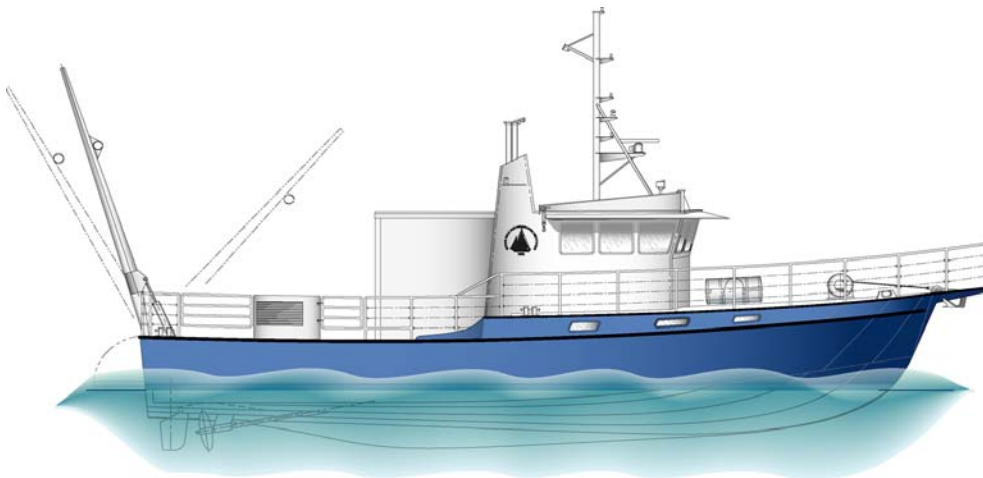
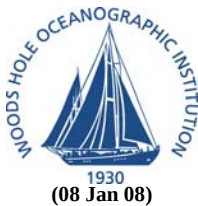


Woods Hole Oceanographic Institution



Operations Manual

R/V Tioga





WOODS HOLE OCEANOGRAPHIC INSTITUTION

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1. INTRODUCTION

To satisfy the growing demand for scientific understanding of the processes that affect out near-shore waters, Woods Hole Oceanographic Institution has acquired a state-of-the-art research vessel. This boat will provide enhanced and efficient access to coastal environments from the Hudson River to the Gulf of Maine, from the edge of the continental shelf to the beaches and bays of the northeastern United States.

This Operations Manual is intended to familiarize users with the capabilities of the *R/V Tioga* and to inform them of operational practices for the successful planning of their scientific projects.

2. SHIP DESCRIPTION

General Description

The *R/V Tioga* is of all aluminum construction, with two 740 horsepower diesel engines utilizing twin screws, oversize rudders and a deep keel. The vessel is usually moored at the WHOI Iselin pier on the west face.

Vessel Name: *R/V Tioga*

Call Sign: **WDB7231**

Physical Description

Length:	60 feet
Draft:	5 feet
Beam:	17 feet
Displacement:	37,000 lbs.
Gross Tonnage:	53 GRT

Machinery

Main Engines:	Twin Detroit Diesel Series 60, 740 horsepower engines
Generator:	Northern Lights Generator, 32 kW
Fuel Capacity:	2,000 gallons
Fresh Water Capacity:	300 gallons
Electrical Service	208VAC, 30 AMPS (Single Phase), 120VAC, 15 AMPS

Operating Range

Range: 350 miles – (round trip at cruising speed)
Cruising Speed: 18 Knots (22.5 max.)
Endurance: usually one day

Accommodations:

Day Trips – 10 people (8 science party, 2 crew), Higher capacity in summer months
10 Immersion (Survival) Suits aboard (more can be obtained from Jay Sisson)
4 – Work Vests aboard
4 – Hard Hats aboard

Berthing - 6 bunks, (4 science berths, 2 crew berths)
Science parties will be expected to provide their own bedding.

Galley space has a sink, refrigerator, stove and microwave.
The facilities are available for everyone to use. Please be responsible
and clean up after yourself, as this is a common area for everyone to use.
Food will not normally be provided.

Major Science Equipment

A-Frame: – 4,600 lbs. capacity from middle of crossbar
21 ft. 8 inches from deck to top of A-Frame – 1,500 lbs max instrument load
13 ft. 5 inches maximum width
12 ft. height to crossbar
48” port extension for crossbar, hydraulically extended
Note: All gear on side extension to have 2,000 lb. weak link
CTD Winch: – Markey Com-7X Compact CTD Winch –2,000 meters of 0.322 EM Cable
7.5 HP Electric Motor with spring-set auto-brake
Trawl Winch: – Hawboldt Electric Trawl Winch Model HSF-2021E – 800 meters of
5/16” wire rope – 7.5 hp marine brake motor with 150% brake
Stern Roller – For use when high loads are expected for mooring recoveries or other
similar operations.
Transducer Well: – 18” square, extends 12” above the fully loaded waterline. Can be
worked on without dry docking vessel
Twin Davits built into deckhouse with 750 lbs capacity each (Port & Starboard)
Dive platform and ladder on transom
Additional Science equipment listed under “*Science Operations*”
RHIB – 9.5 ft. boat with 9.9 hp outboard motor

Work areas

Stern: 17 ft X 17 ft work area with 2 ft X 2 ft. 1” bolt down pattern – 1,200 lb pull out
capacity
4 each aft deck lights – 300 Watts each
Aft Covered Platform: 5/8” bolts, 1 ft X 1 ft. pattern
Dive Platform: Fold down platform with steps down from main deck and recovery ladder

Communications, Navigation and Sounding Electronics

VHF Marine Radio (2 each) – Icom IC-127 with 8’ Shakesphere
SSB Radio – Icom IC-M700 PRO (21) with coupler and 23’ Ant.

Radar – Furuno 1942 or Equal
Depth Sounder – Furuno FCV-582 Color Video Sounder
DGPS – Northstar 951XD
Robertson AP-45 autopilot

3. SCHEDULING

Ship time requests will be taken starting 01 September for the following year.

A draft schedule will be posted on the website in December for the following year.

Meeting will be held late January, early February for the months of April through September.

Meetings will also be used to discuss improvements, changes, suggestions and announcements regarding the *Tioga*.

Priorities

1. WHOI Research and Education
2. Other WHOI Users
3. All other users

Due consideration will be made of time-sensitive and /or time-certain scheduling imperatives.

After the January/February meeting, a working schedule will be posted.

Following that, scheduling will be on a “first come, first served” basis with no priorities.

Once a commitment is made, no one can be bumped.

If someone needs non-specific dates, then those days will be booked as “place holders” and those days can be used as “currency” to trade for specific dates closer to project date.

Trading of dates is allowed and encouraged as long as Marine Operations is kept in the loop.

Alternate users will be wait-listed in the event of cancellations.

4. RATES AND ADDITIONAL COSTS

Full Day = \$2,500*

Half Day = \$1,250

*Rate is subject to change

Definitions

Full Day > 5 hours & < or = 12 Hours

Half Day = Up to 5 Hours

Extended Day > 12 & up to 24 Hours (150% day rate)*

* A 50% user surcharge will apply to extended days and whenever extra or relief crew is required to be aboard.

Cruises Exceeding 12 hours.

Note: Coast Guard regulations state that: *"If the vessel is away from a shoreside dock, or has passengers on board, or both, for more than twelve (12) hours in any twenty-four (24) hour period, an alternate crew shall be provided and the passengers reduced accordingly."*

Cruises that exceed 12 hours require advance planning so please account for this in your planning process. A pre-cruise planning meeting with Marine Operations may be required.

1. The start of an operational day will begin at the agreed upon "meet" time.
2. An operational day as defined above (1/2, Full, Extended) includes move/loading, demove and stand-by time. If extended move/demove time is required beyond that which can be accommodated in a normal operating day (1/2, Full, Extended), a project number is required to cover crew salaries.

Non WHOI Users

Non-WHOI users should contact Marine Operations regarding the current rate.

Transit

Transits will be charged at the regular day rate unless over 12 hours duration. The increased fuel usage due to transits is calculated into the overall budget.

Weather and Non-Operational Days

All cruises canceled due to weather, sea state or other reasons will be rescheduled at the earliest possible date.

Home Port (Woods Hole)

The Master has final authority regarding weather conditions for a cruise. If a cruise is cancelled due to weather there will be no charges while in homeport. If a cruise is cancelled due to the vessel requiring mechanical repairs there will be no charges assessed to the Science User.

Non Home Port

Out of home port costs are included in the day rate (Mooring fees, dockage, crew per diem, electricity, water). Days away from home port, including days the vessel is weathered out, are considered science service days and will be charged the full day rate. Any unusual expenses related to the science party will be charged to the user.

The Master has final authority regarding weather conditions for a cruise. If a cruise is cancelled or delayed due to the vessel requiring mechanical repairs there will be no charges assessed to the Science User for that period of unavailability.

Cancellation fee

(Non-weather or sea related) Two working days notice or the user will be charged the “Minimum charge unit”. This will be implemented if cancellation abuse becomes a problem.

Cruise Loading/Offloading

Charges will be incurred if extraordinary efforts are required or Loading/offloading precludes vessel from other cruises or urgent ship’s business. User will be charged for actual expenses incurred including crew time. These cases will be dealt with on a case-by-case basis and charges will only be assessed when the possibility for other work is lost or actual expenses related to the operation of the vessel are incurred due to these activities.

5. SHIP OPERATIONS

Manning

Captain
TIOGA Crew Member

Operational Work Hours

The operational day is left to the discretion of the Master in accordance with safe and prudent work practice. Extended days, (i.e. more than 12 hours) need advance notification to ensure proper crew rest. Extended days are not considered routine but the exception and require a larger crew.

Deck Operations

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

Stand clear of the aft deck if not involved in operation

Work vests shall be worn at all times during the following times:

1. Gates are open or railings are removed
2. Equipment is being moved or hoisted
3. If going aloft
4. If transferring equipment or personnel to another vessel or station
5. Lines/wires have tension/loads on them
6. During loading with cranes

Hardhats and steel toe boots shall be worn at all times during the following:

1. Equipment is being moved or hoisted
2. Lines/wires are running over the side
3. During loading with cranes

Winch/Hoisting Operations

1. Stand clear of winch and wire
2. Keep tension on wire while reel is moving
3. Do NOT walk underneath wire while equipment is attached
4. Yell out when equipment is in site, and when on surface
5. Yell out which way wire is leading
6. Evacuate aft deck if severe load is placed on wire

Heavy Seas

1. Wear work vests while on deck
2. Keep a hand on something solid
3. If working, use lifelines
4. Secure all equipment
5. Stay away from railings and aft deck if possible

Age Requirement

Any person participating on a cruise aboard TIOGA must 18 years of age or older.

Navigation

While general work areas will be requested for the pre-cruise questionnaire. Exact coordinates will be required to be delivered to Master before the vessel departs.

Communications

All communications needs should be channeled through the Master. Ship's radios should not be used without Master's permission.

Ship Modification

In order to increase longevity, usability, and safety of the vessel, **no modifications**, are to be made without the knowledge and consent of the Captain and Port Engineer.

6. SCIENCE OPERATIONS

Permanent Science Equipment

CTD –SBE9 plus CTD, 6800 m depth capability, 6800m pressure transducer.
one SBE3/SBE4 sensor set.

Benthos PSA-916 altimeter ranging 1 to 100 meters off bottom.

SBE32 12-position pylon on rosette.

Sample bottle size will be 8 or 10 liters.

An SBE11plus Ver. 2 deckunit is provided in the science area, and is connected to a rackmount PC running SBE software (currently installed is version 5.30b acquisition as of 4/09/04). Users will be responsible for providing their own data processing of the CTD data, with their own PC connected to the network to access the CTD data acquired on the rackmount computer system.

CTD Winch – Markey Com-7X Compact CTD Winch –750 meters of 0.322
EM Cable
7.5 HP Electric Motor with spring-set auto-brake

ADCP – RDI 300 kHz Workhorse ADCP

SeaBird MicroTSG Thermosalinograph

Sea Water Flow through system (14 ½ gpm) Higher volumes possible with advance notice

MSRC VDB-1 Vortex Debubbler (Stony Brooke)

Precision Time Keeping – ESE Model S-185A GPS Master Clock w/IRIG-B
SMPTE, 1PPS, RS232 and ESE Outputs.

Heading Reference – Furuno GPS based SC120 heading reference

Transducer Well – 18” square, extends 12” above the fully loaded waterline. Can be worked on without dry docking vessel

Diving Support Equipment –Surface supported hose Diving Compressor and Volume Tank
Dive platform with dive ladder, extra large shower

WHOI Supplied Science Equipment – Aboard as needed

Trawl Winch - Hawboldt Electric Trawl Winch Model HSF-2021E – 800 meters of 5/16” wire rope – 7.5 hp marine brake motor with 150% brake

Bare Drum: 4,650 lb @ 49ft/min

Mid Drum: 3,800 lb @ 60ft/min

Full Drum: 3,220 lb @ 71ft/min

Knudsen 320B 3.5 kHz and 12 kHz Echo Sounder

Portable Science Equipment

All scientific equipment will need to be securely tied down inside and out on deck. It is best to expect equipment to be subject to rough treatment from ship movement. This will keep expensive equipment from being broken and unusable for the cruise. Please contact the Master or Marine Coordinator with any questions regarding the best way to secure your equipment.

When securing equipment to the aft and forward deck areas utilizing deck bolts, consideration must be given to the capacities of these bolt sockets. Unusual stress can damage the socket and surrounding hull causing unusual repairs and lost ship time. Please indicate well in advance if you have any operations that may involve unusual weights or forces to avoid damaging the vessel. The Marine Coordinator and Master can assist you in helping determine these forces and ways to alleviate them. This will help with a safe operation and increase the life of the vessel.

Do not use duct tape or similar material to secure cables or equipment to interior bulkheads and cabinets. It leaves a gummy residue behind and can remove coatings off bulkheads and cabinets. A good alternative is “gaffers tape”.

Dive Operations

Deck Operations Guidelines:

1. Sound out if Divers come to surface
2. If not assisting, stand clear of dive platform during recovery

The vessel will be supplied with a LP compressor with volume tank for hose diving. A Diving compressor and Volume Tank have been purchased for diving operations. The compressor is designed to support two divers on hoses up to 150 feet long.

All diving under the auspices of the Institution (i.e., aboard WHOI vessels or using WHOI-owned equipment) shall be conducted according to the regulations promulgated in the latest revision of the WHOI Diving Safety Manual. The Institution Diving Safety Officer (DSO) or Diving Control Board (DCB) must approve all research diving in

advance. Only those divers currently authorized by the DSO or DCB may dive under Institution auspices.

The Chief Scientist is personally responsible for ensuring that research diving activities are conducted in accordance with all applicable regulations. The Chief Scientist must supply copies of all diver credentials, completed physical examination forms, cruise diving plans and similar documents to the DSO and must nominate a Cruise Diving Supervisor (dive master) at least two weeks prior to commencement of the cruise. Specific information, requirements, and forms are available from the DSO.

The Cruise Diving Supervisor must be approved by the DSO or DCB and shall be responsible for planning, organizing, and managing the diving operations during the cruise. Other responsibilities of the Cruise Diving Supervisor are as follows:

- Submit to the DSO or DCB for approval written emergency plans for the cruise, which must include an evacuation plan to transport an injured diver to a certified recompression chamber
- Ensure, as a minimum, that there is a sufficient supply of oxygen and an appropriate type of resuscitation equipment aboard
- Plan and conduct diving emergency drills
- Ensure that a trial communication contact has been made with the Divers Alert Network and the Medical Advisory System (MAS) prior to commencement of diving operations
- Brief the ship's Master and vessel personnel on the diving operations, emphasizing pertinent safety factors
- Submit all cruise dive logs and a detailed report of any diving-related accident, injury, or dangerous incident to the DSO as soon as possible

The Master of the vessel retains ultimate authority for all diving operations conducted from the ship, which includes terminating all diving operations if, in the Master's judgment, conditions endanger the vessel or personnel. The Master or watch officer will relay information of dive preparations to other crewmembers, especially engine room personnel. The Master or watch officer must give a positive response to the research dive team before anyone leaves the ship. A small boat operated by a member of the ship's crew will be used to support diving operations. The boat operator shall be continuously aware of the diver's locations and shall maintain effective communication with the watch officer of the ship.

For further information contact the Diving Safety Officer, Terrence M. Rioux, at (508) 289-2239, fax (508) 457-2195 or email trioux@whoi.edu

7. SAFETY

Responsibility

Afloat, the Master has the ultimate responsibility for safety. In the case of Science Operations at sea, the Chief Scientist shares in this responsibility. Ashore, the Ship Operations Group and the Marine Coordinator are responsible to provide the Master with information and support to insure safe operations.

Safety Briefing

A safety briefing or orientation shall be conducted immediately prior to sailing or within a few hours of sailing for all the embarked scientists. This briefing shall include the following elements, which are taken from the UNOLS Safety Training Manual:

- A. An introduction to safety at sea - The hazards of a moving platform
- B. Watertight integrity
- C. Fire prevention
- D. Emergency response – man overboard, fire, abandon ship
- E. Life jackets & Immersion (survival) suits
- F. Reminders of requirements for Personal Protective Equipment
- G. Shipboard drills
- H. General deck safety
- I. Shipboard health and sanitation

The ship's officer shall conduct this orientation. Attendance will be recorded.

A successful and safe cruise depends upon accurate, open and frequent communications between the Master and the Chief Scientist and among the science party and the crew.

Reporting

A record that the safety orientation was conducted shall be entered in the ship's log. The ship's log remains onboard the vessel.

Emergency Procedures

Fire and boat drills are held as required and, as basic training in survival, are not to be taken lightly. Science party members are usually notified in advance to avoid disruption of the program. Anyone who must continue working may be excused by prior arrangement with the Master through the Chief Scientist.

When an emergency signal is given, don life jackets, long-sleeved garments, and a hat or other head covering, and report to the station shown on the station card. (Learn this when you first come aboard ship.) During the drill, a ship's officer will conduct a survival suit demonstration. While on board ship, keep in mind that you may be called upon without warning to help out during your off-watch period, and an emergency can occur at any time. Keep your wits about you and let good sense prevail in all you do.

Medical Emergency – The Master has emergency medical training. Please be aware that resources aboard are limited. This should be taken into account when planning your cruise.

Fire and Emergency Drills

The signal is one long blast on the ship's whistle and general alarm bell, lasting for ten seconds or more. During this drill, members of the science party muster in the designated area. Attendance will be taken and reported to the bridge.

Boat Drill (Abandon Ship)

The signal for abandon ship is seven or more short blasts followed by one long blast of the ship's whistle and general alarm. When this signal is heard, report to your designated life raft station. There the Mate in charge will explain the procedures for launching and embarking into the life rafts. The rafts will not be launched during a drill.

Man Overboard

Lifejackets are located amidships on the overhead as well as in the pilothouse under the couch. Exposure suits are located in the lab/galley next to the head.

If someone falls overboard, throw a life-ring into the water towards the person. Keep your eye on the person at all times and point towards the person. Shout, "MAN OVERBOARD, STARBOARD (or PORT)," and notify the bridge to inform them without losing sight of the person if possible. If you hear someone hail "Man Overboard," pass the word to the bridge.

Lab Safety

General Institution Safety policies are set out in the references listed below. These policies are in force aboard all WHOI ships unless a specific procedure is exempted.

- Laboratory Safety Manual

This reference assigns responsibility clearly to the Chief Scientist or Principal Investigator. On cruises with multiple PI's, the Chief Scientist is expected to coordinate all science operations from a safety perspective.

Note: Scientists should be aware that there are other policies within this manual that apply to them. Please see the Master for information concerning other pertinent policies.

Hazardous Scientific Material

A hazardous scientific material is any substance, which, because of its chemical properties, can cause the deterioration of other materials or injury to living organisms. Hazardous scientific materials may be grouped into five major classes: Flammable or explosive, corrosive, reactive, toxic or poisonous, and cryogenic.

Rules for stowage, labeling, and protection of flammables and other hazardous scientific stores on inspected vessels are given in Subchapter U, Title 46 CFR, Part 194. All

research vessels insofar as practicable should follow these rules. Particular standards are singled out below:

- a. Storage Containers should be marked, labeled, and stored in a ventilated and protected area under the supervision of the Chief Scientist with the knowledge and approval of the Master. Consideration should be given to transporting and storing hazardous materials, normally shipped in glass containers, in special, non-breakable containers.
- b. Working quantities only should be stored in the laboratory. A reasonable working quantity would be a one-day supply, considering the hazard posed by the material. Containers should be marked with the material's chemical and common names, type and classification.
- c. Because of the limited shipboard storage for hazardous materials, particular attention must be made to avoid storing incompatible materials together. A close review of the Material Safety Data Sheets will show if two chemicals are incompatible.

Upon Boarding - Chief Scientist will provide to Master:

An inventory of all hazardous materials brought aboard by science party.

MSDS for all hazardous material.

Upon Departure - Scientific Party will provide to Master:

An inventory of hazardous material showing all that has been depleted, removed ashore, or properly stored aboard for later removal.

Chemical Spill Response

The scientific party will be responsible for supplying neutralizing agents, buffers and/or absorbents in the amounts adequate to address spills of a size equal to the amount of any chemicals brought aboard. This spill response material must accompany the chemicals when they come aboard.

8. SHIPBOARD LIFE

Harassment

Anyone on board ship may be subject to more intense or excessive attention, welcomed or not, than might be experienced ashore. In particular, sexual awareness and tensions can be heightened at sea. This attention can be magnified to the point of harassment. Sexual harassment is unlawful and is generally defined as "unwelcome sexual advances, requests for sexual favors, and/or any printed, verbal or physical conduct of a sexual nature, whether on or off the vessel, which has the intent or effect of unreasonably interfering with an individual's or group's academic or work performance, or which creates an intimidating, hostile or offensive educational or work environment." As an assault upon

an individual's rights and dignity, harassment in any form is clearly unacceptable behavior and is inconsistent with the standards of the Woods Hole Oceanographic Institution. Please refer to the [WHOI Harassment Policy](#) on the Human Resources Website for the specific document.

In order to reduce the possible occurrences of unwelcome incidents, everyone should consider modifying behavior and attire accordingly. You are all urged to acknowledge the sense of isolation from life ashore that accompanies shipboard living and try to prevent and avoid any infringements on your personal rights and those of others. In the event that you believe you may have experienced or witnessed harassment in any form, do not hesitate to tell the offender how you feel. Many situations can be resolved very simply by directly and promptly speaking to the offending party, in private if possible and appropriate. In addition or alternatively, it is your right and, especially in the area of sexual harassment, your obligation to report the matter to the ship's Master and/or the Chief Scientist.

Good Safety Habits

Do not go out on the deck alone in rough weather or at night. Rough seas and/or darkness make it almost impossible to find someone who has fallen over the side.

Sensible clothing is a part of good safety habits. Wear shoes with non-skid soles, especially on deck. Sandals of any kind are not safe. Be sure to wear safety-toe shoes if you are working on deck with heavy gear. NEVER go barefoot. Loose or floppy clothing, long hair, and jewelry can become caught in machinery and may result in injury. Life jackets and hard hats are required for personnel working around moving loads and overboard/recovery operations.

Wear a hat and sunglasses (use sun block) if you are sensitive to the sun. Its effects are more intense at sea. Have medication for seasickness if you suspect you may be troubled this way. If you are certain of it, start taking the medication twenty-four hours before the ship leaves the dock. Caution to women – certain classes of these medications should not be taken during pregnancy. Consult with your doctor.

Be aware that lines and wires can part under tension. Do not stand under or near a line or wire while it is under a heavy strain. STAY CLEAR. Never step inside the bight (loop) of a line or wire. Respond immediately to directions from the Mates or Bos'n. They are trying to preserve the safety of all, not prevent you from going somewhere. When a crane is in operation, be aware of the location of its load at all times and stay out from underneath. If you are working on deck while a crane is in operation, you are required to wear safety hardhat. If you have one, bring it with you. When working at or near the side of the ship or stern, safety work-vests must be worn. The ship provides these.

The disposal of plastics in any form is prohibited on the waterways of the world. The ship's waste management procedures are posted. Learn the procedures and follow them.

Alcohol and Controlled Substances

The Institution has established a firm policy that no alcoholic beverages of any type will be permitted on the TIOGA. This means that members of the scientific party should not

bring on board alcoholic beverages of any kind for consumption while on the cruise. The possession or use of any controlled substance will not be tolerated aboard ships operated by WHOI. [WHOI Drug Free Workplace Policy](#) Regardless of your philosophical persuasion, do not risk getting yourself, your shipmates, the Master (who can lose his/her Master's certificate as a result) and the Institution into a great deal of serious and expensive trouble. Any incident could also have an extremely negative impact on the career of any member of the science party.

Under a federal ruling, all persons on board, including members of the scientific party, are subject to drug and alcohol testing for reasonable cause in the event of a "serious marine incident." The Master has the sole responsibility and authority for such a determination. A "serious marine incident" is deemed to have occurred when any accident results in a person being unable to perform his or her duty for 72 hours or material or environmental damages have occurred. All such testing, as well as the fact of a refusal to be tested, must be recorded in the ship's log.

Smoking

For reasons of health and safety, smoking is prohibited within the ship's enclosed spaces. [WHOI Non-Smoking Policy](#) Foul weather smoking is allowed on the aft deck of the Tioga.

Benefits of Past Experience

Tips for maintaining goodwill and a congenial atmosphere

Get your gear settled and stowed away before you go on to explore other aspects of your new environment. Personal effects are most easily stowed aboard ship in soft duffel bags (sea bags), which can fit into odd spaces and are easily lashed in place. This is the time to secure all your gear so that it will stay in place under sea conditions, not after the rolling and pitching begins. If you have brought or are responsible for laboratory equipment or other scientific gear, see that it is aboard and secured.

You will be sharing the somewhat confined space of a stateroom with at least one other, and it is best to get off to a good start by following these guidelines: Keep your personal things neat and contained; and keep your bunk made; keep your room clean and in order. Keeping yourself and your clothing presentable will help to assure your welcome among your shipmates.

Seasickness can sneak up on almost anyone at any time, and it is not an appropriate subject for humor. If it happens to you, be reassured that it is usually a short-term illness. Rest on your bunk, but do not stay down for prolonged periods. Test your sea legs occasionally, and get out for fresh air if weather permits. Stay neat and clean and try to keep eating, if only a little bit. Unsalted, dry crackers, bread or other plain starches are usually good if all else fails.

Many persons who have been to sea regularly bring their own snack foods - particularly those foods, which are wrapped individually and give quick energy. Consult with someone experienced in your party and seek their recommendation.

There will be interesting people to talk with and philosophizing is a time-honored pastime. During informal gatherings, be careful not to disturb others who may be trying to sleep or study.

The close quarters aboard ship demand utmost consideration of others at all times. When someone is required to work long or irregular hours, perhaps out of phase with the next person's schedule, all the freedom of off-hours ashore cannot be assumed.

Be considerate of the belongings of others. The ships and most science groups have carefully planned tool kits and stocks of spares. Most things cannot be replaced at sea. Ask permission before borrowing tools, spare parts, or personal items from any source.

When your cruise is over, you will have participated in a whole new aspect of science, met interesting people, made new friends, and perhaps you will have seen some new places. You may hope never again to see another ship (not everyone "takes" to the sea), or you may already be planning your next cruise. In either case, you will have had a unique experience, and we hope this manual will have eased the way.