Hawai'ian Islands Cetacean & Ecosystem Assessment Survey

---- OBSERVER MANUAL ----

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MARINE MAMMAL OBSERVER MANUAL
HICEAS Research Cruise 2002

I. INTRODUCTION

The Southwest Fisheries Science Center (SWFSC) of the National Marine Fisheries Service (NMFS) conducts line transect surveys of whale and dolphin populations in various areas of the Pacific. This current survey is in the U.S. EEZ waters around Hawaii and is the first such large-scale ship survey in this area. This manual is intended as an introduction to the field methodologies, project objectives, and as a general information guide for the biological observers who will be participating in the surveys.

I.A. *Hawaiian Island Cetacean and Ecosystem Assessment Survey 2002*

1. Project Overview

The HICEAS-2002 cruise is a marine mammal assessment survey of the U.S. Hawaiian waters out to a distance of approximately 200 nautical miles from the islands (including the northwest islands). The overall objective of the HICEAS cruise is to estimate the abundance, and understand the distribution, of dolphins and whales which are commonly found off Hawaii. In addition, biological and oceanographic data will be collected to better characterize their environment. Other objectives include acoustic sampling, biopsy sampling and photo-identification.

The principal study area includes the U.S. Exclusive Economic Zone (EEZ) of Hawaii out to a distance of approximately 200 nautical miles and international waters between California and Hawaii. The survey is planned to be a grid of predetermined tracklines to uniformly cover this offshore area. Tracklines may need to be modified prior to or during the cruise due to weather or other considerations.

Scientists will identify cetacean species and estimate school size and composition, and will also census seabirds and pinnipeds. Physical, chemical, and biological oceanographic data will be collected via net tows and CTDs. Acoustic sampling using a towed hydrophone array and deployed sonobuoys will be conducted. Biopsy sampling and photography will be conducted from the bow or from small boats. Photo-ID on this cruise will be especially important and is the primary method for estimating the abundance of blue and humpback whales.

The Chief Scientist for the cruise is Dr. Jay Barlow.

II. MARINE MAMMAL OBSERVERS AND PROCEDURES

II.A. Personnel

The ultimate responsibility for the project rests with the Chief Scientist. On each leg of each ship, the scientific party is headed by the cruise leader, who is designated with the authority of the Chief Scientist. The cruise leader's position is covered in section IV. A.

1. Identification Specialists (two per ship)

Identification Specialists are experienced observers who have demonstrated ability to identify the marine mammal species of the working grounds and to organize the collection of scientific data. Generally, these individuals have opposite watch schedules so that one or the other will always be on duty.

Sometimes identification specialists have been referred to as "team leaders", and very often, they do act as leaders based on their wealth of prior experience on SWFSC and other surveys. However, at various times, any member of the search team may be called upon to act as its leader. The team is encouraged to make decisions and act by consensus. If everyone understands and agrees with a particular decision, the team will work better together. Of course, the experience of the identification specialists will be a big help in maintaining the consistency of data gathering efforts between this and previous surveys. In confusing or unique field situations, judgement calls should be made in conjunction with the cruise leader.

2. Observers (four per ship)

Observers and identification specialists are responsible for collecting the primary data for which the cruises are designed. The observer teams use 25 x 150 power Fujinon binoculars ("bigeyes") to scan the waters over the forward 180º along the vessel's course. The marine mammal observers must be proficient in sighting marine mammals and in recording accurate data. Some people have a "better eye" than others and will see schools at a greater distance, but what is important is that schools do not get abeam of the vessel before an observer detects them. Observers work together as a team. Of primary importance is that the observers work together to identify as many of the potentially identifiable schools in the search path as possible.

In high-density areas it can be difficult to determine what is a new sighting and what has already been recorded. This is especially true as the vessel turns while on chase. It is important to keep track of what is happening around the vessel, not just what is occurring in your search area. Try to keep in mind the general bearing, distance, and direction of travel of all animals in a multiple sighting area. Avoid double counting whales and dolphin schools. Often the recorder can aid in this since s/he has the bigger picture visually and can use the graphic mapping function of the computer data program.

Communication among observers is key to everyone on the flying bridge knowing what has been seen and where it is. When closing on a school, observers should be communicating about where the front and rear of the school is located, the location and taxonomic identity of subgroups, and related information. Sometimes during a chase subgroups separate from the main school. When this is noticed it should be pointed out so that all observers will include these animals in their final estimates of school size.

II.B. Watch Rotations

The primary duties of the marine mammal observers are conducted during a rotation through three positions: port binoculars, data recorder, and starboard binoculars. Observers alternate two-hour shifts (two hours on, two hours off) throughout the daylight hours. Exceptions to this schedule may be necessary to adjust to the ship's mealtimes, to assist with ancillary projects, and to make school size estimates with the helicopter (if applicable). Observers also rotate on a daily schedule, i.e. a different combination of people will begin at daybreak each day.

During a given watch, the observers rotate through the positions, normally for a period of forty minutes per station. During severe glare or high Beaufort conditions the team may select watch periods of shorter duration to lessen fatigue.

Be on time when reporting to the flying bridge for duty. Allow enough time for a smooth transition between observers. You should arrive on the flying bridge 3-5 minutes before the beginning of your watch. This is especially important when cues have been spotted or a sighting is in progress.

II.C. Duties

1. Searching

The visual survey takes place from the ship’s flying bridge about 10 meters above waterline. The work area is comprised of three pair of bigeye binoculars mounted on adjustable stands to the port, central and starboard regions of the deck; a recorder’s chair and a laptop computer; and a birder’s station with a laptop computer. Two observers search forward of the ship with 25X bigeyes for marine mammals (or cues that could lead to a marine mammal sighting such as splashes, blows, or bird activity). Both the port and starboard 25X binoculars are used while “on-effort,” or actively searching for new sightings. A third, central pair of bigeyes will be used by the recorder while on chase, after data have been entered into the computer. The birder or the independent observer may also use the central bigeyes.

It is extremely important to maintain consistency in searching effort. While on-effort, all three members of the observer team, are actively searching for marine mammals. Any other configuration should be recorded as “off-effort.”

The binocular stands are equipped with a 360º azimuth ring enabling the observer to read relative bearing. A reticle scale inscribed in the eye piece is used to measure distance. Each observer scans out to the horizon from abeam (90º) on his/her side of the ship to 10º to the opposite side of the bow (100º in all). The 20º along the ship's trackline will thus receive overlapping coverage by the two bigeye observers.

When a sighting is made, the reticle (distance) and angle (bearing) is verbally relayed to the recorder. Angles should be read to the nearest degree; not rounded to the nearest 5º or 10º. Distances greater than the first tenth reticle below the horizon (about five nautical miles) cannot be determined with any accuracy and should not be recorded until a sighting is within this distance of the ship. Do not record whale blows or leaping dolphins seen over the horizon. Cues are not entered into the computer until marine mammals are sighted.

2. Recorder

When in the recorder position, observers search the area near the ship to prevent close sightings from being missed. The magnification of the 25X binoculars preclude searching closer than about 300 meters to the ship. The recorder maintains watch over this region as well as the "big picture" view using naked eye and hand-held 7X binoculars.

The recorder is responsible for entering all searching, sighting and environmental data into a laptop PC and for starting the Marine Mammal Sighting Form (Appendix 1). The recorder estimates school size and species composition for sightings after these initial responsibilities are completed.

The computer is connected to a geographical positioning system (GPS) that associates all records ("events") with the latitude and longitude at the time of entry. The recorder should keep abreast of all changes as they occur during the survey. When a sighting is initially made, the observer who made it informs the recorder of the angle and distance to the school. The recorder should repeat the angle and distance, and receive a verbal confirmation from the observer who made the sighting before recording the data. It is important to enter the angle and the reticle before asking the ship to turn, otherwise the data program's mapping function will not operate correctly.

The recorder is typically the person who communicates with the ship's bridge during searching operations via handheld radio. The bridge records environmental data every hour and is usually the source of information for the wind, wave and swell data the recorder enters into the PC database. The recorder may also be the person communicating with the bridge during a chase sequence, although this varies (see II.C.3. below).

3. Closing Mode

When a sighting is made, searching effort is usually terminated and the team enters the off-effort mode. At this time both pairs of binoculars should be focused on the sighting to ensure keeping visual contact with the school. At the decision of the team, the ship will close on the school to determine the species present and estimate the total number of individuals. Once the initial sighting data have been recorded and the ship is closing on the mammal school, the recorder should move to the third pair of bigeyes to make his/her own estimates of school size and composition. When observers are communicating about the school, they should include morphological features and behavior of the dolphins as they are observed.

Close communication with the ship's bridge personnel is necessary during chase. In most cases, there should be only one person coordinating all communication with the bridge to reduce confusion. This can be the recorder or the person who initially made the sighting.

Some bridge personnel appreciate additional information as it develops about the sighting, such as the species composition (the school is usually too far away for them to see at the outset of chase), while others prefer just the basic requests for changes in ship course or speed. Observers should try to be aware of how much information about the sighting different bridge personnel want or don't want, and provide that level.

II.D. Data

1. WinCruz

Searching effort and sightings of marine mammals, pinnipeds, and sea turtles are recorded using "WinCruz," a computer program developed at the SWFSC. Whenever observer teams are actively searching for new sightings they are on-effort and that effort must be recorded as well as any actual sightings. Data on environmental factors (weather, sun height and angle, swell height and direction, etc.) and position of observers are entered by the recorder and integrated by the program with GPS data on vessel course and speed.

2. Marine Mammal Sighting Form

The sighting sheet (Appendix 1) is a paper form designed to supplement and expand upon information on each sighting contained in WinCruz. Initial time of sighting, angle and reticle are recorded as a backup to the computer file, while other information on taxonomic identification (including a sketch showing identifying features observed), behavior, life history, etc., is unique to the form. These data are used to verify species identification as well as record features of interest associated with the sighting. You do not have to be a good artist, but the species in your sketch must be identifiable to someone who has not been told in advance what species it is.

For each ship, every on-effort marine mammal sighting is identified by a consecutive number unique to the cruise. Although the sighting form is initiated by the recorder entering the taxonomic ID, time, angle and reticle into the appropriate fields, the observer who first sighted the animals is responsible for completing the form. (Or, occasionally, this may be the observer who got the best look.) If any observer has additional information that would enhance the report, that individual should add his/her comments on the sighting form. These additions should include the observer's identification number.

On the back of the form are questions regarding dolphin behavior (Appendix 2). These should be completed with the rest of the form by the observer who made the sighting or who got the best look. If possible, expand the narrative portion of the form with observations of the dolphins' reaction to the vessel (see Appendix 3).

3. Taxonomic Identifications and School Size Estimates

The focus of the survey and the primary marine mammal data to be collected are the species identification and group size estimates. Ideally, the ship will stay with a school long enough for all on-watch observers to see all the species present and make their best possible estimates of abundance. Observers agree about which species (or taxonomic levels if species IDs aren't possible) are present. The identification specialist, in consultation with team members, makes the final determination of the appropriate taxonomic level to record for the sighting.

Taxonomic identifications on this survey should be conservative. For example, if only a blow is seen a generalized taxonomic grouping such as "large whale" should be used. When identification to species level can not be made, observers should, if possible, indicate "possible" or "probable" identifications on the sighting form. Sightings should be identified based on features actually seen, as recorded on the sighting continuation form. Appendix 4 lists the species, subspecies, and data codes for marine mammals, pinnipeds, and sea turtles.

Each observer makes three estimates of school size (best, high, low) for all sightings. A high estimate is the number that the observer feels confident is not exceeded by the number of animals in the school; similarly a low estimate is the number for which the observer is confident that the school size equals or exceeds. Estimates of school size and percent taxonomic composition should be made independently by each observer, without discussion among observers of one another's estimates at any time. On some cruises, observer estimates are calibrated against schools photographed by a helicopter carried on the research vessel and an observer-specific correction factor may be calculated using statistical techniques. It is important that each observer maintain as consistent a method as possible of estimating school size and composition independently of all other observers during the cruise.

4. Individual Observer Log Books

Each observer maintains a "green book," used primarily to record estimates of the number of individuals and taxonomic composition in percentages for each school seen by the observer. Three estimates of school size (best, high, and low) are recorded for all schools seen, as well as the percent composition for mixed-species schools. The green books are collected by the cruise leader at the end of the day and the estimates of school size and composition are added to the sighting records in WinCruz. The information recorded in green books should be legible and written in a consistent format.

Use the following guideline for consistent record keeping of sighting information during the cruise. Use a full double page for your entries. Best/High/Low estimates are for the total school size, not individual species within the sighting. When a lower number of animals of the second or third species are seen, calculate percentages of the best estimate (i.e. sighting #137).

Date: 15 AUG 93

Sight	Best	High	Low	Species	%	Notes
#135	12	15	10	*Stenella attenuata*	100	
#136				*Stenella attenuata*	80	
				Stenella longirostris	20	
	200	250	150	TOTAL	100	
#137				*Tursiops truncatus*	80	Two fin whales in a group
				G. macrocephalus	16	of bottlenose dolphins and
				B. physalus	4	pilot whales
	50	55	45	TOTAL	100	

The species or taxa recorded for each school in the green book should match those in the WinCruz file and on the sighting continuation sheet for all observers that saw the school.

Sometimes a small school will be lost during chase, or a large school will scatter before all observers have had time to make their best estimates of abundance or see all species. In these situations observers should do the best they can at estimating abundance, perhaps using a wider range between their high and low estimates than typical. Individual observers should not estimate a percentage composition for species they did not see, but should include all the species' names the team have agreed were present in their green book for that sighting.
These books are also useful for taking down pertinent information about each sighting. Notes taken immediately after an encounter will aid in the quality of the information that will be written on the sighting continuation form at a later time (usually that evening).

5. Sightings Made Off-Effort or by Individuals Other Than the Survey Team

Every attempt is made during these surveys to hold searching effort as uniform as possible. Therefore, all personnel not working in a survey position (this includes off-duty observers, bird observers, and crew members) must follow the "90º Rule:" marine mammals should not be pointed out to on-watch observers by other personnel until the mammals have passed more than 90º to either side of the vessel (i.e., they have passed abeam). There are no exceptions to this rule. Once the animals have passed abeam of the ship, they can be recorded as off-effort sightings. These sighting are not used in calculating abundance.

Similarly, off-effort sightings made by the on-watch observers are not used in estimating dolphin abundance. However, off-effort data may be used for other purposes, such as distribution records. When on chase, observers should keep an eye out for other marine mammals in the area and enter the data on these off-effort sightings. If, when resuming on-effort searching, an off-effort sighting is visible in the 180E forward of the ship, enter it as a new on-effort sighting and add comments to the computer file and paper forms detailing which two sightings (off-effort and on-effort) are the same.

6. Independent Observer

At times the cruise leader or other survey member will be designated the "independent observer". This person searches for marine mammals ahead of the ship using naked eye, 7X binoculars and occasionally the third pair of bigeyes. If marine mammals are seen by the independent observer s/he notes the time, and the approximate angle and reticle, taking care not to cue the regular observer team to the presence of animals. The 90º Rule still applies. However, if these animals are not sighted by the primary team before they pass abeam, they are recorded as an on-effort sighting made by the independent observer, using the original time, angle and sighting distance. These data are used in determining the proportion of schools missed by the primary team.

II.E. Procedures

1. Criteria for Off-Effort or Closing Mode

In order to obtain school size and species information, the survey enters the off-effort mode, in which the ship can turn off the trackline in order to approach a school. A balance must be struck between spending time off-effort chasing dolphin schools and time searching on-effort. The team makes the decision to go off-effort and turn the ship. The criteria for turning are: (1) the school is a target species, and (2) the school is not too far off the trackline (usually not more than 3 nautical miles off the trackline, perpendicular distance). Exceptions to these guidelines are possible, but the team should discuss such exceptions with the cruise leader before turning. For reference, a table with the 3-mile reticle reading at different angles will be provided at the recorder station on the flying bridge.

After the sighting is complete, the ship resumes a course parallel to the original trackline and the team goes back on-effort, as long as the distance from the planned trackline is less than 5 nautical miles. Once the ship is further than 5 miles from the original trackline, it will angle back to the trackline at 20E.

2. Environmental Considerations for Stopping Effort

Weather is recorded throughout the day. A Beaufort Scale of six or higher is the point at which conditions become too poor for marine mammal survey effort to continue. Determination of Beaufort can be somewhat arbitrary as it is based on the combination of wind velocity, wave and swell height. Remember that the Beaufort scale is based on observations made by naked eyes; the view through bigeyes will show more whitecaps because they emphasize the crests of waves near the horizon. Sighting conditions traveling with the swell are better than those heading into it, for instance. Decisions to maintain or close the survey effort must reflect the team's judgment of the quality of data they would collect or miss in either event. Termination of survey effort should be determined by the team in conjunction with the cruise leader.

Survey effort is also suspended when rain or fog reduce visibility to a mile or less along the trackline or greater than 50% of the horizon is obscured. The team may decide to alter course by up to 30E for short periods to avoid rain squalls.

3. Glare

During periods of morning or afternoon glare, the team may decide to turn the vessel 10E- 15E to avoid the glare being positioned dead ahead. The vessel should return to base course (or slightly to the opposite side of base course from which originally turned) once glare is no longer a problem. When deciding on this temporary course, the needs of the bird observers should be considered as well.

II.F. Helicopter Operations (only on select cruises… HICEAS is not one of them)

Four additional scientific personnel are involved with helicopter operations: a pilot, a helicopter mechanic, and two SWFSC individuals from the photogrammetry section.

The function of the helicopter is to fly ahead of the ship and photograph schools that will subsequently be observed by the observers on the ship. The aerial photos are used for several purposes. One is to make counts of the number of individual dolphins in the school, which are compared to observer estimates of school size. A statistical regression of the observer's best, high and low estimates against the photogrametric counts is performed to determine the best linear combination of the three estimates for representing school size.

Observers are calibrated with as many schools as possible. When the helicopter photographs a school the off-watch team will be summoned to the flying bridge by the cruise leader to make estimates of the school. The observer teams switch ships midpoint

through the survey to give all observers the opportunity to be calibrated with the helicopter.

Suggested techniques for counting/estimating school size will be covered during observer training. The observer should not change his/her technique for estimating schools when the helicopter is photographing them. Each observer's effort should be consistent throughout the entire project.

Because the helicopter is flying ahead of the ship's path, it is possible to see it while searching for marine mammals. Observers should disregard its presence and continue the normal searching pattern.

The helicopter may also be launched to obtain reproductive data from dolphins affected by the tuna fishery, or to obtain length data from any cetacean species.

III. ADDITIONAL SCIENTIFIC PROJECTS

III.A. Seabird Survey

1. Personnel and Duties

There are two scientific personnel (birders) aboard each vessel to survey seabirds throughout the study area with hand-held binoculars. These individuals maintain a dawn to dusk watch from the flying bridge for seabirds in a 90º arc out 300 meters. Birders adjust their effort to conform with the mammal effort, so it is important to keep them abreast of any changes in survey activity, such as going on or off effort.

2. Additional 25X Binoculars

The third pair of 25X binoculars on the flying bridge of the *McArthur* are for the use of the birders as well as the recorder. Many times bird flocks occur with marine mammals. Although the mammal observers have first priority on the these binoculars, and the recorder will need access to them to make school size estimates, cooperative sharing is expected. On the *D. S. Jordan* the third pair is for the recorder and a fourth pair is for the use of the birders.

III.B. Oceanography

One or two oceanographers and/or oceanographic technicians are aboard each vessel to monitor oceanographic features. Oceanographic data is collected throughout the cruise. Continuous data on temperature, salinity, and fluorescence of surface water is recorded digitally as well as on paper tracings. During the cruise and within the survey area, the vessel is stopped for one or two one-hour stations: after sunset and/or before sunrise. These stations are made in order to conduct conductivity-temperature-depth (CTD) casts. During these casts, water samples are taken with an array of sample bottles which sample

the water column within the range of 0-1000 meters, depth permitting. These samples are analyzed for nutrient concentrations and primary productivity.

Expendable bathythermographs (XBTs) are dropped three to four times daily, to provide ocean temperature profiles. Additional probes are used if conditions dictate further study.

After the evening CTD station, bongo tows will be conducted.

III.C. Biopsy Sampling of Cetaceans

When time and circumstances permit, biopsy sampling for genetic studies of the population structure of dolphins and whales will be conducted using hollow-tipped darts fired from a crossbow. Observers on each ship will be designated as the primary biopsy samplers but other observers will have the opportunity if interested. Samples can often be obtained from bow-riding dolphins or, in the case of whales, from an inflatable small boat that will be launched from the larger ship. Sample preservation and data forms are the responsibility of the primary samplers and should be completed as soon as possible after collection.

Biopsy and photography (III.D.) are ancillary to the central objectives of this survey and should not interfere with them. In particular, on-effort observers should take the time required to make their best effort at estimating school size and composition before using crossbows and cameras. One observer must remain on the flying bridge at all times as others proceed to the bow to take photographs and biopsy samples.

III.D. Photo-Identification Studies

For particular species of interest, such as blue, humpback and killer whales, photographic catalogs of individually identified animals exist which are used to produce mark/recapture-type estimates of abundance and to document migration patterns. For other species, such as short- and long-beaked common dolphins (*Delphinus delphis* and *D. capensis*), photographs are desired to document geographic variation. There will be ample opportunity on these cruises to photograph a variety of species of marine mammals and observers are encouraged to do so once estimates of school abundance and composition have been completed. Photos can be taken from the main vessel, or at times from small inflatable boats. The latter will often be in combination with biopsy sampling. On the *McArthur*, when the primary photographers and/or biopsiers are using the bow cage, other personnel should remain on the bow deck.

On each ship, two observers will be designated as primary photographers. They have responsibility for the project camera equipment, film and photo notes. Other observers are welcome to use project cameras after receiving permission from the primary photographers. Project film is available for observers using personal cameras but all originals developed from this film belong to the SWFSC. Observers using project film must keep a logbook of sighting numbers and other pertinent information associated with their photos. For observers using personal film, donations of originals or copies to the

SWFSC of identifiable individual whales or other photos of interest is appreciated. The SWFSC will pay for copies it chooses to be made from personal film at the end of the survey.

III.E. Small Boat Operations

1. Procedures

In some situations photo-ID studies and biopsy sampling are best conducted from smaller, faster, and more maneuverable platforms than the ship. When time and circumstances permit, rigid-hulled inflatable boats (RHIBs) are used to approach marine mammals. These range in size from 14 to 21' long and may have outboard or inboard motors. The RHIBs are operated and maintained by ship personnel, while members of the scientific party conduct the sampling procedures.

Safety is of paramount importance when participating in studies from the RHIBs. Each ship's staff will explain the procedures to follow when launching from that ship. On the *McArthur* scientific personnel board the RHIB before it is lowered to the water, while on the *Jordan* the scientific party board after it has been launched. Whatever the case, be alert and follow the crew's instructions.

When participating in small boat studies, be prepared to be on the water for up to four or more hours. Full sun protection, raingear if needed, and plenty of water and snacks should be packed for the trip.

2. Observers Remaining on the Survey Ship

During small boat operations the observers who would normally be off watch in the schedule may be required to fill in on the flying bridge for the observers in the small boat. This can allow the ship to continue normal searching effort. Also, the RHIB may require directions from observers on the flying bridge to assist in locating animals.

III.F. Sea Turtles (when applicable. There is currently a controversial issue regarding NMFS sea turtle research which is preventing HICEAS from tagging. Please keep this in mind when dealing with the public. Procedures listed here are for general SWFSC marine mammal cruise reference.)

1. Sightings

Mammal and seabird observers record on-effort sightings of sea turtles in the marine mammal database. Angle, distance from the ship, species, and number of individuals are recorded. Comments should include an estimated size of the turtle's shell. Mating behavior or association with flotsam should also be noted.

2. Recovery for Tagging and Natural History Data

Most information about sea turtles comes from studies of females on nesting beaches. Very little is known about turtle migration and natural history in the pelagic realm. SWFSC personnel will be collecting turtles at sea on an opportunistic basis in order to tag them, obtain morphometric data and collect blood samples. Analyses of blood can be used to determine breeding state as well as for genetics studies.

Turtle activities should not interfere with the primary mission of marine mammal census. The cruise leader will decide if marine mammal effort may stop for a short time to capture, tag and sample a turtle. The teams should find out from the cruise leader in advance whether the day's schedule will allow suspension of effort to conduct turtle activities. When a turtle sighting is made a rapid response is necessary if capture is to be successful.

III.G. Dipnetting (when applicable)

During the evening CTD, spotlights are turned on in order to attract flying fish and squid to the side of the vessel. Scientific personnel, using long handled half-meter nets, retrieve samples of all catchable organisms. These samples are preserved either frozen or in buffered formalin for return to SWFSC. Interesting live specimens may be placed in aquaria provided by Scripps Institution of Oceanography and returned to San Diego.

III.H. Acoustics

Monitoring and recording sound in the ocean to detect and localize cetaceans will be conducted using a towed hydrophone array. The array will be deployed in the morning prior to visual search effort and retrieved in the evening after search effort ends. In order not to damage the array, the maneuverability of the ship will somewhat restricted while the array is being towed. The array will need to be retrieved before bringing the ship to a full stop in order to launch a small boat or to conduct sperm whale observations. The array will also need to be retrieved before making the 180E turns often used for repeated passes through dolphin schools to collect biopsy samples. Two members of the scientific party will operate and maintain the acoustic equipment.

Sonobuoys will be deployed opportunistically to gather basic information on whale vocalization. This includes the range of sounds produced by each species, the fraction of time spent vocalizing, and the gender of vocalizing whales. These duties are performed by the acoustician. During a recording event, other observers will be called upon to assist in locating sonobuoys and whales using 25X binoculars.

IV. SHIPBOARD FACILITIES AND CONSIDERATIONS

When you first board the NOAA ships, you will receive a Welcome Aboard booklet and be briefed on the particular procedures of that ship. Each ship will conduct regular fire and abandon-ship drills.

IV.A. Chain of Command

The chain of command aboard the *D. S. Jordan* and the *McArthur* consists of a Commanding Officer, Lieutenant Commander Chris Moore (the CO), an Executive Officer, Lieutenant Brian Parker (XO), the Field Operations Officer, Ensign Jessica Kondel (FOO), and the Navigation Officer, Ensign Josh Bauman. The ship's officers belong to the NOAA Corps and generally alternate between two years of ship-based and two years of land-based service. Other ship personnel (seamen, engineers, etc.) do not belong to the NOAA Corps and have often worked on the same ship for a number of years.

Each vessel and leg of the survey is assigned a scientific cruise leader. The cruise leader has overall responsibility for the research effort aboard the ship and for coordinating the scientific mission with the vessel personnel. The cruise leader reports to the chief scientist and keeps the SWFSC abreast of cruise progress. The chief scientist is ultimately responsible for the analysis of the data and overall success of the project.

Members of the scientific party, including marine mammal observers, report directly to the cruise leader. The cruise leader represents the scientific party in dealing with the vessel's staff, and has sole authority to act on behalf of the chief scientist and the SWFSC Director. **All sensitive or operational communications from the scientific party to the ship's staff should pass through the cruise leader**. The cruise leader should initiate any change in operating procedures or handle any out of the ordinary matter. If you have a problem, see the cruise leader. Do not try to solve it yourself by approaching the ship's personnel directly.

IV.B. Relations With Ship Personnel

While living and working aboard the NOAA ships, all scientific personnel should keep in mind that the officers and crew spend a greater portion of the year on the vessel than they do on shore. Procedures and expectations of the ship personnel have become established through many projects throughout the years, not just the current survey. Respect this when dealing with the ship personnel. Always ask before using any ship equipment.

The daily, work-related interaction with the officers and crew that observers will have most frequently will be radio communications between the flying bridge and bridge during chase or other survey activities. A good working relationship with the bridge team can be established by maintaining a professional demeanor and framing clear and concise requests.

IV.C. Staterooms

Space is limited at sea. Staterooms are approximately 6 X 10' and shared by two individuals. Bring only the necessary gear, as there will be little (or no) storage space outside your stateroom.

Noise levels should be maintained with respect for off-watch personnel. Scientific staterooms adjoin the crew's quarters and since ship personnel work throughout the night, some people will be sleeping at all times during the day.

Walls in the staterooms are painted plasterboard. Nails and tack holes are unacceptable as they damage the walls. Handi-tak is a product that can be used to mount pictures or wall decoration without harming the surface. Bedding is furnished, although some people bring their own blanket/bedcover to make their space more personal. The ships also provide bathroom towels and soap. The ship's towels are not allowed on deck, however, so bring along your own beach towel if you'll be sunning on the "steel beach."

Rooms are routinely inspected by the CO, mainly to check for health or safety violations, or for things which need repair. Inspection schedules are usually posted in advance.

IV.D. Meals

Three meals are served aboard ship every day at scheduled times, however, the ships serve their meals differently. On the *D. S. Jordan* meals are served cafeteria style and both the crew and scientific personnel take their meals in a combined mess (dining) area. The *McArthur*, on the other hand, has an officer's mess separate from the crew's mess. While onboard the *McArthur*, scientific personnel take their meals in the wardroom (officer's mess).

Observers should be punctual to meals. The Stewards Department should be contacted if for some reason you will miss or be late for a meal. Except when oceanographic stations are conducted at noon, marine mammal watch does not stop during mealtime. Customarily, off-effort observers eat promptly and then replace on-effort observers for about 20 minutes so that the on-effort team can get their meals too. Besides regular meals, the ships have juice and milk dispensers, fresh fruit (when available) and snacks. These are accessible at all times. An attempt is made to accommodate vegetarian diets during most meals, but the non-meat selection will at times be limited. The standard vegetarian fare may contain eggs or cheese.

IV. E. Laundry

The ships have washer and dryer facilities with detergent. They are operated on a first-come first-serve basis, although the *McArthur* reserves the facilities for the Stewards Department two daytimes a week. Please make sure that your clothes are removed promptly from the washer or dryer so the next person can use the machine.

IV.F. Exercise Room

The vessels have areas set aside for work-outs and weight training. When using those facilities, take care of the equipment and do not abuse your privileges by spending too much time in those limited areas so that others are denied use. Additionally, make sure to wipe down any equipment you use.

IV.G. Water Usage

While at sea, and usually in foreign ports, the vessel must make its own water. Please take Navy showers (wet yourself, turn off water, lather with soap, and then rinse yourself off) when aboard the vessel. Wash only full loads of laundry. Be especially conscientious of water usage on the *D. S. Jordan*, where water is a limiting factor in the vessel's range.

IV.H. Footwear

Closed-toe shoes are mandatory while traveling throughout the ship. Thongs or other open-toe sandals are permitted only while on the flying bridge (wear closed-toe shoes to and from this location) or in the living quarters.

IV.I. Sex, Drugs, Alcohol, and Smoking

1. Sex

NOAA regulations forbid all sexual liaison aboard the vessels.

2. Drugs and Alcohol

The NOAA vessels have a zero tolerance policy on the possession of drugs and alcohol (see Appendix 5). Dogs may be used to inspect vessels by custom officials.

3. Smoking

There is a No Smoking policy for all interior spaces on the ship. Smoking is only allowed on the weather decks, in designated areas.

IV.J. Communications

1. Mail

Letters for the vessels should be sent to:

The addressed party
c/o Survey Coordinator
Southwest Fisheries Science Center
PO Box 271
La Jolla, CA 92038

Letters, up to videocasette size or large (manilla) envelopes, will be hand carried to the ship by incoming personnel during port calls. Letters should arrive at SWFSC one week prior to the scheduled inport to ensure they will be carried down. Packages larger than mentioned above will not be sent. The ships usually make arrangements for an outgoing mailbag to the U.S. during a port stop.

2. Phone Calls and Radio Patches

The ships are equipped with INMARSAT, a satellite phone system. Calls cost about $10.00 per minute and there is a 3 minute minimum. It is expensive but nice to have in an emergency. Sometimes radio phone patches are an option.

3. Email

The ships generally have email services available for use by scientific personnel to send and receive messages. The SWFSC will pay for satellite time for reasonable usage. Do not send large files, graphics, or attachments and ask your correspondents not to send them to you.
Currently, the ship's server has been programmed to not accept messages larger than ~100K. If someone sends you a large e-mail, and it is rejected by the server, not only will you not receive it, but no one may ever be aware that it was sent or rejected. The system is not a "return to sender" system, rather a "limbo" block.
This is not done maliciously, but to avoid costly and time-consuming satellite down (and up) loads.
As satellite technology becomes more mainstream, we hope to see this system improved in the near future.

4. Emergency Contact

In the event of an emergency on land, have family or friends contact SWFSC and you will be notified. Contact point: Survey Coordinator (858)546-5672 office, (858)472-0418 cell. The main number for the SWFSC lab is: (858)546-7000.
The cruise leader will also have the SWFSC-PRD cell phone during the cruise. This number is (619)888-3609.

IV.K. Inter-personal Relations

1. Social Considerations

People working and living together on a ship creates an unusual social/work environment. There is minimal privacy and space for individuals spending an extended amount of time together in an isolated setting. In this environment, otherwise minor incidents can gain great importance. Be aware that your own feelings may intensify at sea and try to keep things in perspective.

2. Problems

Occasionally things don't work out as they should and conflicts arise. If you have difficulty working with someone, feel threatened, or discriminated against, see the cruise leader. Your comments will be kept confidential and will only be used to make things better. It is of utmost importance to the Chief Scientist and the CO's that scientists are comfortable and happy working and living aboard the ships. They want the cruise leaders to know of a problem as soon as it arises so they can help resolve the issue and prevent an exacerbation of the problem.

V. PORT CALLS

V.A. General Information

During port calls, you are paid 8 hour days, and still officially working on the cruise. Travel outside the port area is usually possible, but takes place at the discretion of the cruise leader. In unusual circumstances you might be required to stay around the ship. A personal passport is necessary for any travel outside the immediate port area in foreign countries. For HICEAS, it is recommended that you have your passport with you in the unlikely event the ship must detour to the South Pacific.

Port calls should be a lot of fun. Plan ahead, talk to others that have visited the area recently, and read up on where you're going. Take some precautions and travel with a sense of both humor and respect.

Some info specific for foreign travel:

As with any foreign travel, learning some words and phrases in the national language is very helpful and usually appreciated by the residents. Hawai'i, though part of the USA, has a local population of native Islanders who are very proud of their heritage and language.

Travel in groups, especially at night. Most ports pose little problem, but you are safer (particularly women) as part of a group.

Stow your belongings carefully in your stateroom while you're away.

V.B. Ship's Agent

At foreign (not Hawaii) ports the ship will have an agent to help arrange the ship's requirements (but they are not travel agents). This individual and his/her staff can give up-to-date information and should be contacted in the event of any problems. It is always a good idea to carry the agent's name and telephone number along with your passport.
In US ports, the ship will most likely have phone lines, or at least a cell number you can carry with you.
The D.S. Jordan's cell phone number is (619)548-4016.
The McArthur's is (206)669-4437.

V.C. Returning to the Ship

Most importantly, leave enough travel time to be back aboard the ship before liberty expires. Liberty usually expires one hour prior to sailing - the time will be posted at each port call. The ship takes this all-aboard time very seriously. If you are not aboard when liberty expires, your port call privileges will be revoked at the next port stop. Travel in some places can be iffy so always allow a little extra time to deal with the unexpected. It is best to spend the last night of a port call on or near the ship, as most departures will occur in the morning.

BE SAFE, HAPPY, AND HAVE A GOOD CRUISE!

updated 7/23/02

SWFSC Marine Mammal Sighting Form

NOTES: w/ ANGLE

Date ___/___/___ (Y Y M M D D) Cruise # _____ Sighting # _____

Time _____ Effort ON OFF Observer # _____

SPECIES DETERMINATION

	CODES
1.	
2.	
3.	
4.	

ASSOCIATED ANIMALS:
List ID and number of other species near the sighting.

DIAGNOSTIC FEATURES: Describe and sketch the shape, size and markings of the species identified.

BEHAVIOR: Describe the aggregations, movements, blows, etc. of the animals.

School Movement: Initial Speed _____ Direction relative to bow _____ Closest Distance _____

Calibration Y N Bow Riding Y N Biopsy Y N Photographs Y N

NOAA FORM 88-208 (7-01)

★ U.S. GPO: 1997-581-635/40256

Behavioral Observations

When first observed, do you think the animals were already reacting to the research vessel? Y N U O

I. School Behavior

What was the behavior of the school when first observed (circle all that apply):

fast traveling | moderate traveling | slow traveling | milling | associated swimming | approaching | bowriding | unknown | other

Did the behavior change one or more times during observation? Y N U O

If yes, what did the behavior change to (circle all that apply)?

fast traveling | moderate traveling | slow traveling | milling | associated swimming | approaching | bowriding | unknown | other

II. School Shape

What was the school shape when first observed? tight & uniform | tight & clumped | loose & uniform | loose & clumped | unknown | other

Did the school shape change one or more times during observation? Y N U O

If yes, what did the school shape change to? tight & uniform | tight & clumped | loose & uniform | loose & clumped | unknown | other

III. School Composition

Calves present? Y N U O

If yes, estimate percent _____; were neonates present? Y N U O

IV. Reaction to the Vessel

					Distance reticle OR estimate	
Approach the boat?	Y	N	U	O	_____	_____
Bow ride?	Y	N	U	O		
Run from the boat?	Y	N	U	O	_____	_____
Low swimming?	Y	N	U	O	_____	_____
Did the school split?	Y	N	U	O	_____	_____
If yes, did the subgroups move off in different directions?	Y	N	U	O		

If it's a mixed school, was the last observed subgroup composition: mixed | single species | both mixed & single species | unknown | other

V. In your estimation, relative to the research vessel, was this school:

evasive | non-evasive (including attracted to the boat and/or indifferent) | both | cannot be determined | other

If the school was evasive, at what distance did you first see a strong evasive response (ie., when did the dolphins get up and run)? _____ _____

Key: Y = yes N = no U = unknown/cannot be determined O = other, please explain

Guide to Behavioral Data Collection (for Observers)
Protocol and some hints for recording behavioral data on Marine Mammal Sighting Forms
18 July 2002

GENERAL INSTRUCTIONS

Purpose: The purpose of recording behavioral observations on the sighting forms is to enable us to standardize the behavioral data that comes back from the field. We will use these data to document the reaction of dolphins to the research vessel and to better understand how dolphin behavior affects our ability to detect and count animals. We greatly appreciate your time and effort in this pursuit. You are our eyes, tell us what you see!

Use: The behavior fields on the front and the back of the Marine Mammal Sighting Form should be filled out for each sighting. We would like your observations on every species but we also know that you are under tight time constraints on the flying bridge. Therefore, sampling priorities are:

Priority Group 1.	false killer whales, pilot whales, Risso's, bottlenose, spotted, spinner, common, and striped dolphins
Priority Group 2.	all other delphinids
Priority Group 3.	any other marine mammal species.

The first four species of priority group one are impacted by the Hawaiian longline fishery, and are thus of particular interest during this cruise. We would also like to compare the behavior of spotted, spinner, common, and striped dolphins in this area to the populations in the eastern tropical Pacific (ETP). The Hawaiian dolphins are not involved with the tuna purse-seine fishery, making them a good control group for the ETP dolphins for which we already have a large data set.

Questions: During HICEAS, we have three main questions, which build upon what we have learned by observing dolphin behavior in previous cruises:

(1) *Ship avoidance/attraction*. To look at the behavior of cetaceans relative to our presence, we are collecting data on the movement of dolphin schools relative to the research vessel.

(2) *A comparison of acoustic and visual sighting results*. Some animals are seen and not heard, while others are heard and not seen. To explain this discrepancy, we collect behavioral data to determine whether the animals are behaving differently during these times.

(3) *Sex and age composition of schools*. Little is known about the social structure of pelagic dolphins. We will use the behavioral data to gain insights into the sex and age composition of schools.

Forms*:* The following forms are designed to be used together. The *SWFSC Marine Mammal Sighting Form* (NOAA Form 88-208) has a front and a back side (updated for STAR 2000) on which to record your behavioral observations. The *"Observer Guide to Dolphin Behavior"* defines terms and standardizes terminology. Please refer to it when describing dolphin behavior. It is pasted into the front of your green book. The *"Guide to Behavioral Data Collection for Observers"* (this document) describes the protocol for recording behavioral observations on the flying bridge and instructions for filling out the sighting form. A laminated copy is available on the bridge and there are copies of all three documents in the binder with the sighting forms.

Protocol: You've just sighted a spinner dolphin school at 30 degrees right, reticle 1.3. What do you do?

The first priority for you and the rest of the observers is to make your species identification and abundance estimates. This year, we are taking a resight on the school 3 – 5 minutes after the initial sighting. The recorder will prompt for this information. The heading of the animals between the two positions will provide information on the question of ship avoidance.

Then, make your behavioral observations. We are especially interested in whether the dolphins react to the research vessel and at what distance they react. If you, or any other observer, sees such a change in dolphin behavior, call out the reticle to the recorder who will record a resighting in WINCRUZ. It is very important that the recorder also records a comment so that we know that this resighting referred to a change in dolphin behavior. In the comment field, write something concise like: "dolphins run from research vessel". If the dolphins changed behavior while you were in the middle of making your abundance estimate, don't interrupt what you're doing, but note the reticle if possible (or just estimate the distance by eye) and keep it in mind until you have a moment to tell the recorder or to write it on the sighting sheet.

After making your species ID and abundance estimate, it is best to fill out the front and the back of the sighting form while you are still on watch. We've designed the back of the form to go as fast as possible; just circle the appropriate answer. If you do not have time, make a few notes and fill out the behavioral fields after the watch.

In general, observers fill out the narrative portion after their watch is over. You might also want to write more later on when you have a chance to chat with the other observers. It is fine, in fact we encourage you, to talk with the other observers about dolphin behavior. Add their observations to the narrative (or ask them to add a sheet of their own).

Some general notes on recording behavioral data*:* Behavioral data is inherently variable and difficult to quantify reliably. However, if the terminology and the data collection are standardized, we can gain considerable information from the field that would otherwise be lost. Here are a few other hints when recording behavioral data:

Categorical data. We've tried to strike a balance between making the form quick and easy to fill out (by creating behavioral categories for you to circle) and by leaving room for you to describe your observations (in the narrative). On the backside of the sighting form, do your best to pick one of the categories. Undoubtedly, situations will arise in which our categories do not describe what you see. There are options to cover these situations:

> U = unknown/cannot be determined; use this when you did not systematically look for a particular behavior. For example, if the question is, "Calves present?" but the school was at reticle 0.1 and you feel that you would not have been able to see calves at that distance, even if they had been present, then you should circle the "U."
>
> O = other/please explain; use this category when you do not think that what you observed is explained by the categories given. If this is the case, circle the "O" and use the narrative to describe what you did observe.

Leaving fields blank. Please don't. Let's say the question on the sighting form is: "bow-riding?" and you leave the field blank. Back on dry land, we do not know if you looked for bow-riding and didn't see it (a negative answer) or if you didn't or couldn't look (an unknown/cannot be determined answer).

Describe what you see. The most important trick to good behavioral observations is to describe only what you see. Please keep what you see (your description of dolphin behavior) separate from what you think is going on (your interpretation of dolphin behavior). It is important to communicate both to us, however. You are the best one to interpret what is going on out there because you can take the entire scene into account. For example, please don't just write dolphins are "feeding." How do you know they are feeding? Write instead … "I observed three dolphins with tightly rounded backs, diving slowing and surfacing with fish in their mouths," or, "I *think* they were feeding." Similarly, if you think that the dolphin school was *"evasive*" (your interpretation), please describe the specific dolphin behaviors that gave you that impression (e.g., the dolphins "ran," "scattered," and "frequently changed direction," etc.).

Change in behavior. Because we are interested in dolphin behavior in response to the research vessel, we are talking about *changes* in dolphin behavior. There are two tricks to recording changes in behavior. First, have a firm idea of what *no change*, or in this case what *no response* to the research vessel, would look like. (*No response* = dolphins just keep on doing exactly the same thing, before, during and after the research vessel moved on through.) The second trick to describing changes in behavior is to record what was happening *initially* (e.g., before the dolphins detected the research vessel) and what happened *subsequently* (after they detected the research vessel). You should be able to say something like this … "When *initially* sighted, the dolphins were milling around in a loosely spaced school. *Then*, the dolphins closed ranks, and they began to run directly away from the ship." We need your description of events before and after the dolphins detect the ship to determine if a change in behavior occurred.

THE FRONT OF THE SIGHTING FORM

Narrative

Please use the narrative section on the front of the sighting form to describe dolphin behavior in detail. Use additional paper if needed and feel free to draw us a map of the dolphin track during the sighting. We are especially interested in you elaborating on the following:

Describe dolphin behavior. What were the dolphins doing? We use the terms milling, traveling and associated-swimming but elaborate, tell us about their aerial activity, diving behavior, etc.

What are dolphins doing when they associate with birds and tuna? We don't know what the dolphins are doing when they aggregate with birds and tuna. Describe what the dolphins are doing. How is it different than what dolphins do when they are not in these multi-species aggregations? Please systematically look for evidence of dolphin feeding.

How did the school respond to the research vessel? For example, if you circled on the back side of the sighting form that the school was *"evasive,"* in the narrative please describe the specific dolphin behaviors that gave you that impression (*evasive* = the dolphins "ran," "scattered," and "frequently changed direction," etc.). If your impression was that the school was *not evasive*, please tell us the behaviors that you observed that gave you that impression (*not evasive* = the dolphins showed "no response" to the research vessel or they were "attracted" to the research vessel; e.g., bow-riding or wake-riding). See note above on recording changes in behavior.

If dolphin behavior changed in response to the research vessel, when did it change? Describe behavior before and after and record the reticle/distance at which the change was detected. Remember to record the angle and reticle at which dolphin behavior changed and to record a resight in WINCRUZ.

Describe the composition and spatial distribution of the school. Please describe the species composition of the school. Describe age (calves, juveniles, adults present?) and gender (can you see any adult males?) of the dolphins. Describe the spatial distribution of individuals within the school; is it uniform or are different types of dolphins seen together?

Does the school change shape in response to the research vessel? If the school splits, please describe the sequence of events and what happens to the different species in mixed-species schools.

THE BACK OF THE SIGHTING FORM

In your estimation, were the animals already reacting to the research vessel?

Sometimes, when you *first* make a sighting, the school is already moving away from the research vessel, or toward it. We need to know if, in your estimation, you observed the dolphins before they responded to the research vessel (a negative answer) or if you think that the dolphins were already responding to the research vessel when first sighted (a positive answer).

School Behavior

Behavior when first observed: Choices are traveling, milling, associated-swimming, approaching the ship, and bow-riding. We've tried to make the categories as mutually exclusive as possible, but sometimes they will not work out that way. Circle all that apply and use the narrative to explain. For example, you might observe dolphins "associated swimming" that are also "slow traveling" … circle both.

Did dolphin behavior change during the observation? Y or N**.** What we are asking here is whether or not you think that dolphin behavior changed during the course of the sighting. If the answer is a positive one, remember to record a resight, so that we can determine the distance at which the change occurred. When you first observed the school, if they were traveling rapidly away from the ship and they continued to do this until you lost them in the distance, record a negative answer (no, dolphin behavior did not *change* during the sighting). Note: dolphin behavior might have changed before the sighting, but you did not see that. If you record a negative answer, do not answer the next question.

If behavior changed, what did the behavior change to? Answer this only if you answered "yes" to the previous question. Choices are the same as above; circle all that apply.

School Shape

As above, we are interested in the initial shape of the school and whether or not it changed during the sighting. If it did change, what did it change to? Please see terms regarding aggregation (tight or loose) and clumping (uniform or clumped).

School Composition

Were calves present? Y or N. We don't really know how to tell what a "calf" is either! What we mean is an individual that is still nursing. We cannot, however, tell whether an individual is nursing just by looking. Do your best; look for especially small animals with different coloration patterns than adults. What if you see "juveniles?" Juveniles are not calves. We define juveniles as individuals that are no longer nursing but that have yet to reach adult size (and along with it sexual or social maturity). Answer "no" to the question about calves but please do tell us about their presence in the narrative.

If you answered "yes" to the previous question, please estimate the percent of calves in the school. Were neonates present? Neonates we define as calves that are visibly pink and/or with fetal folds.

Reaction to the Vessel

Please see the definition of terms. The questions we ask here are only some of the many possible reactions dolphins might have to the research vessel. Please use the narrative to describe other types of reactions not mentioned here. We are interested in both the presence/absence of these behaviors and the distance at which they occur from the ship. Estimate distance either by recording the reticle or by eye.

Does the school split? Y or N. After detecting the ship, the school may split into smaller groups. These subgroups can vary in size from one individual to many. Not applicable to schools that when initially sighted are already in subgroups (a "clumped" distribution). "Shattering" or "exploding" or "starburst" describes a special case when dolphins move away in all different directions, singly or in groups.

If the school splits, do the subgroups move off in different directions? Y or N. What we are trying to get at here is whether the subgroups continue to move in the same direction (e.g., the school breaks up into subgroups but all subgroups continue moving north) or if they move away from one another (e.g., the school splits up and the subgroups scatter in different directions).

If the school splits, and it's a mixed species school, is the subgroup composition: mixed or single species? Answer this question only if the school was a mixed school. Answer this question when you last see the school; consider the species composition at the end of the splitting. We are curious about how the two species segregate themselves when a school splits up. Do the subgroups have the same composition as the initial school? Our impression (from observer observations) is that generally, when a mixed school splits up, the two species segregate into single species subgroups. This question may be slightly confusing to answer as we understand that in mixed schools (before they are disturbed), the species are often segregated spatially (e.g., a small group of spinners in the back of a big school of spotters). For the sake of answering this question, however, consider this a mixed species school and don't worry about where the species are located in the school. Now, let's imagine that the ship approaches this school and then it splits up. Wait till the end of the sighting and take a look at the subgroups …. are they single or mixed species? Please use the narrative to fill in the details.

In your estimation, relative to the research vessel, was this school …

Here, we are interested in your opinion of the schools reaction to the research vessel. Choices are *evasive* (e.g., running, low swimming, frequent changes of direction, school splitting, etc.); *non-evasive* (e.g., schools that show no response to the research vessel or that show a positive response to the research vessel such as attracted to the boat, bow-riding, or wake-riding, etc.); or *both* (e.g., most individuals within the school run but some individuals come over and bow-ride).

If you answered "evasive" to the previous question, please estimate the distance (reticle or by eye) from the ship at which you felt the animals showed a strong evasive response (i.e., when the dolphins got up and ran).

We thank you for your time in filling out these forms.

Questions/comments: Sarah Mesnick (sarah.mesnick@noaa.gov) or Anne Allen (anne.allen@noaa.gov).
Updated 18 July 2002.

Behavioral Observations

When first observed, do you think the animals were already reacting to the research vessel? Y N U O

I. School Behavior

What was the behavior of the school when first observed (circle all that apply):

fast traveling | moderate traveling | slow traveling | milling | associated swimming | approaching | bowriding | unknown | other

Did the behavior change one or more times during observation? Y N U O

If yes, what did the behavior change to (circle all that apply)?

fast traveling | moderate traveling | slow traveling | milling | associated swimming | approaching | bowriding | unknown | other

II. School Shape

What was the school shape when first observed? tight & uniform | tight & clumped | loose & uniform | loose & clumped | unknown | other

Did the school shape change one or more times during observation? Y N U O

If yes, what did the school shape change to? tight & uniform | tight & clumped | loose & uniform | loose & clumped | unknown | other

III. School Composition

Calves present? Y N U O

If yes, estimate percent _____; were neonates present? Y N U O

IV. Reaction to the Vessel

					Distance reticle OR estimate	
Approach the boat?	Y	N	U	O	_____	_____
Bow ride?	Y	N	U	O		
Run from the boat?	Y	N	U	O	_____	_____
Low swimming?	Y	N	U	O	_____	_____
Did the school split?	Y	N	U	O	_____	_____
If yes, did the subgroups move off in different directions?	Y	N	U	O		

If it's a mixed school, was the last observed subgroup composition: mixed | single species | both mixed & single species | unknown | other

V. In your estimation, relative to the research vessel, was this school:

evasive | non-evasive (including attracted to the boat and/or indifferent) | both | cannot be determined | other

If the school was evasive, at what distance did you first see a strong evasive response (ie., when did the dolphins get up and run)? _____ _____

Key: Y = yes N = no U = unknown/cannot be determined O = other, please explain

Observer guide to dolphin behavior

I. School Behavior

A. *Traveling* – the movement in a given direction of an individual or school, at approximately 3 knots or greater. Movement of school is polarized (all individuals are moving in the same direction) and coordinated (moving at the same pace). Aerial activity may be observed. Can be:

1. *Fast traveling* – characterized by rapid, directed swimming with many porpoising individuals; school is highly polarized.
2. *Moderate traveling* – some of the individuals are porpoising; school is traveling at medium speeds.
3. *Slow traveling* – few or no individuals porpoising; school is traveling at slower speeds; movement of the school is less directed and school may be less polarized.

B. *Milling* – animals remain in the same general area; school is not polarized. Movement of individuals is characterized by frequent changes in direction over a small spatial scale; speed approximately less than 2 knots. Aerial activity may be observed.

II. Associations

A. *Associated-swimming* – swimming/diving in association with birds and tuna. Generally, individuals are moving slowly, diving and spending less time at the surface. The school is not polarized. It is not known if the dolphins are feeding at this time, even if there is evidence that the birds and tuna are feeding, so this term should be used only with direct evidence of feeding dolphins. *Note: animals can be associated-swimming while traveling or milling.

III. Individual Behavior

A. *Lob tailing* – one or more individuals slapping the surface of the water with the tail flukes. This behavior makes splashes on the water.

B. *Aerial activity* – one or more individuals are seen leaping, spinning, breaching, tail walking, roto-tailing, head slapping, etc. These activities usually associated with splash entries into the water.

C. *Porpoising* – smooth arching leaps clear out of the water while traveling; entry into the water is splashless and rostrum first.

D. *Other* – describe behavior.

IV. Behavior Relative to the Research Vessel

* Please note the distance from the ship at which the behavior first occurs (reticle or estimate by eye)

A. *Approach the boat* – individual/s alter course to swim directly towards the vessel, approaching but not bow riding.

B. *Bow riding* – diving and surfacing in the bow wave of the boat.

C. *Wake riding* – diving and surfacing in the wake of the boat.

D. *Running from the boat* – swimming at high speed directly away from the boat. This means that the school has changed direction and/or increased speed.

E. *School splitting* – a larger school breaks up into smaller groups, which are spatially segregated clusters of animals. Subgroups may vary in size but they are always smaller than the initial school. Please describe how the school splits up and the species composition of the school before and after splitting. "Shattering" describes a special case when dolphins move away in all directions, singly or in small groups.

1. When the school first splits, do the individuals/subgroups:
   a. *move off in different directions.*
   b. *continue to move in the same direction.*

2. During your final observation of the school, is the composition:
   a. *mixed* – different species in the same subgroup.
   b. *single species* – subgroups are species-specific.

F. *School coalescing* – after initial sighting, a more scattered school closes ranks and becomes more tightly aggregated, cohesive, and polarized.

G. *Low swimming* – only the dorsals or small patches of back are visible at the surface, making the animals very difficult to see.

H. *Other "evasive," "attractive," or "neutral" behaviors* – describe any other behaviors that you think may indicate that the dolphins are attracted to, are avoiding, or are not responding to the research vessel.

V. Spatial Distribution of Individuals

A. *Aggregation* – the distance between individuals within the school.

1. *tight* - most animals are within one body length of each other. School has easily discernible shape; the beginning and end are well defined.
2. *loose* - most animals are distributed greater than one body length apart. School shape is difficult to discern; the beginning and end are not well defined.

B. Clumping – the degree of clustering within the school.

1. *uniform* – ca. equal amounts of space between all individuals in the school.
2. *clumped* – the school is divided into subgroups, with more space between subgroups than among individuals in each subgroup.

VI. Composition of Schools

A. Note the presence or absence of neonates, calves and/or juveniles in the school.

B. Note the species composition of the school at the beginning and end of the sighting.

Species Code List (by # and *genus*)

July 2001

Sp. Code	Short Name	Scientific Name	Standard Common Name, Other Common Names
001	MESOP_PERU	*Mesoplodon peruvianus*	Pygmy beaked whale
002	OFFSH_SPOT	*Stenella attenuata (offshore)*	Offshore pantropical spotted dolphin, offshore spotter
003	UNID_SPINR	*Stenella longirostris (unid. subsp.)*	Unidentified spinner dolphin, spinner porpoise
004	CLYMENE	*Stenella clymene*	Clymene dolphin, short-snouted spinner dolphin
005	UNID_COMM	*Delphinus sp.*	Unidentified common dolphin, saddleback dolphin, whitebelly porpoise
006	COAST_SPOT	*Stenella attenuata graffmani*	Coastal spotted dolphin, spotter, silverbacks
007	SOTALIA	*Sotalia fluviatilis*	Tucuxi, Guiana dolphin
008	ORCAELLA	*Orcaella brevirostris*	Irrawaddy dolphin, Lumbalumba
009	SPECTACLED	*Phocoena dioptrica*	Spectacled porpoise
010	EAST_SPINR	*Stenella longirostris orientalis*	Eastern spinner dolphin
011	WBEL_SPINR	*Stenella longirostris (whitebelly)*	Whitebelly spinner dolphin
012	WHITE-BEAK	*Lagenorhynchus albirostris*	White-beaked dolphin
013	STRIPED	*Stenella coeruleoalba*	Striped dolphin, streaker porpoise, euphrosyne dolphin
014	A_WHT_SIDE	*Lagenorhynchus acutus*	Atlantic white-sided dolphin
015	STENO	*Steno bredanensis*	Rough-toothed dolphin, Steno
016	LONGB_COMM	*Delphinus capensis*	Baja neritic common dolphin, long-beaked common dolphin
017	SHRTB_COMM	*Delphinus delphis*	Offshore common dolphin, short-beaked common dolphin
018	TURSIOPS	*Tursiops truncatus*	Bottlenose dolphin, black porpoise, common porpoise
019	HEAVISIDES	*Cephalorhynchus heavisidii*	Heaviside's dolphin
020	HECTORS	*Cephalorhynchus hectori*	Hector's dolphin, pied dolphin, white front dolphin
021	GRAMPUS	*Grampus griseus*	Risso's dolphin, gray grampus
022	P_WHT_SIDE	*Lagenorhynchus obliquidens*	Pacific white-sided dolphin, lag, hookfin porpoise
023	PEALES	*Lagenorhynchus australis*	Peale's dolphin, blackchin dolphin
024	HOURGLASS	*Lagenorhynchus cruciger*	Hourglass dolphin
025	DUSKY	*Lagenorhynchus obscurus*	Dusky dolphin
026	FRASERS	*Lagenodelphis hosei*	Fraser's dolphin, Sarawak dolphin
027	LISSO_BOR	*Lissodelphis borealis*	Northern right whale dolphin
028	LISSO_PER	*Lissodelphis peronii*	Southern right whale dolphin
029	BLACK_DOL	*Cephalorhynchus eutropia*	Black dolphin, Chilean dolphin
030	COMMERSONS	*Cephalorhynchus commersonii*	Commerson's dolphin, piebald dolphin
031	MELON_HEAD	*Peponocephala electra*	Melon-headed whale, Hawaiian/many-toothed blackfish, electra dolphin
032	PYGMY_KLLR	*Feresa attenuata*	Pygmy killer whale, slender blackfish
033	FALSE_KLLR	*Pseudorca crassidens*	False killer whale
034	GLOBI_SPP	*Globicephala sp.*	Unidentified pilot whale
035	LONG_PILOT	*Globicephala melas*	Long-finned pilot whale, Atlantic pilot whale, blackfish, pothead
036	SHRT_PILOT	*Globicephala macrorhynchus*	Short-finned pilot whale, blackfish, pothead
037	KILLER_WHA	*Orcinus orca*	Killer whale
038	SOUSA_CHIN	*Sousa chinensis*	Indo-Pacific hump-backed dolphin, white dolphin
039	SOUSA_TEUS	*Sousa teuszii*	Atlantic hump-backed dolphin
040	HARBR_PORP	*Phocoena phocoena*	Harbor porpoise, herring hog
041	VAQUITA	*Phocoena sinus*	Vaquita, Gulf of California harbor porpoise
042	BURMEISTER	*Phocoena spinipinnis*	Burmeister's porpoise, black porpoise
043	BL_FINLESS	*Neophocaena phocaenoides*	Black finless porpoise
044	DALLS_PORP	*Phocoenoides dalli*	Dall's porpoise
045	BELUGA	*Delphinapterus leucas*	White whale, beluga, belukha, sea canary
046	SPERM_WHAL	*Physeter macrocephalus*	Sperm whale
047	PYGMYSPERM	*Kogia breviceps*	Pygmy sperm whale
048	DWARFSPERM	*Kogia sima*	Dwarf sperm whale
049	ZIPHIID_WH	Ziphiid whale	Unidentified beaked whale
050	HYPERO_PLN	*Hyperoodon planifrons*	Southern bottlenose whale, flathead bottlenose whale
051	MESOP_SPP	*Mesoplodon sp.*	Unidentified Mesoplodon
052	MESOP_CARL	*Mesoplodon carlhubbsi*	Hubb's beaked whale, archbeak whale
053	MESOP_HECT	*Mesoplodon hectori*	Hector's beaked whale
054	MESOP_BOWD	*Mesoplodon bowdoini*	Andrew's beaked whale, deepcrest whale
055	MESOP_EURO	*Mesoplodon europaeus*	Gervais' beaked whale, Antillean beaked whale
056	MESOP_BDNS	*Mesoplodon bidens*	Sowerby's beaked whale

057	MESOP_GNKO	*Mesoplodon ginkgodens*	Ginkgo-toothed beaked whale
058	MESOP_GRAY	*Mesoplodon grayi*	Gray's beaked whale
059	MESOP_DENS	*Mesoplodon densirostris*	Blaineville's beaked whale, dense-beaked, tropical beaked whale
060	MESOP_LAYA	*Mesoplodon layardii*	Strap-toothed whale
061	ZIPHI_CAVI	*Ziphius cavirostris*	Cuvier's beaked whale, goose-beaked whale
062	BERARD_ARN	*Berardius arnuxii*	Arnoux's beaked whale, southern giant bottlenose whale
063	BERARD_BAI	*Berardius bairdii*	Baird's beaked whale, northern giant bottlenose whale
064	TASMA_SHEP	*Tasmacetus shepherdi*	Shepherd's beaked whale
065	INDOPAC_PAC	*Indopacetus pacificus*	Tropical bottlenose whale
066	NPAC_RT_WH	*Eubalaena japonica*	North Pacific right whale
067	BOWHEAD_WH	*Balaena mysticetus*	Bowhead whale
068	PYGMY_RGHT	*Caperea marginata*	Pygmy right whale
069	GRAY_WHALE	*Eschrichtius robustus*	Gray whale
070	UNID_RORQL	*Balaenoptera sp.*	Unidentified rorqual
071	MINKE_WHAL	*Balaenoptera acutorostrata*	Common minke whale
072	BRYDES_WHL	*Balaenoptera edeni*	Bryde's whale
073	SEI_WHALE	*Balaenoptera borealis*	Sei whale
074	FIN_WHALE	*Balaenoptera physalus*	Fin whale
075	BLUE_WHALE	*Balaenoptera musculus*	Blue whale
076	HUMPBACK_W	*Megaptera novaeangliae*	Humpback whale
077	UNID_DOLPH		Unidentified dolphin or porpoise
078	UNID_SM_WH		Unidentified small whale
079	UNID_LG_WH		Unidentified large whale
080	KOGIA_SPP	*Kogia sp.*	Unidentified Kogia - dwarf or pygmy sperm whale
081	MESOP_STEJ	*Mesoplodon stejnegeri*	Steinger's beaked whale, sabertooth, Bering Sea beaked whale
082	MESOP_MIRU	*Mesoplodon mirus*	True's Beaked Whale
083	MESOP_SP_A	*Mesoplodon sp. A*	Unnamed beaked whale
084	HYPERO_AMP	*Hyperoodon ampullatus*	Northern Bottlenose, North Atlantic bottlenose whale
085	NARWHAL	*Monodon monoceros*	Narwhal, sea unicorn
086	S_RIGHT_WH	*Eubalaena australis*	Southern right whale
087	FRANCISCAN	*Pontoporia blainvillei*	Franciscana, La Plata dolphin
088	C_A_SPINNR	*Stenella longirostris centroamericana*	Central American spinner dolphin, Costa Rican spinner dolphin
089	UNID_SPOT	*Stenella attenuata/plagidon*	Unidentified spotted dolphin in Atlantic
090	UNID_SPOT	*Stenella attenuata (unid. subsp.)*	Unidentified pantropical spotted dolphin, spotter porpoise
091	AT_SPOTTED	*Stenella frontalis*	Atlantic spotted dolphin, spotter porpoise
092	GANGES_DOL	*Platanista gangetica gangetica*	Ganges river dolphin
093	INDUS_DOL	*Platanista gangetica minor*	Indus river dolphin
094	INIA	*Inia geoffrensis*	Boto, Amazon river dolphin
095	LIPOTES	*Lipotes vexillifer*	Baiji, Chinese river dolphin, whitefin dolphin
096	UNID_CETAC		Unidentified cetacean
097	UNID_OBJCT		Unidentified object, possible marine mammal
098	UNID_WHALE		Unidentified whale
099	SEI/BRYDES	*Balaenoptera borealis/edeni*	Rorqual identified as a Sei or Bryde's whale
100	TRESMARIAS	*Stenella longirostris (Tres Marias)*	Tres Marias spinner dolphin
101	SW_SPINNER	*Stenella longirostris (southwestern)*	Southwestern spinner dolphin
102	GRAYS_SPIN	*Stenella longirostris (Gray's)*	Gray's spinner dolphin, pantropical spinner dolphin
103	E/CA_SPIN	*Stenella longirostris orientalis/centroamericana*	Undetermined eastern or Central American spinner dolphin
	ANTC_MINKE	*Balaenoptera bonaerensis*	Antarctic minke whale
	IO_BTLNOSE	*Tursiops aduncas*	Indian Ocean bottlenose dolphin
	BAHAMONDE	*Mesoplodon bahamondi*	Bahamonde's beaked whale
	DWF_SPINNR	*Stenella longirostris roseiventris*	Dwarf spinner dolphin
	NATL_RT_WH	*Eubalaena glacialis*	North Atlantic right whale
109		*Mesoplodon perrini*	Perrin's beaked whale
177	UNID_SM_DEL		Unidentified small delphinid (Delphinus, Lagenorhynchus, Lissodelphis o
277	UNID_MED_DEL		Unidentified medium delphinid (Feresa, Grampus, Steno or Tursiops)
377	UNID_LG_DEL		Unidentified large delphinid (Pseudorca, Orca or Globicephala)
477	UNID_PORP		Unidentified porpoise (Phocoena or Phocoenoides)
AA		*Arctocephalus australis*	South American fur seal
AF		*Arctocephalus forsteri*	New Zealand fur seal
AG		*Arctocephalus galapagoensis*	Galapagos fur seal

AT	GUAD_FURSL	*Arctocephalus townsendi*	Guadalupe fur seal
AZ		*Arctocephalus gazella*	Antarctic fur seal
CU	NO_FURSEAL	*Callorhinus ursinus*	Northern fur seal
EB		*Erignathus barbatus*	Bearded seal
EJ	STELLAR_SL	*Eumetopias jubatus*	Stellar sea lion
MA	N_ELEPHN_S	*Mirounga angustirostris*	Northern elephant seal
ML	S_ELEPHN_S	*Mirounga leonina*	Southern elephant seal
MS		*Monachus schauinslandi*	Hawaiian monk seal
OB	SA_SEALION	*Otaria byronia*	South American sea lion
OR		*Odobenus rosmarus*	Pacific walrus
OS		*Ommatophoca rossii*	Ross Seal
PC	CASPN_SEAL	*Phoca caspica*	Caspian seal
PF		*Phoca fasciata*	Ribbon seal
PH		*Phoca hispida*	Ringed seal
PL		*Phoca largha*	Spotted seal
PU	UNID_PINNI	unid. pinniped	Unidentified Pinniped
PV	HARBR_SEAL	*Phoca vitulina*	Harbor seal
UA	UNID_FURSL	unid. fur seal	Unidentified fur seal
UO	UNID_OTARI	unid. sea lion	Unidentified sea lion
US	UNID_SEAL	unid. seal	Unidentified seal
ZC	CA_SEALION	*Zalophus californianus*	California sea lion
EL		*Enhydra lutris*	Sea otter
HG		*Hydrodamalis gigas*	Stellar sea cow
TI		*Trichechus inunguis*	Amazon manatee
TM		*Trichechus manatus*	West Indian manatee
UM		*Ursus maritimus*	Polar bear
CC		*Caretta Caretta*	Loggerhead sea turtle
CM		*Chelonia mydas/agassizi*	Green/Black sea turtle
DC		*Dermochelys coriacea*	Leatherback sea turtle
EI		*Eretmochelys imbricata*	Hawksbill sea turtle
HT			Hybrid sea turtle
LK		*Lepidochelys kempi*	Kemp's Ridley turtle
LV		*Lepidochelys olivacea*	Olive Ridley sea turtle
ND		*Natator depresus*	Flatback turtle
UH		Other than D. coriacea	Unidentified hardshell sea turtle
UT		*Chelonidae*	Unidentified sea turtle

NOAA Policies on Harassment and Drug and Alcohol Use

The following is general policy information for all ships in the fleet. Additional information about a specific ship can be found on that ship's home page.

* Possession or Use of Alcohol or Illegal Drugs
* Sexual Harassment
* Smoking Restrictions
* Underway Shipboard Emergencies
    - Fire
    - Abandon Ship
    - Man Overboard
* Drills at Sea
* Working On Deck
* Seasickness
* Firearms and Other Weapons

Please Note: As a U.S. Government commissioned vessel, all persons boarding give an implied consent to conform with all safety and security policies and regulations which are administered by the Commanding Officer (CO). All spaces and equipment on this vessel are subject to inspection or search at any time. Additionally, the following is prohibited aboard any U.S. Government vessels: possession and/or use of intoxicating alcoholic beverages, illegal drugs, controlled drugs without a prescription, sexual harassment, or use of shipboard spaces for purpose of sexual liaison. Violaters may be removed from the vessel at the earliest opportunity.

Possession or Use of Alcohol or Illegal Drugs

Possession or use of alcohol, illegal drugs, or prescription medications without a prescription, on board any NOAA vessel, by any member of the embarked complement is strictly forbidden and will not be tolerated. When violations of this policy are discovered, the following procedures will be adhered to:

* The alcohol will be confiscated and immediately disposed of in the presence of a witness.
* Drugs will be confiscated and placed in a secured location until the vessel reaches home port or another port of call, at which time the offense will be reported, and the drugs turned over to the appropriate authorities for action.
* Disciplinary or corrective action will be taken in accordance with the applicable Table of Offenses and Penalties.
* Department of Commerce employees will be given information regarding the availability of the Department of Commerce Employees Assistance Program.

Sexual Harassment

Sexual harassment will not be tolerated aboard NOAA vessels. This applies to all persons, male and female, including members of the operating crew and any embarked scientific personnel or other personnel. Sexual harassment is sex (gender) discrimination that involves unwelcome sexual conduct, which can include both verbal and physical behavior. Some examples of such behavior are: pressure for dates or sex; sexually suggestive looks, comments or gestures; sexual jokes; displaying material of a sexual nature; and deliberate touching. Conduct is unwelcome if it is unsolicited and an

individual finds it undesirable and/or offensive. All instances of sexual harassment should be immediately reported to your supervisor, the XO, or the CO.

Smoking Restrictions

Smoking in Federal workplaces is prohibited by regulations applicable government-wide. Aboard NOAA ships, personnel who smoke may do so only on the weather decks. There is no smoking permitted on the interior of any NOAA ship. Smokers are expected to observe particular care in disposing of cigarettes or smoking materials. Use ashtrays or butt kits provided around the ship for this purpose.

Smoking is prohibited:

* on any part of the weather decks when the vessel is fueling or taking on flammable cargo.
* in the vicinity of any gasoline engine undergoing repair
* in the vicinity of any compressed gas cylinder carrying a flammable gas sticker, which may be stored on deck for the use of the embarked science party
* during certain types of scientific missions or in the immediate vicinity of sensitive science mission equipment

Underway Shipboard Emergencies

Fire

Fire at sea, no matter how small, can become a life-threatening situation. At sea, everyone aboard ship, be they crew, scientist, or passenger, is a member of the fire department. When the General Alarm sounds, everyone has a specific emergency billet assignment and each person is relied upon by all others aboard to carry out that assignment. Learn all you can about how to perform your emergency duties so that carrying them out becomes second nature. Firefighting at sea is a team effort.

Emergency billet assignments are posted on the Watch, Quarter, and Station Bill. These are posted at convenient places throughout the ship. Additionally, each person is provided with a "bunk card" which lists his/her individual emergency billet assignments.

The signal for fire or emergency is a 10 second continuous ringing of the General Alarm bell and a 10 second continuous sounding of the ship's whistle. This alarm will be followed by an appropriate announcement on the general announcing system. When you hear the signal, immediately proceed to your fire and emergency billet station. Firefighting and emergency equipment is distributed throughout the ship. All hands should familiarize themselves with the locations of this equipment, as well as the Damage Control Lockers and their contents.

Abandon Ship

Abandoning ship in the open sea is an action of last resort. All reasonable efforts required of mariners for the saving of their ship must clearly have failed before any decision to abandon the vessel will be taken. Only when there is no reasonable chance of saving the ship will the order ever be given to abandon it. The decision to abandon ship is made only by the CO, or in the CO's incapacity, the senior member of the chain of command.

The signal to abandon ship is seven (7) or more short blasts on the ship's

whistle and General Alarm, followed by one (1) long blast.

When the order is given to abandon ship, all hands will proceed to their assigned life raft muster stations. Each shall bring his/her protective survival clothing, survival suit, personal floatation device (i.e., life jacket), and other equipment assigned in his/her abandon ship billet. Once the order to abandon ship has been given, the life raft Officers in Charge (OIC) will muster their respective parties and dispatch the assigned crew members to the life raft locations to launch their respective life rafts. Once launched, the remaining personnel will have to act in concert to haul the deployed rafts alongside the main deck embarkation stations. Orderly seamanlike actions at the embarkation stations will assure the rapid and efficient abandoning of the ship.

Man Overboard

Except for uncontrollable fire at sea, there is perhaps no more personally terrifying situation for a member of the ship's complement than being lost overboard. There are two basic man overboard scenarios: witnessed and unwitnessed.

Witnessed Man Overboard - Actions of the Witness

Upon observing a person going overboard, the witness shall take the following actions:

1. Call out for assistance and throw a life ring buoy into the water, preferably one equipped with a strobe light. Pass the word to the Bridge by any means possible.
2. Wait about one minute and throw a second life ring buoy (at night - one equipped with a strobe light) into the water. This will create a visual range for the OOD and the lookouts, aiding the search effort.
3. Keep the victim under surveillance if at all possible, but do not delay passing the word to the Bridge.

Unwitnessed Man Overboard

Underway, until proven otherwise, when a crew member is unaccounted for, it will be presumed that the individual has been lost overboard. This situation then becomes a search and rescue problem of a far more complicated nature. The time of the casualty will be unknown, or at best, only grossly estimated. The ship's navigation record, as contained on the Marine Operations Abstract or Dead Reckoning Abstract, will be crucial for search planning, as will the hourly weather observations entered into the Weather Log. Initial actions will be to notify the Marine Operations Center Director of the situation and to notify the nearest Rescue Coordination Center for assistance. Search operations will be conducted with the advice and guidance of SAR professionals.

Drills at Sea

Emergency drills at sea will be held in accordance with the requirements of NC Instruction 5100.1B. Reporting for drills, in accordance with the billets assigned in the Watch, Quarter, and Station Bill, is mandatory for all hands, including the embarked science party, unless the absence is specifically authorized by the CO, XO or Safety Officer.

For Abandon Ship drills, unless otherwise advised, all hands are required to wear their life jackets and carry their survival suits when reporting to their life raft muster stations. All personnel shall be attired in, or

bring to the muster, clothing that fully covers legs and arms, a hat, socks and shoes. Signals to call all hands to emergency stations shall be identical to those that are used for actual emergencies. When a drill is held, the OOD will always state "This is a drill. This is a drill." followed by an appropriate announcement on the general announcing system.

The signals are as follows:

Fire and Emergency	Continuous ringing of the General Alarm bell for 10 seconds and continuous sounding of the ship's whistle for 10 seconds [Image]
Abandon Ship	7 or more short blasts on the ship's whistle and General Alarm bell, followed by one prolonged blast [Image]
Man Overboard	3 prolonged blasts on the ship's whistle and General Alarm bell [Image]
Dismissal from Drill	3 short blasts on the ship's whistle and General Alarm bell [Image]

Working on deck

The following safety regulations will be observed when working on deck:

* Life vests or floats coats will be properly worn when handling equipment over the side, deploying equipment over the side, and on all launches (whether alongside the ship, launching, or recovering).
* Safety belts and lines will be worn by those handling equipment over the side.
* Hardhats will be worn by all those involved in recovery or deployment of equipment and boats.
* Proper footwear should be worn at all times (Open toe shoes are NOT proper work footwear).
* Ship's equipment is to be operated only by qualified members of the ship's complement.

Seasickness

Information on sea sickness and treatments available will be provided by the Medical Officer. Those requiring preventative treatment should see the Medical Officer prior to sailing.

One of the least pleasant aspects of going to sea is the possibility of seasickness. An individual's susceptibility to seasickness is highly variable. If you've experienced motion sickness in cars, planes, or amusement park rides, you may experience seasickness during the cruise. Regardless, most people feel some level of illness or discomfort when they first go to sea. Seasickness is a result of a conflict in the inner ear (where the human balance mechanism resides) caused by the erratic motion of the ship through the water. Inside the cabin of a rocking boat, for example, the inner ear detects changes in linear and angular acceleration as the body moves with the boat. But since the cabin moves with the passenger, the eyes register a relatively stable scene. Agitated by this perceptual incongruity, the brain responds with a cascade of stress-related hormones that can ultimately lead to nausea and vomiting. Its effect can be

magnified by strong smells (like diesel fumes or fish). It usually occurs in the first 12-24 hours after sailing, and dissipates when the body becomes acclimated to the ship's motion (getting one's "sea-legs"). Rarely does anyone stay ill beyond the first couple of days at sea, regardless of sea state. There are several over-the-counter medications available to prevent or minimize motion sickness. These are usually taken about an hour before sailing and as needed at sea; you should follow the instructions for the particular medication you are taking. All of these medications tend to dehydrate the body, so fluid intake is important.

If you should get seasick, take comfort in the fact that recovery is only a matter of time, and the survival rate is 100%. Each ship has a trained medical officer who can treat severe cases of sea-sickness. However, all that is usually required for a complete recovery is some sensible eating/drinking and some patience. Here are a few tips and considerations regarding seasickness:

* Vomiting offers relief. Make an effort to continue eating items like crackers, dry toast, dry cereal, etc. (avoid anything greasy, sweet, or hard to digest). Keeping something in your stomach suppresses nausea, or, if vomiting, eliminates painful "dry heaves". Antacid tablets help some people.
* Maintain fluids. Seasickness and related medications cause dehydration and headaches. Try to drink juices low in acidity, clear soups, or water, and stay away from milk or coffee.
* Keep working. Most people find that being busy on deck keeps their minds off their temporary discomfort. Also, the fresh air out on deck is often enough to speed up recovery.
* Carry a plastic bag. This simple trick allows some peace of mind and eliminates some of the panic of getting sick. Do not vomit in sinks or trash cans. If you vomit "over the side", be aware of which way the wind and waves are coming. Going to the "lee" will ensure that an unpleasant experience doesn't become any more unpleasant.

Above all, don't be embarrassed or discouraged! If you get sick, chances are that others are sick too! No one -- fishermen, ship's officers, scientists -- is immune to seasickness.

Firearms and Other Weapons

Personally owned firearms are not permitted aboard the ship without the advance written approval of the XO. Any firearm permitted aboard the ship must be accompanied by any applicable permits. All firearms and their ammunition will be locked in the ship's weapon's locker until they are removed from the vessel. Firecrackers, fireworks and similar pyrotechnics will not be permitted aboard the ship. Sheath knives are not permitted aboard the ship with the exception of fishing fillet knives which are permitted. Folding knives are permitted to be carried aboard ship and their use is encouraged.
