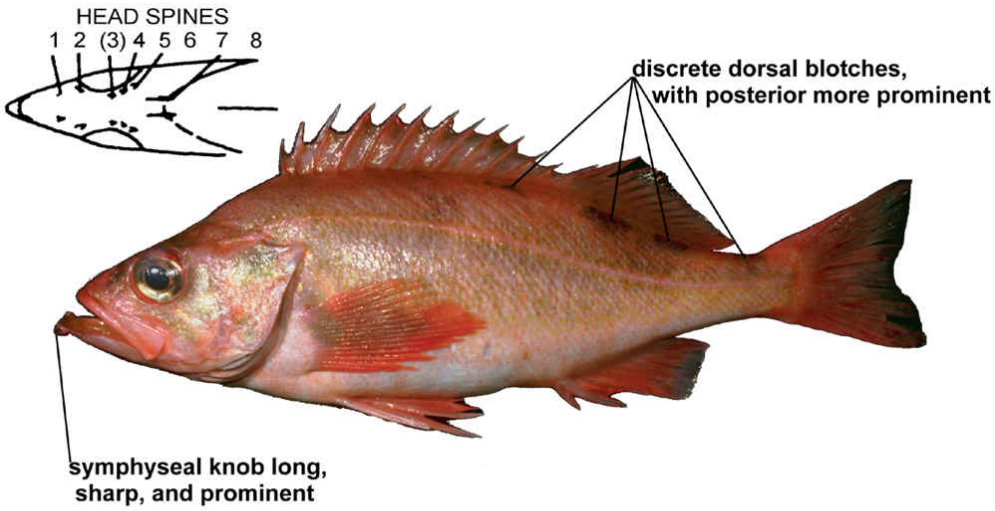
Canary Rockfish



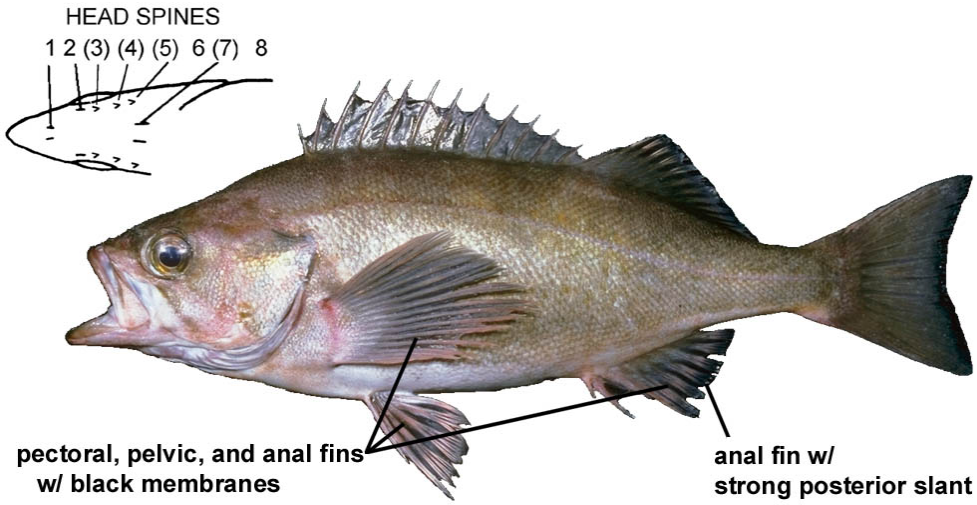
Cowcod



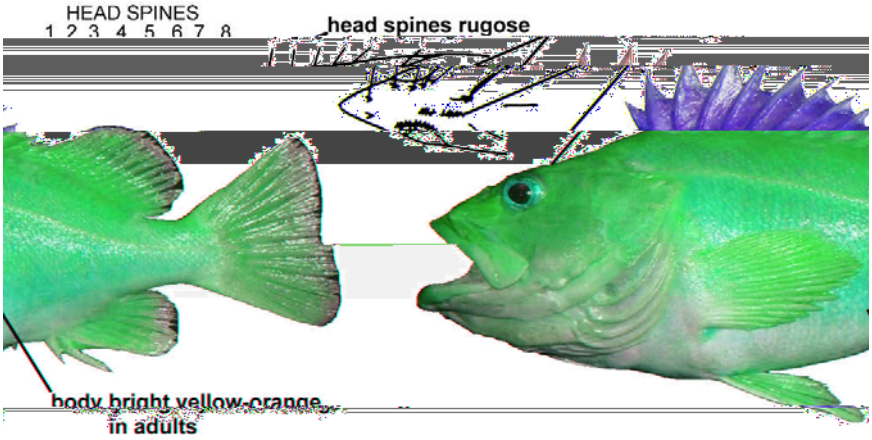
Dark Blotched rockfish



Pacific Ocean Perch



Widow Rockfish



Yellow Eye Rockfish

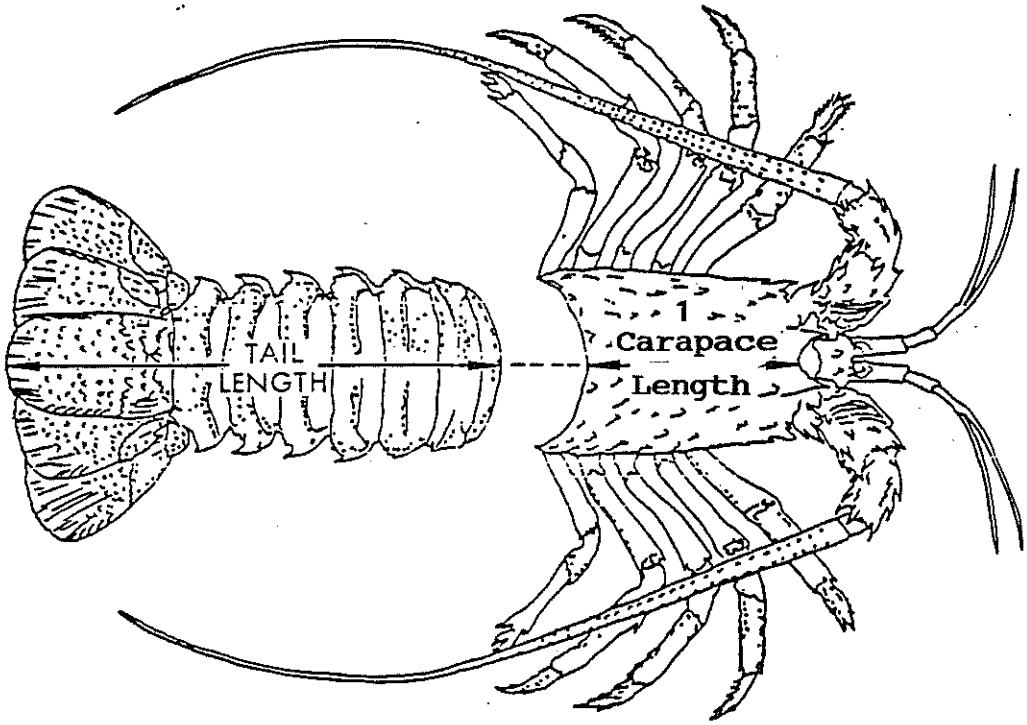
APPENDIX D

The following pages address invertebrate measurements and illustrated examples.

INVERTEBRATE MEASUREMENTS

Invertebrate measurements are taken with a tape measure.

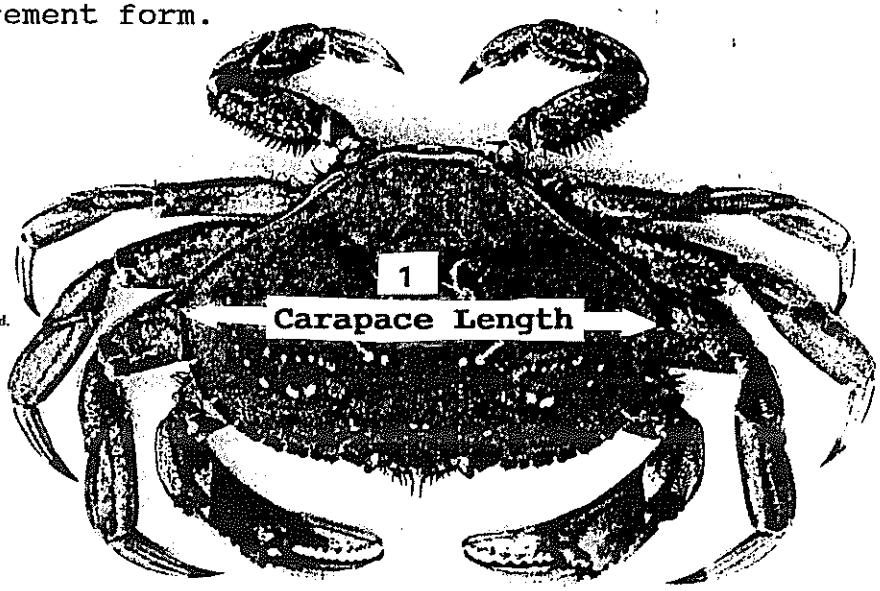
California spiny lobster



Dorsal view of a California spiny lobster with tail separated to show measurements.

1 Record the **Carapace Length** in the Length column of the fish and invertebrate measurement form.

Dungeness crab



Dungeness crab, *Cancer magister* Dana. Photo by Paul W. Wild.

1 **Carapace Width** is the straight line distance across the widest part of the carapace from notch to notch (excluding the spine). Record this measurement in the Length column of the fish and invertebrate measurement form.

Northern Kelp Crab

16. *Pugettia producta*

Northern kelp crab

Identification: Carapace broad and smooth with margin of carapace between lateral teeth straight; rostrum relatively short . Color kelp brown or dark red; underside yellow or scarlet. Juveniles either red or olive green. ***Size***: Males to 93 mm (3.6 in); females 78 mm (3 in). ***Range***: Prince of Wales Island, Alaska to Baja California. ***Habitat***: Adults are abundant in the kelp canopy and also common on wharf pilings, while juveniles are found intertidally among algae and under rocks. Recorded to 73 m (240 ft). ***Remarks***: Although small specimens often have a single piece of algae attached to their rostrums, adults are typically devoid of such intentional decorations and rely on their coloration and feisty disposition for protection. Large, old shell crabs living on pilings are often covered with barnacles. An important prey item for sea otters in California.

Sheep Crab or Spider Crab

23. *Loxorhynchus grandis*

Sheep crab

Identification: Carapace oval and inflated-looking, with a covering of spines and tubercles; rostrum short and curving distinctly downward. Color a dull gray with some blue on the tubercles and usually masked by decorations in younger specimens. ***Size***: Males to 159 mm (6.2 in) in width and females 115 mm (4.5 in), but there are old records of specimens to 273 mm (10.7 in). ***Range***: Marin County, California to Punta San Bartolome, Baja California. ***Habitat***: Found in rocky areas, although adults often venture out onto open sandy bottoms. Occurs from the low intertidal to 124 m (407 ft). ***Remarks***: Like the moss crab *L. crispatus* [22], this species loses the habit of decorating itself when it reaches a large size.

24. *Taliepus nuttallii*

Southern kelp crab

Identification: Carapace very rounded in outline with lateral teeth reduced to small bumps and surface smooth and undecorated; rostral horns fused for most of their length. Juveniles match the color of the kelp, while adults are reddish-brown to bright red. ***Size***: Males to 92 mm (3.6 in); females 45 mm (1.8 in). ***Range***: Santa Barbara, California to Baja California. ***Habitat***: Among algae in the rocky intertidal and offshore on kelp; intertidal to 93 m (305 ft). ***Remarks***: A quick and agile spider crab. It is highly dependent on kelp beds for food and shelter, and populations in the San Diego area have not yet recovered from the drastic reductions in kelp caused by the large El Niño of the early 1980's.

Southern Kelp Crab

31. *Cancer magister*

Dungeness crab

Identification: Carapace widest at the tenth and very prominent final tooth following the eye; claws with white tips and serrated along the upper margin of the palm and finger. Color and pattern varies little except for slight differences in the amount and intensity of purple on the claws and legs. ***Size***: To 230 mm (9 in), but usually less than 190 mm (7.5 in). There is one old report of specimens measuring 330 mm (13 in)! ***Range***: Pribilof Islands to Santa Barbara, California. ***Habitat***: Most common subtidally on sandy bottoms and in eelgrass beds; occurs from the low intertidal to 230 m (750 ft). Juveniles can be extremely abundant in the intertidal zone. ***Remarks***: Diet consists primarily of clams, but also feeds on smaller crustaceans and fish. During the daytime it often remains buried with only the eyes and antennae exposed. This species supports important sport and commercial fisheries, with commercial quantities occurring from Kodiak, Alaska to central California.

Dungeness Crab

Red Rock Crab

32. *Cancer productus*

Red rock crab

Identification: Carapace teeth somewhat broad and rounded, with teeth between eyes of nearly equal size and shape. Claws large, with black tips. Adults are typically a uniform reddish color, while juveniles are extremely variable and often have very striking "zebra" patterns. ***Size***: Males to 200 mm (7.8 in); females 158 mm (6.2 in). ***Range***: Kodiak, Alaska to Isla San Martin, Baja California. ***Habitat***: Found from the middle intertidal to 79 m (260 ft). Occurs on a wide range of substrate types, but is most common in gravelly areas and on well-protected boulder beaches. ***Remarks***: This crab is a voracious predator, using its powerful claws to open clams, snails, mussels, and barnacles, and to catch smaller crabs. It is collected by sport crabbers but has attracted little commercial attention to date.

Yellow Crab

33. *Cancer anthonyi*

Yellow crab

Identification: Carapace smooth, hairless, and slightly domed. Claws black-tipped, the black extending less than halfway up the top edge of the moveable finger; orange blotch on inside of claw. Carapace and legs a uniform orange-yellow. ***Size***: Males to 176 mm (6.9 in); females 144 mm (5.6 in). ***Range***: Humboldt Bay, California to Bahia Magdalena, Baja California. ***Habitat***: Found on open sand bottoms in southern California and largely confined to and bays and estuaries in the northern part of its range. Recorded from the low intertidal to 132 m (433 ft), but most abundant from 20-55 m (60-180 ft) on sand. ***Remarks***: Along with the Pacific rock crab *C. antennarius* [35] this species supports a minor commercial and recreational fishery along the southern California coast.

Graceful Crab

34. *Cancer gracilis*

Graceful crab

Identification: Often mistaken for a Dungeness crab, *C. magister* [31], it can be distinguished from its much larger relative by the shape of its carapace (which is widest at the ninth tooth instead of the tenth), the white edging of the cara-
pace teeth, and the lack of serrations on the upper margin of
the claws. Claws with white tips; legs pu rple. ***Size***: Males to
115 mm (4.5 in); females 87 mm (3.4 in). ***Range***: Prince
William Sound, Alaska to Bahia Playa M aria, Mexico. ***Habi-***
tat: Primarily subtidal on sand or mud an d preferring slightly
muddier areas than *C. magister*; cannot tolerate low salinity
water so is usually absent from estuaries. Recorded from the
low intertidal to 143 m (470 ft). ***Rema rks***: Feeds on small
bivalves and barnacles and is sometimes considered a pest
on commercial oyster beds. Megalop ae and small juveniles
can often be found clinging to large jellyfish, presumably
using them for transport to nearshore areas.

Pacific Rock Crab

35. *Cancer antennarius*

Pacific rock crab

Identification: Easily distinguished from other Pacific coast *Cancer* crabs by the conspicuous red spotting on the underside of the body. Claws large, black tipped; carapace reddish-brown. Juveniles usually have a dense covering of hair on the carapace. ***Size***: Males to 178 mm (7 in); females 148 mm (5.8 in). ***Range***: Queen Charlotte Sound, British Columbia to Cabo San Lucas, Mexico. ***Habitat***: Found under boulders in the low intertidal, subtidally in kelp beds, and on gravel bottoms to 91 m (300 ft) but usually at depths less than 45 m (150 ft). Most abundant subtidally near rock-sand interfaces along exposed coastlines. ***Remarks***: Although perceived as being a southern species, this crab is quite common in Barkley Sound on the west side of Vancouver Island, British Columbia.

52. *Randallia ornata*

Purple globe crab

Identification: Carapace very round and bulbous, with a granular texture and armed with two pairs of short but distinct projections along the posterior margin. Color usually white with purple or red blotches and spots. ***Size***: Carapace width to at least 53.2 mm (2 in). ***Range***: Mendocino County, California to Bahia Magdalena, Baja California. ***Habitat***: Found on open sand bottoms. Although found on rare occasions intertidally, it is typically a subtidal form that occurs down to 92 m (300 ft). ***Remarks***: Remains buried in sand during the day.

Purple Globe Crab or Marble Crab

140. *Paralithodes camtschaticus*

Red king crab

Identification: The largest crab on our coast. Carapace, legs and claws covered with thornlike spines that are proportionately longer and sharper in juveniles. Walking legs long. Color ranging from pale brownish red to purple. ***Size***: To 280 mm (11 in). ***Range***: Bering Sea south to the Queen Charlotte Islands and to Japan in the western Pacific. ***Habitat***: Open sand or mud bottoms from 3-366 m (10-1200 ft). Very small juveniles sometimes common intertidally among rocks and algae. ***Remarks***: An important commercial species in Alaskan waters. Feeds on a wide range of benthic invertebrates including seastars, urchins, clams, and barnacles. Juveniles form spectacular aggregations or "pods", often in very shallow water, that can contain thousands of individuals. Pods break up shortly after dusk as the members disperse to forage, then re-form just before dawn.

71

Red King Crab

143. ***Lopholithodes foraminatus***

Brown box crab

Identification: Similar to *L. mandtii* [144] in shape but lacking its relative's brilliant coloration, being predominantly a drab reddish-brown or tan. Claws and first pair of walking legs each with smooth, semicircular concavities that combine to form a nearly perfectly round opening when folded together. ***Size***: To 185 mm (7.4 in), but much larger ones have been reported. ***Range***: Kodiak, Alaska to San Diego, California. ***Habitat***: Low intertidal to 547 m (1800 ft). Typically found on muddy bottoms below 18 m (60 ft) and occasionally seen on vertical rock faces overlooking soft bottoms. Once considered common in Puget Sound but rarely encountered there in recent years. ***Remarks***: Reportedly deposit feeds by filtering sediment dredged up by its claws and also preys on the small clams exposed by its digging. The circular openings in the claws aid in respiration when the crab is buried in the sediment.

Brown Box Crab or Opossum Crab

146. ***Pleuroncodes planipes***

Pelagic red crab

Identification: Claws much shorter and stouter than those of *Munida* [145] and not obviously spiny. Color reddish. ***Size***: Carapace length to 50 mm (2 in). ***Range***: Distribution is centered off the west coast of Baja California, but sometimes carried as far north as San Francisco ***Habitat***: Normally found on sand and mud bottoms at depths of 45-90 m (148-295 ft), and also free-swimming in the water column. Occasionally large numbers are carried inshore along the southern California coast, eventually becoming stranded on beaches. ***Remarks***: Feeds on copepods and other small organisms in the water column and is itself an important food for many fish and marine mammals.

Pelagic Red Crab

*ALL CRABS SHOWN ABOVE THIS POINT WERE TAKEN FROM :
Jenson, Gregory, <u>Pacific Coast Crabs and Shrimps,</u> Sea Challengers, 1995.

Pointer Crab *Mursia gaundichaudii*

http://www.slugophile.org/taxon/page/uwphoto.php?foto=Mursia_gaudichaudii

APPENDIX E

The following pages address safety issues and should be reviewed periodically.

Safety Sheets are courtesy of the United States Coast Guard

DRESS FOR SURVIVAL

Extra clothing will prolong your survival time by reducing loss of body heat and trapping air that will help keep you afloat. Put on plenty of warm clothing, including a watch cap. Wool or polypropylene clothing is best.

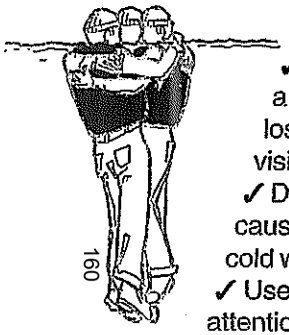
ENTERING THE WATER WITH A PFD

If you are wearing a PFD:

- ✓ Fasten PFD securely. Cross your arms over your chest to help hold it down.
- ✓ Block off your nose and mouth with one hand.
- ✓ Protect your head.
- ✓ Keep your feet together in case you land on something.
- ✓ Check the area below before you enter.
- ✓ Enter feet first.

IN THE WATER WITH A PFD

- ✓ Use the **HELP (Heat Escape Lessening Posture)** technique.



- ✓ Huddle together as a group to decrease heat loss and increase visibility.
- ✓ Don't swim! Swimming causes rapid heat loss in cold water.
- ✓ Use a whistle to attract attention.

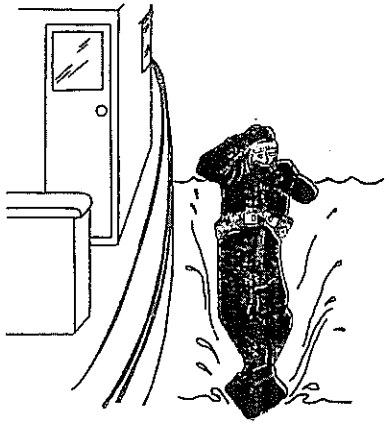
ABANDON SHIP!

- ✓ Give a proper MAYDAY: vessel name, position, nature of distress.
- ✓ The Captain gives the order to abandon ship.
- ✓ Stay clear of rigging.
- ✓ Throw buoyant objects over the side, if possible, to increase visibility.

IMMERSION SUITS

Immersion suits are your best protection against the cold and the harsh conditions of the water. Take care of it! Don't wait for an emergency! Regularly air it out and lubricate the zipper. Drill with the suit on so you know how it works.

ENTERING THE WATER:

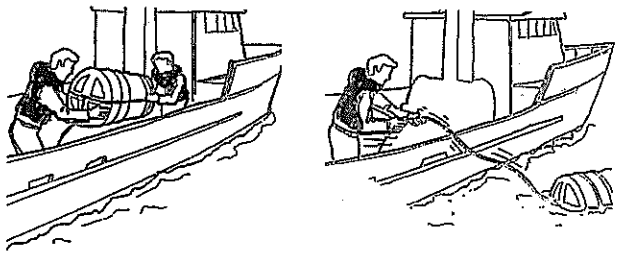


- ✓ Fully zip suit and ensure all closures are snug.
- ✓ Enter water feet first, as slowly as possible: feet together, protect your head.
- ✓ Inflate external flotation bladder <u>after</u> entering the water.

RAFT STOWAGE

- ✓ Stow raft in a readily accessible location where it will float free.
- ✓ Secure raft canister to cradle or bed with a properly installed hydrostatic release.
- ✓ Secure painter firmly to vessel, with a weak link incorporated into the line.
- ✓ Install liferaft canister carefully, ensuring it is not punctured and watertight gaskets are intact.

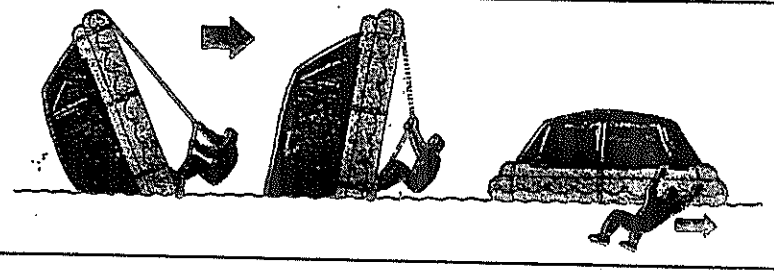
RAFT LAUNCHING



- ✓ Ensure launching area in water is free of debris.
- ✓ 2 crewmen should grab the canister at the ends and toss it into the water on the lee side of the vessel. Do not cut bands.
- ✓ After launching, pull painter until raft inflates. (The painter may be as long as 250 feet.)
- ✓ Wait for full inflation - with the canopy erected - before boarding.
- ✓ Ensure raft is tied to vessel.
- ✓ Keep the raft tied to vessel as long as it is safe; the vessel is easier for rescuers to see.

HOW TO RIGHT A CAPSIZED RAFT

Grab the righting strap and pull. When it begins to right, spring backward and to the side.



Developed under Contract DTCG23-95-D-HMS026

Quick Reference Single Person Operations

STAY ALERT! WORK SAFE!

- Check all ladders: make sure they are secure and intact.
- Secure all equipment when not in use.
- Keep feet and hands clear.
- Keep clear of the bight of a line.
- Keep a sharp knife available.
- Monitor weather reports.
- Secure hair, jewelry and clothing to prevent entanglement.

KEEP IN CONTACT

- Have a FLOAT PLAN and follow it.
- Use a BUDDY SYSTEM. Travel together if possible.
- Stay in radio contact.

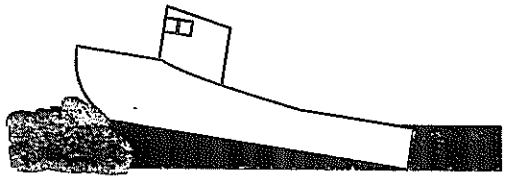
COLD WEATHER CLOTHING

- Wear layers of wool or polypropylene. Avoid cotton.
- Wear wool hat. 50% of body heat is lost through the head.
- Be visible! Have bright colors and reflective tape on all outer garments. Attach whistle and light.
- Wear nonskid boots.

PERSONAL FLOTATION DEVICES

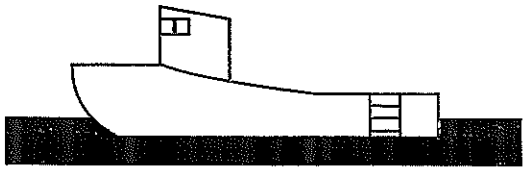
- Wear flotation at all times when on deck.
- Practice donning the PFD or immersion suit you would rely on in an emergency.
- Find the type of PFD that works for you and WEAR IT!

STAY AWAKE! STAY ALERT! STAY ALIVE! YOU MAY HAVE ONLY YOURSELF TO DEPEND ON!



Use alarms. Watch alarms, radar, LORAN, depth finder, deadman switch, etc. should be set to activate in case you fall asleep.

FALLING OVERBOARD



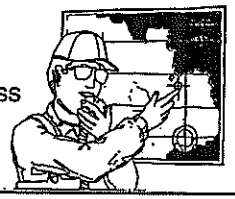
- Permanently attach a ladder or rope over the side.
- Follow every precaution to avoid falling overboard.

MAN OVERBOARD ALARMS ARE AVAILABLE

These alarms are set off when the wearer is immersed in water. They can activate an alarm in the wheel house, shut down an engine or deactivate an autopilot.

EMERGENCY COMMUNICATION

Use your EPIRB (Electronic Position Indicating Radio Beacon) and make a distress call at the first sign of trouble. Contact the Coast Guard and nearby vessels.



STOPPING THE BOAT

- Stop motion of vessel before leaving the wheel.
- Use the deadman switch/pedal to disengage propulsion.

MAYDAY
How to make a distress call

Establish radio contact as soon as you recognize that an emergency exists. Know how to give a proper Mayday.

Speak: slowly and clearly

Select 156.8MHz
(vhf channel 16 or 2182KHz)
Know local fleet backup channels.

Say "Mayday Mayday Mayday."

Say "This is name of vessel." Describe your position in latitude and longitude or range and bearing from a known point. "Over."

Release microphone and listen for response.

Repeat "Mayday. This is the fishing vessel name."

State nature of your distress. Give number of individuals on board and injuries. Briefly describe your vessel.

If situation permits, stand by radio for further communication with the Coast Guard or another vessel. If no one answers, repeat above then try on another channel.

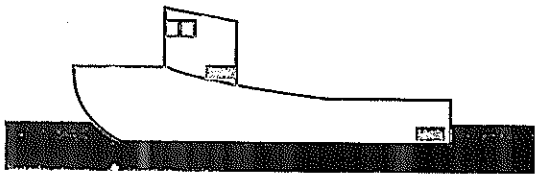
This information provided by the U.S. Coast Guard and the Commercial Fishing Industry Vessel Advisory Committee

Quick Reference Single Person Operations

GOOD HOUSEKEEPING

- Inspect your equipment and basic systems (propulsions, steering, pumps, alarms) frequently.
- Keep bilges free of debris so pump strainers do not clog.
- Keep decks, work areas and passageways clean and free of obstructions.
- Keep regular maintenance schedules for all safety equipment, machinery, electronics and gear.
- Store oily rags and solvents in non-flammable containers to eliminate sources of fuel for fire.
- Secure loose gear.

Keep at least 1 battery above the bilge line to operate emergency equipment in case of flooding.



DISTRESS SIGNALS


orange smoke


signalling mirror


pistol and flares


hand-held flares


strobe light


flashlight

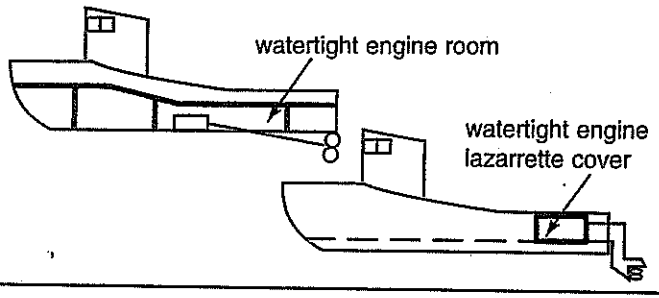
Developed under Contract DTCG23-95-D-HMS026

FLOODING CONTROL

- Check bilges regularly.
- Maintain bilge high water alarms.
- Maintain watertight integrity at all times. Secure hatches when underway.
- Carry a "Damage Control Kit" with a variety of wedges, round soft wood plugs, patches, waterproof epoxy, waterproof flashlight and hose clamps.
- Have an emergency source of power above deck, separate from the main battery bank.
- Know the capacities of your compartments and have a means to pump any that flood.
- Know the effect on the vessel's stability if a compartment is flooded.
- Regularly check through-hull fittings, clamps and hoses.

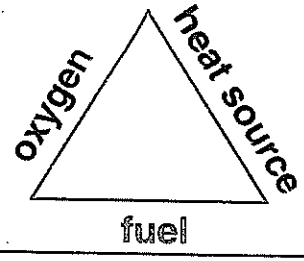
WATERTIGHT INTEGRITY

* Maintain watertight bulkheads watertight!
  * Minimize number of penetrations.
  * Penetrations must be watertight, high and centered on the bulkhead.
* Discharge piping penetrating the hull shall be fitted with positively closing check valves.
* Deckhouse openings shall open outward and be fitted with gasket seals.
* Hatches/covers for engine room, lazarrette, fish holds should be watertight and have gaskets and proper dogging devices to ensure watertight seal.



THE FIRE TRIANGLE

A fire must have heat, fuel and oxygen in order to burn. Remove any leg of the "triangle" and fire cannot occur.



FIGHTING A FIRE

Have more than one fire extinguisher available and know how to use them. Follow the rules below for safety.

F - Find the fire, its location and size.
I - Inform nearby vessels and make a distress call if you cannot control it yourself.
R - Restrict the fire.
- Shut off air supply to the fire (close hatches, ports, doors, and other similar openings).
- De-energize electrical systems.
- Set fire boundaries to confine the fire.
- If the fire is in a machinery space, shut off the fuel supply and ventilation system.
- Maneuver the vessel to minimize the effect of wind on the fire.

E - Extinguish the fire.
- Aim your extinguisher at the base of the fire.
- Sweep the extinguisher back and forth.
- If unable to control fire, prepare to abandon the boat.
- Do not use water to extinguish an electrical fire.

NOTE: If water is used to extinguish the fire, dewatering procedures should be started immediately to avoid stability problems.

APPENDIX F

Species and Port Code Lists

SPECIES CODES COMMON NAME	CODE	AUGUST 2008 *SCIENTIFIC NAME*
Unknown Species	000	Unknown Species
FISH		
Anchovy, Northern	110	*Engraulis mordax*
Barracuda, California	130	*Sphyraena argentea*
Barracuda, Giant	131	*Sphyraena barracuda*
Barracudinas	056	*Paralepididae sp.*
Bass, Barred Sand	278	*Paralabrax nebulifer*
Bass, Giant Sea	280	*Stereolepis gigas*
Bass, Kelp	277	*Paralabrax clathratus*
Bass, Spotted Sand	276	*Paralabrax maculatofasciatus*
Bass, Striped	913	*Roccus saxatilis*
Bass, Unidenified	272	Serranidae
Billfish, Unidentified	089	*Xiphiidae/Istiophoridae*
Blacksmith	479	*Chromis punctipinnis*
Bonito, Pacific	003	*Sarda chiliensis*
Butterfish, Pacific	080	*Peprilus simillimus*
Cabezon	261	*Scorpaenichthys marmoratus*
Cod, Pacific	197	*Gadus macrocephalus*
Corbina, California	426	*Menticirrhus undulatus*
Crestfish	906	*Lophotus lacepede*
Croaker, Black	421	*Cheilotrema saturnum*
Croaker, Spotfin	422	*Roncador stearnsii*
Croaker, Unidentified	420	Seiaenidae
Croaker, White	435	*Genyonemus lineatus*
Croaker, Yellowfin	423	*Umbrina roncador*
Dogfish, Spiny	152	*Squalus acanthias*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Dogfish, Velvet	097	*Scymnodon squamulosis*
Dolphinfish, Mahi-Mahi, Dorado	914	*Coryphaena hippurus*
Escolar (Smith's)	013	*Lepidocybium flavobrunneum*
Escolar, Longfin (Black mackerel)	054	*Scombrolabrax heterolepis*
Fish, Other Identified	910	Pisces
Fish, Unidentified	700	Pisces
Flatfish, Other Identified	955	Pleuronectiformes
Flatfish, Unidentified	200	Pleuronectiformes
Flounder, Starry	231	*Platichthys stellatus*
Flyingfish, California	445	*Cypselurus spp.*
Fringehead, Onespot	681	*Neoclinus uninotatus*
Fringehead, Sarcastic	680	*Neoclinus blanchardi*
Garibaldi	482	*Hypsypops rubicundus*
Greenling, Painted	289	*Oxylebius pictus*
Grenadier, Pacific	904	*Coryphaenoides acrolepis.*
Grenadier, Roundnose	905	*Coryphaenoides rupestris*
Grunion, California	181	*Leuresthes tenuis*
Guitarfish, Banded	183	*Zapteryx exasperata*
Guitarfish, Shovelnose	174	*Rhinobatos productus*
Hagfish Pacific	496	*Eptatretus stoutii*
Hake, Pacific	495	*Merluccius productus*
Halfmoon	478	*Medialuna californiensis*
Halibut Pacific	917	*Hippoglossus stenolepis*
Halibut, CaliforniaThe main	222	*Paralichthys californicus*
Herring, Pacific	121	*Clupea pallasii*
Herring, Round	122	*Etrumeus teres*
Jacksmelt	184	*Atherinopsis californiensis*
Kelpfish, Giant	501	*Heterostichus rostratus*

COMMON NAME	CODE	*SCIENTIFIC NAME*
King Of The Salmon	912	*Trachipterus altivelis*
Lampfish, Bigfin	822	*Symbolophorus californiensis*
Lampfish, Dogtooth	824	*Ceratosopelus townsendi*
Lampfish, Sunbeam	823	*Lampadena urophaos*
Lancetfish, Longnose	909	*Alepisaurus ferox*
Lingcod	195	*Ophiodon elongatus*
Lizardfish, California	473	*Synodus lucioceps*
Louvar	191	*Luvarus imperialis*
Mackerel, Bullet	019	*Auxis rochei*
Mackerel, Jack	055	*Trachurus symmetricus*
Mackerel, Pacific	051	*Scomber japonicus*
Mackerel, Unidentified	050	*Auxis Spp.*
Manta	129	*Manta birostris*
Marlin, Black	090	*Makaira Indica*
Marlin, Blue	093	*Makaira nigricans*
Marlin, Striped	092	*Tetrapturus audax*
Midshipman, Plainfin	485	*Porichthys notatus*
Midshipman, Specklefin	486	*Porichthys myriaster*
Midshipmen, Unidentified	489	*Batrachonididae*
Mobula	128	*Mobula sp.*
Mola, Common	292	*Mola mola*
Mola, Slender	298	*Ranzania laevis*
Mullet, Striped	135	*Mugil cephalus*
Needlefish, California	476	*Strongylura exilis*
Oarfish	911	*Regalecus glesne*
Oilfish	014	*Ruvettus pretiosus*
Opah	467	*Lampris guttatus*
Opaleye	475	*Girella nigricans*
Pacific saury	114	*Cololabis saira*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Pipefish Bay	140	*Syngnathus leptorhynchus*
Pipefish, Snubnose	141	*Syngnathus arctus*
Pomfret, Dagger	907	*Taractes rubescens*
Pomfret, Pacific	915	*Brama japonica*
Promfret, Sickle	908	*Taractichthys steindachneri*
Puffer, Pelagic	293	*Lagocephalus lagocephalus*
Queenfish	440	*Seriphus politus*
Rainbow Runner	058	*Elagatis bipinnulatus*
Ratfish, Spotted	166	*Hydrolagus colliei*
Ray, Bat	171	*Myliobatis californica*
Ray, California Butterfly	120	*Gymnura marmorata*
Ray, Pacific Electric	172	*Torpedo californica*
Ray, Unidentified	170	Myliobatoidea
Remora	127	*Remora remora*
Rockfish Yellowtail	259	*Sebastes flavidus*
Rockfish, Bank	663	*Sebastes rufus*
Rockfish, Black and Yellow	251	*Sebastes chrysomelas*
Rockfish, Blue	665	*Sebastes mystinus*
Rockfish, Bocaccio	253	*Sebastes paucispinis*
Rockfish, Bronzespotted	662	*Sebastes gilli*
Rockfish, Brown	267	*Sebastes auriculatus*
Rockfish, Canary	247	*Sebastes pinniger*
Rockfish, Chilipepper	254	*Sebastes goodei*
Rockfish, China	258	*Sebastes nebulosus*
Rockfish, Copper	655	*Sebastes caurinus*
Rockfish, Cowcod	245	*Sebastes levis*
Rockfish, Flag	657	*Sebastes rubrivinctus*
Rockfish, Gopher	263	*Sebastes carnatus*
Rockfish, Grass	652	*Sebastes rastelliger*
Rockfish, Kelp	659	*Sebastes atrovirens*
Rockfish, Olive	651	*Sebastes serranoides*
Rockfish, Other Identified	920	*Sebastes spp.*
Rockfish, Pink	653	*Sebastes eos*
Rockfish, Rosy	268	*Sebastes rosaceus*
Rockfish, Shortbelly	672	*Sebastes jordani*
Rockfish, Speckled	669	*Sebastes ovalis*
Rockfish, Treefish	658	*Sebastes serriceps*
Rockfish, Unidentified	250	*Sebastes sp.*
Rockfish, Vermillion	249	*Sebastes miniatus*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Sablefish	190	*Anoplopoma fimbria*
Sailfish	095	*Istiophorus platypterus*
Salmon, King	302	*Oncorhynchus tshawtscha*
Salmon, Other Identified	930	*Oncorhynchus spp.*
Sanddab, Unidentified	225	Bothidae
Sanddab, Longfin	226	*Citharichthys xanthostigma*
Sanddab, Pacific	227	*Citharichthys sordidus*
Sanddab, Speckled	228	*Citharichthys stigmaeus*
Sardine, Pacific	100	*Sardinops sagax*
Sargo	480	*Anisotremus davidsonii*
Scorpionfish, California	260	*Scorpaena guttata*
Sculpin, Unidentified	274	Cottidae
Seabass, White	400	*Atractoscion nobilis*
Searobin, Lumptail	674	*Prionotus stephanophrys*
Senorita	144	*Oxyjulis californica*
Shad, American	325	*Alosa sapidissima*
Shark or Ray, Unidentified	102	Elasmobranchii
Shark, Basking	156	*Cetorhinus maximus*
Shark, Bigeye Thresher	147	*Alopias superciliosus*
Shark, Blue	167	*Prionace glauca*
Shark, Brown Smoothhound	154	*Mustelus henlei*
Shark, Common Thresher	155	*Alopias vulpinus*
Shark, Cookie Cutter	136	*Isistius brasiliensis*
Shark, Crocodile	143	*Pseudocarcharias kamoharai*
Shark, Dusky	164	*Carcharhinus obscurus*
Shark, Gray Smoothhound	179	*Mustelus californicus*
Shark, Horn	169	*Heyterodontus francisci*
Shark, Leopard	153	*Triakis semifasciata*
Shark, Longfin Mako	938	*Isurus paucus*
Shark, Megamouth	192	*Megachasma pelagios*
Shark, Oceanic Whitetip	138	*Carcharhinus longimanus*
Shark, Other Identified	935	*Chondrichthys*
Shark, Pacific Angel	165	*Squatina californica*
Shark, Pelagic Thresher	148	*Alopias pelagicus*
Shark, Prickly	963	*Echinorhinus cookei*
Shark, Salmon	168	*Lamna ditropis*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Shark, Scalloped Hammerhead	949	*Sphyrna lewini*
Shark, Sevengill	162	*Notorynchus cepedianus*
Shark, Shortfin Mako	151	*Isurus oxyrinchus*
Shark, Silky	142	*Carcharhinus falciformis*
Shark, Sixgill	161	*Hexanchus griseus*
Shark, Smooth Hammerhead	158	*Sphyrna zygaena*
Shark, Soupfin	159	*Galeorhinus zyopterus*
Shark, Swell	163	*Cephaloscyllium ventriosum*
Shark, Unidentified Hammerhead	157	*Sphyrna sp.*
Shark, Unidentified Thresher	139	Alopidae
Shark, Unidentified Mako	939	*Isurus sp.*
Shark, Unidentified	936	Chondrichthys
Shark, White	096	*Carcharodon carcharias*
Sheephead, California	145	*Semicossyphus pulcher*
Skate, Big	176	*Raja binoculata*
Skate, California	177	*Raja inornata*
Skate, Longnose	941	*Raja rhina*
Skate, Other Identified	940	Rajidae
Skate, Starry	079	*Raja stellulata*
Skate, Unidentified	175	Rajidae
Smelt, Surf	182	*Hypomesus pretiosus*
Smelt, True, Unidenfified	180	Osmeridae
Snake Mackerel	295	*Gempylus serpens*
Sole, Bigmouth	202	*Hippoglossina stomata*
Sole, Butter	208	*Isopsetta isolepis*
Sole, Dover	211	*Microstoma pacificus*
Sole, English	206	*Parophrys vetulus*
Sole, Fantail	204	*Xystreurys liolepis*
Sole, Petrale	209	*Eopsetta jordani*
Sole, Rex	207	*Glyptocephalus zachirus*
Sole, Rock	203	*Lepidopsetta bilineata*
Sole, Sand	205	*Psettichthys melanostictus*
Sole, Slender	210	*Lyopsetta exilis*
Spearfish, Shortbill	094	*Tetrapturus angustirostris*
Stargazer Smooth	673	*Kathetostoma averruncus*
Stingray, Pelagic	193	*Dasyatis violacea*
Stingray, Round	173	*Urolophus halleri*
Sturgeon Unidentified	470	Acipenseridae
Sturgeon, Green	471	*Acipenser medirostris*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Sturgeon, White	472	*Acipenser transmontanus*
Surfperch Barred	551	*Amphistichus argenteus*
Surfperch Black	552	*Embiotoca jacksoni*
Surfperch Other Identified	945	Embiotocidae
Surfperch Pile	559	*Rhacochilus vacca*
Surfperch, Pink	563	*Zalembius rosaceus*
Surfperch, Rainbow	562	*Hypsurus caryi*
Surfperch, Reef	946	*Micrometrus aurora*
Surfperch, Rubberlip	558	*Rhacochilus toxotes*
Surfperch, Shiner	554	*Cymatogaster aggregata*
Surfperch, Silver	564	*Hyperprosopon ellipticum*
Surfperch, Striped	565	*Embiotoca lateralis*
Surfperch, Unidentified	550	Embiotocidae
Surfperch, Walleye	557	*Hyperprosopon argenteum*
Surfperch, White	556	*Phanerodon furcatus*
Swordfish, Broadbill	091	*Xiphias gladius*
Thornback	178	*Platyrhinoidis triseriata*
Tonguefish, California	212	*Symphurus atricauda*
Topsmelt	186	*Atherinops affinis*
Triggerfish, Finescale	290	*Balistes polyepis*
Triggerfish, Unidentified	291	Balistidae
Tuna, Albacore	005	*Thunnus alalunga*
Tuna, Bigeye	916	*Thunnus obesus*
Tuna, Bluefin	004	*Thunnus thynnus*
Tuna, Skipjack	002	*Euthynnus pelamis*
Tuna, Unidentified	006	Scombridae
Tuna, Yellowfin	001	*Thunnus albacares*
Turbot Hornyhead	238	*Pleuronichthys verticalis*
Turbot, C-O	237	*Pleuronichthys coenosus*
Turbot, Curlfin	235	*Pleuronichthys decurrens*
Turbot, Diamond	236	*Hypsopsetta guttulata*
Turbot, Spotted	239	*Pleuronichthys ritteri*
Turbot, Unidentified	240	Pleuronectidae
Wahoo	057	*Acanthocybium solandri*
Whitefish, Ocean	490	*Caulolatilus princeps*
Wolf-eel	---	*Anarrhichthys ocellatus*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Wrasse, Rock	146	*Halichoeres semicinctus*
Yellowtail	040	*Seriola lalandei*
Zebraperch	602	*Hermosilla azurea*
INVERTEBRATES		
Abalone, Red	702	*Haliotis rufescens*
Argonauts/Paper Nautilus	684	*Argonauta sp.*
Cephalopod, Unidentified	688	*Cephalopoda*
Crab, California King	804	*Paralithodes sp.*
Crab, Decorator	832	*Loxorhynchus crispatus*
Crab, Dungeness	800	*Cancer magister*
Crab, Hermit	830	*Pagurus sp.*
Crab, Marble	831	*Randallia ornata*
Crab, Northern Kelp	833	*Pugettia producta*
Crab, Opossum	808	*Lopholithodes forminatus*
Crab, Parasol	806	*Paromola faxoni*
Crab, Pelagic Red	807	*Pleuroncodes planipes*
Crab, Pointer	809	*Mursia gaudichaudii*
Crab, Red Rock	341	*Cancer productus*
Crab, Rock	801	*Cancer sp.*
Crab, Sand	805	*Emerita sp.*
Crab, Southern Kelp	802	*Taliepus nutallii*
Crab, Spider	803	*Loxorhynchus sp.*
Crab, Yellow	342	*Cancer anthonyi*
Crab, Unidentified	798	Coenobitidae
Crustacean, Unidentified	899	Crustacea
Echinoderm, Unidentified	750	Echinodermata
Hare, Sea	749	*Aplysia californica*
Invertebrate, Unidentified	999	Invertebrata
Krill, Pacific	821	*Euphausia pacifica*
Lobster, California Spiny	820	*Panulirus interruptus*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Mollusk, Unidentified	799	Mollusca
Octopus, Tuberculate Pelagic	715	*Ocythoe tuberculata*
Octopus, Giant	683	*Haliphron atlanticus*
Octopus, Unidentified	712	*Octopus sp.*
Prawn, Golden	817	*Penaeus californiensis*
Scallop, Unidentified	719	Pectinidae
Sea Cucumber	755	Holothuroidea
Sea Star	751	Asteroidea
Sea Urchin	752	*Strongylocentrotus sp.*
Shrimp, Bay	810	Crangonidae
Shrimp, Mantis	811	*Hemisquilla ensigera*
Shrimp, Spot, Spot Prawn	815	*Pandalos platyceros*
Shrimp, Unidentified	814	Caridea
Snail, Moon	736	*Polinices lewisii*
Snail, Unidentified	732	Gastropoda
Squid, Eggs	993	*Teuthida*
Squid, Clubhook spp.	699	*Onychoteuthis spp.*
Squid, Cranchia, Glass Squid	718	*Cranchia scabra*
Squid, Flowervase Jewell	686	*Histioteuthis dofleini*
Squid, Gonatus sp.	714	*Gonatus sp. squid*
Squid, Jumbo (Humboldt)	717	*Dosidicus gigas*
Squid, Market	711	*Loligo opalescens*
Squid, Robust Clubhook	687	*Moroteuthis robusta*
Squid, Unidentified	713	*Teuthoidea*
Squids, Jewell/Umbrella	685	*Histioteuthis sp.*
Squids, Octopus	682	*Octopoteuthis sp.*
Tunicates, Pelagic	840	*Tunicates spp.*
Whelk	731	*Kellettia sp.*
SEABIRDS		
Albatross, Black-Footed	dNG	*Phoebastria nigripes*
Albatross, Laysan	dIM	*Phoebastria immutabilis*
Albatross, Short-tailed	dAL	*Phoebastria albatrus*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Albatross, Unidentified	dSP	*Phoebastria sp.*
Alcid, Unidentified	aSP	Alcidae
Bird, Unidentified	aVE	Aves
Booby, Brown	sLP	*Sula leucogaster plotus*
Booby, Masked	sDP	*Sula dactylatra personata*
Booby, Red-Footed	sSR	*Sula sula rubripes*
Cormorant, Brandt's	pPN	*Phalacrocorax penicillatus*
Cormorant, Double-crested	pAU	*Phalacrocorax auritus*
Cormorant, Pelagic	pPL	*Phalacrocorax pelagicus*
Cormorant, Unidentified	pSP	*Phalacrocorax sp.*
Fulmar,Northern	fGL	*Fulmarus glacialis*
Grebe, Unidentified	pOD	*Podiceps sp.*
Grebe, Western	aOC	*Aechmophorus occidentalis*
Guillemot, Pigeon	cCO	*Cepphus columba*
Gull, Unidentified	gLA	Laridae
Loon, Common	gIM	*Gavia immer*
Loon, Pacific	gPA	*Gavia pacifica*
Loon, Red-throated	gST	*Gavia stellata*
Loon, Unidentified	gSP	*Gavia sp.*
Murre, Common	uAA	*Uria aalge*
Murrelet, Marbled	bMA	*Brachyramphus marmoratus*
Pelican, Brown	pOC	*Pelecanus occidentalis*
Oystercatcher, Black	hBA	*Haematopus bachmani*
Scoter, Surf	mDE	*Melanitta perspicillata*
Tern, Common	tSH	*Sterna hirundo*
SEA TURTLES		
Turtle, Green/Black	CM	*Chelonia mydas/agassizi*
Turtle, Hawksbill	EI	*Eretmochelys imbricata*
Turtle, Leatherback	DC	*Dermochelys coriacea*
Turtle, Loggerhead	CC	*Caretta caretta*

COMMON NAME	CODE	*SCIENTIFIC NAME*
Turtle, Olive Ridley	LV	*Lepidochelys olivacea*
Turtle, Unidentified	UT	Chelonidae
Turtle, Unidentified Hardshell	UH	other than Leatherback
MARINE MAMMALS		
Beaked Whale, Baird's	BD	*Berardius bairdii*
Beaked Whale, Blainville's	MD	*Mesoplodon densirostris*
Beaked Whale, Cuviers	ZI	*Ziphius cavirostris*
Beaked Whale, Ginkgo-toothed	MG	*Mesoplodon ginkgodens*
Beaked Whale, Hector's	MH	*Mesoplodon hectori*
Beaked Whale, Hubbs'	MC	*Mesoplodon carlhubbsi*
Beaked Whale, Mesoplodont	UM	*Mesoplodon spp.*
Beaked Whale, Stejneger's	MT	*Mesoplodon stejnegeri*
Beaked Whale, Unidentified	ZU	Ziphiidae
Cetacean, Unidentified	UC	Cetacea
Dolphin, Bottlenose	TT	*Tursiops truncatus*
Dolphin, Fraser's	LH	*Lagenodelphis hosei*
Dolphin, Long-Beaked Common	DL	*Delphinus capensis*
Dolphin, Northern Right Whale	LB	*Lissodelphis borealis*
Dolphin, Pacific White-sided	LO	*Lagenorhynchus obliquidens*
Dolphin, Risso's	GG	*Grampus griseus*
Dolphin, Rough-toothed	SB	*Steno bredanensis*
Dolphin, Short-Beaked Common	DS	*Delphinus delphis*
Dolphin, Spinner	SL	*Stenella longirostris*
Dolphin, Spotted	SA	*Stenella attenuata*
Dolphin, Striped	SC	*Stenella coeruleoalba*
Dolphin, Unidentified	UD	Delphinidae
Dolphin, Unidentified Common	DD	*Delphinus sp.*
Porpoise Dall's	PD	*Phocoenoides dalli*
Porpoise, Harbor	PP	*Phocoena phocoena*
Porpoise, Unidentified	UP	Phocoenidae
Whale, Blue	BM	*Balaenoptera musculus*
Whale, Dwarf Sperm	KS	*Kogia simus*
Whale, False Killer	PC	*Pseudorca crassidens*
Whale, Fin	BP	*Balaenoptera physalus*
Whale, Gray	ER	*Eschrichtius robustus*
Whale, Humpback	MN	*Megaptera novaeangliae*
Whale, Killer	OO	*Orcinus orca*
Whale, Melon-headed	PE	*Peponocephala electra*

COMMON NAME	**CODE**	***SCIENTIFIC NAME***
Whale, Minke	BA	*Balaenoptera acutorostrata*
Whale, Pygmy Killer	FA	*Feresa attenuata*
Whale, Pygmy Sperm	KB	*Kogia breviceps*
Whale, Sei	BB	*Balaenoptera borealis*
Whale, Short-finned Pilot	GM	*Globicephala macrorhynchus*
Whale, Sperm	PM	*Physeter macrocephalus*
Whale, Unidentified	UW	*Cetacean whale*
Whale, Unidentified Kogia	UK	*Kogia*
Fur Seal, Guadalupe	AT	*Arctocephalus townsendi*
Fur Seal, Northern	CU	*Callorhinus ursinus*
Fur Seal, Unidentified	UA	*Arctocephalinae*
Pinniped, Unidentified	PU	Pinnipedia
Sea Lion, California	ZC	*Zalophus californianus*
Sea Lion, Steller	EJ	*Eumetopias jubatus*
Sea Lion, Unidentified	UO	Otariinae
Seal, Harbor	PV	*Phoca vitulina*
Seal, Hawaiian Monk	MS	*Monachus schauinslandi*
Seal, Northern Elephant	MA	*Mirounga angustirostris*
Seal, Unidentified	US	*Phocidae*
Sea Otter	EL	*Enhydra lutris*

PORT CODES

PORT	PORT DEPART	PORT RETURN
Albion	ALB	ALB
Alviso	ALV	ALV
Astoria Oregon	AST	AST
Avalon	AVA	AVA
Avila Beach	AVI	AVI
Bellingham	BEL	BEL
Bodega bay	BOD	BOD
Carpinteria	CAR	CAR
Catalina Harbor	CAT	CAT
Coos bay	COO	COO
Crescent City	CC	CC
Dana Point	DAN	DAN
Eureka	EUR	EUR
Everett	EV	EV
Fort Bragg	FB	FB
Gunther Island (Eureka)	GUN	GUN
Half Moon Bay	HMB	HMB
Huntington Beach	HB	HB
Incline Village	INC	INC
Juneau	JUN	JUN
Lompoc	LOM	LOM
Long Beach	LB	LB
Los Angeles	LA	LA
Malibu	MAL	MAL
Mission Bay	MB	MB
Monterey	MON	MON
Morro Bay	MOR	MOR
Moss Landing	MOS	MOS
Newport	NEW	NEW
Newport Beach	NB	NB
Oakland	OAK	OAK
Oceanside	OCE	OCE
Oxnard	OXN	OXN
Pillar Point	PIL	PIL
Port Hueneme	PH	PH
Port San Luis	PSL	PSL
Redondo Beach	RB	RB
Richmond	RMD	RMD
San Bruno	SBO	SBO

PORT	PORT DEPART	PORT RETURN
San Diego	SD	SD
San Francisco	SF	SF
San Luis Obispo	SLO	SLO
San Pedro	SP	SP
Sand Point	SPT	SPT
Santa Barbara	SB	SB
Santa Cruz	SCR	SCR
Santa Paula	SPA	SPA
Seal Beach	SLB	SLB
Seattle	SEA	SEA
Solana Beach	SOL	SOL
Trinidad	TRI	TRI
Unknown	UNK	UNK
Ventura	VEN	VEN
Westport	WES	WES
Wilmington	WIL	WIL

Simplified overview of the discharge provisions of the revised MARPOL Annex V which entered into force on 1 January 2013

DISCLAIMER: Additional requirements may apply.

This simplified overview is for information or reference purposes only and is not meant as a substitute for the comprehensive provisions in the revised MARPOL Annex V (resolution MEPC.201(62)) or the 2012 Guidelines for the Implementation of MARPOL Annex V (resolution MEPC.219(63)).

<table>
<tr><th>Type of garbage</th><th>Ships outside special areas</th><th>Ships within special areas</th><th>Offshore platforms and all ships within 500 m of such platforms</th></tr>
<tr><td>Food waste comminuted or ground</td><td>Discharge permitted
≥3 nm from the nearest land and en route</td><td>Discharge permitted
≥12 nm from the nearest land and en route</td><td>Discharge permitted
≥12 nm from the nearest land</td></tr>
<tr><td>Food waste not comminuted or ground</td><td>Discharge permitted
≥12 nm from the nearest land and en route</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Cargo residues[1] not contained in wash water</td><td rowspan="2">Discharge permitted
≥12 nm from the nearest land and en route</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Cargo residues[1] contained in wash water</td><td>Discharge only permitted in specific circumstances[2] and ≥12 nm from the nearest land and en route</td><td>Discharge prohibited</td></tr>
<tr><td>Cleaning agents and additives[1] contained in cargo hold wash water</td><td rowspan="2">Discharge permitted</td><td>Discharge only permitted in specific circumstances[2] and ≥12 nm from the nearest land and en route</td><td>Discharge prohibited</td></tr>
<tr><td>Cleaning agents and additives[1] contained in deck and external surfaces wash water</td><td>Discharge permitted</td><td>Discharge prohibited</td></tr>
<tr><td>Carcasses of animals carried on board as cargo and which died during the voyage</td><td>Discharge permitted
as far from the nearest land as possible and en route</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>All other garbage including plastics, domestic wastes, cooking oil, incinerator ashes, operational wastes and fishing gear</td><td>Discharge prohibited</td><td>Discharge prohibited</td><td>Discharge prohibited</td></tr>
<tr><td>Mixed garbage</td><td colspan="3">When garbage is mixed with or contaminated by other substances prohibited from discharge or having different discharge requirements, the more stringent requirements shall apply</td></tr>
</table>

1 These substances must not be harmful to the marine environment.

2 According to regulation 6.1.2 of MARPOL Annex V, the discharge shall only be allowed if: (a) both the port of departure and the next port of destination are within the special area and the ship will not transit outside the special area between these ports (regulation 6.1.2.2); and (b) if no adequate reception facilities are available at those ports (regulation 6.1.2.3).