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SECTION ONE
MBRD BOATING POLICY

1.10 PURPOSE

1.11 The MBRD Boating Program

The purpose of the MBRD boating program is to make all boating as safe as possible. This is best done by assuring that all boat operators understand the relevant rules, regulations, standards for training, and have sufficient hands on experience with small boats.

1.12 The MBRD Boating Safety Handbook

This handbook is designed to provide guidelines for conducting safe boating operations in support of SIO research. The boat operator should find this handbook to be a working reference, outlining procedures that have proven to be safe and effective while operating boats at SIO and throughout the world. Any person designated as an MBRD Boat Operator should observe the provisions of this guide.

1.20 AUTHORITY AND RESPONSIBILITY

The boat operator has immediate authority and responsibility to the safe conduct of each boating operation. The Coast Guard will hold the boat operator directly responsible for any violation of Coast Guard regulations. The principal investigator has ultimate responsibility of the boat and its operations. Maximum authority and operational responsibility for the conduct of boating operations at SIO is vested in the Chancellor. She/he is responsible for providing surveillance of campus boating activities, interpreting University policies, and developing additional campus policies, regulations and standards consistent with University policies.

1.30 THE MBRD BOATING OPERATIONS MANAGER

1.31 Appointment and Qualifications

The MBRD Director appoints the MBRD Boating Operations Manager. It is required that he/she be competent in operating any boat under her/his surveillance in both Inland and International Waterways and in a diverse array of weather conditions. The MBRD Boating Operations Manager shall also be competent in launching and recovering boats from Scripps Pier.

1.32 Authority

The MBRD Boating Operations Manager shall have the authority to restrict or suspend any boating activity that is in her/his judgment unwise or unsafe. She/he shall inform the Boating Safety Committee immediately of any such restrictive actions.
1.33 The MBRD Boating Operations Manager is responsible for the:

1) Surveillance and coordination of MBRD boating programs (instructional, scientific, recreational, commercial, etc.) with a special attention to safety, and to assure the implementation of all applicable campus policies and standards.
2) Evaluation and surveillance of boats and boat inspection programs.
3) Supervision of instruction and evaluation of training programs.
4) Preparation of recommendations for consideration by the Boating Safety Committee, such as changes in or additions to campus policy, standards, and regulations to promote boating safety and efficiency; changes in training programs; locations for SIO sponsored boating programs; new boats and equipment; and individuals qualified to inspect boats and equipment.
5) Operation and conduct of the Marine Biology boating program, although guided in the performance of required duties by the advice of the Boating Safety Committee.
6) Suspension of boating operations that she/he considers to be unsafe or unwise.
7) Custody and audit of boating program records pertaining to safety.
8) Maintain a list of current boats in the boating program and their owners.

1.40 RELEASE AND WAIVER

All persons who are not University faculty, staff, students or volunteers participating in boat operations under SIO auspices shall execute a release holding the Regents harmless from any claims which might arise to require these releases from University employees, either academic or non-academic, who participate in boating operations in the course of their employment. This release will read as seen in appendix A.
SECTION TWO

Authorization

2.10 AUTHORIZED BOAT OPERATOR LIST

A list of authorized small boat operators will be maintained by the MBRD Boating Operations Manager. Only those people on the list are permitted to operate boats in support of SIO research operations.

2.20 BECOMING AUTHORIZED

To become an authorized small boat operator, an individual must be over 18 years of age and demonstrate:
1) Physical ability to operate a boat
2) Ability to make logical decisions at sea
3) Ability to swim and tread water
4) Basic seamanship (Certification of Completion of California Department of Boating and Waterways’ “Course for Small Boating”
5) Ability to launch from the SIO pier (Certificate of Completion of “Safe SIO Pier Boat Operations” class
6) Ability to hitch and tow a boat (Registration with Fleet Services as having completed the training required to check out a UCSD vehicle with a tow hitch)
7) Successful completion of one or more checkout boat trips, as appropriate, with the MBRD Boating Operations Manager or his designee

At the conclusion of the checkout procedure, the following documents recording the successful completion of the requirements must be submitted:

1) “California Boating” Certificate of Completion
2) “Safe SIO Pier Boat Operations” Certificate of Completion

2.21 Denials of Authorization

Any applicant who, in the judgment of the MBRD Boat Operations Manager, does not appear to possess the judgment, skills, or knowledge necessary to conduct safe boating operations in the environment in which he/she will operate shall be denied authorization.

2.22 Wavier of Specific Requirements

If an applicant for certification can show evidence of previous qualifying experience or training, he/she may be granted a waiver from the appropriate specific requirements of training and experience by the Boat Operations Manager or the Boating Safety Committee.

2.30 REVOCATION OF AUTHORIZATION

Boat Operator authorization may be revoked or restricted for cause. Violation of any of these campus boating regulations, of Coast Guard regulations, of maritime law, or unsafe boat operation will be considered cause. The boat operator shall be informed in writing of the reasons for revocation, and she/he will be given an opportunity to present her/his case to the Boating Safety Committee in writing for reconsideration and/or reauthorization.
2.40 PHYSICAL ABILITY TO OPERATE A BOAT

Ultimately, it is within the MBRD Boating Operations Managers authority to determine a small boat operator’s capacity to operate a boat based on medical or physical grounds related to safe boat operation. Any controversies about such rejections are referred to the Boating Safety Committee for settlement. In the final analysis, both operator and crew must take responsibility for their own safety. If you are not physically capable of operating a boat safely throughout the entirety of the mission, don't go.

2.50 SWIMMING SKILLS

2.51 Boat Operator

The boat operator shall have skills necessary to successfully swim at least 100 yards and tread water for fifteen minutes in the environment in which she/he will operate.

2.52 Crew

The crew shall possess skills necessary to be able to successfully swim in the environment that she/he will be working in. If the crewmember is not comfortable swimming, ALL crew and operators shall don a type I, II, III or V Personal Floatation Device (PFD) throughout the boating operation over water. SCUBA divers donned in diving wetsuits are exempt from this requirement.

2.60 DECISION MAKING

The boat operator’s priority as captain is to stay focused on the continuous safety of the voyage. She/he may need to make the sometimes difficult and unpopular choice to cancel a trip or divert back to safe harbor due to weather, health or other unforeseen circumstances. A conscientious principal investigator will factor in these issues as part of standard fieldwork expectations. The boat operator should never make an at-sea decision based on whether it will affect their career. The ability to gather and interpret information correctly becomes essential during boating decision making. The acronym DECIDE is used to describe the basic steps in the decision making process:

1) Detect the fact that a change has occurred
2) Estimate the need to counter or react to the change
3) Choose a desirable outcome for the success of the voyage
4) Identify actions which could successfully control change
5) Do the necessary action to adapt to the change
6) Evaluate the effect of the action
2.70 BASIC BOATING TRAINING

All MBRD boat operators must complete a “Course for Small Boating” approved by the California Department of Boating and Waterways, in conformance with section 668.1 of the Harbors and Navigation Code. The course must also be approved by the National Association of State Boating Law Administrators and recognized by the United States Coast Guard.

2.71 Maneuvering and Seamanship

The trainee must satisfy the MBRD Boating Operations Manager that her/his judgment is adequate for safe boating and possesses the knowledge of how to perform the following in the ocean or other open water:

a. Basic principals of boat handling and the art of seamanship
b. Maneuvering in restricted visibility (fog, smoke, heavy rain, etc.)
c. Demonstrate an understanding of how a boat’s handling characteristics are affected by wind, waves, swell and current.
d. Nautical terms
e. Maneuvering in a kelp bed or other restrictive waters.
g. Gathering headway
h. Turning with and without power
i. Pivoting points in boats
j. Stopping
k. Backing Down
l. Maneuvering in tight quarters
m. Deploying and recovering instruments
n. Approaching a pier with full control in variable weather and sea state conditions
o. Boat handling in adverse conditions
p. Sea anchors and their different uses
q. Marlinspike seamanship: ability to tie and know when to use a Bowline, Clove Hitch and Cleating a line

2.72 Anchoring Techniques

The trainee should understand of art of anchoring, demonstrating that she/he could successfully anchor in any environment that he/she plans to work in. The trainee shall possess sound judgment in:

a. Selecting an anchorage location
b. Characteristics of the bottom and their various effects on anchor holding power
c. Letting the anchor go in such a way that fouling or severe kiting is prevented
d. Setting the anchor properly in order to yield its full holding power.
e. Anchor line scope ratio with regard to depth, bottom characteristics, weather and environmental conditions
f. Making anchor line fast after the anchor has a good bite
g. Dragging/holding verification
h. Clearing a fouled anchor
2.73 Launching, retrieving and maneuvering from and around Scripps Pier

All SIO boat operators should be able to launch and recover a boat safely from SIO Pier as outlined in Appendix B, the Procedure for Launching a Boat from SIO Pier. The trainee should understand common boat launching mistakes and advanced boat handling procedures when operating boats at Scripps Pier. Knowledge and skills should include:

a. Capacity, safe working limits, hazards and operation of a 3-ton Bridge Crane
b. Suitable boats to launch from SIO pier
c. Essential pre-launch equipment
d. Pre-launch boat preparation
e. Loading
f. Weather and wave judgment with respect to Pier launching and retrieving
g. Safe launching and retrieval procedures

2.80 TRAILERBOATING

If the boat operator uses a Fleet Services tow vehicle, the person must adhere to requirements mandated by UCSD Fleet Services for trailering a boat. UCSD Fleet Services requires that anyone using a Fleet Services rental vehicle to tow any trailer must take their training and be registered with them. In addition any trailer towed by a Fleet Services vehicle must have an appropriate safety certification. The CA department of Boating and Waterways offers Trailering Tips for trailer-boating

2.90 WRITTEN EXAMINATION

Before completing training, the trainee must pass a written examination that demonstrates knowledge of the following. The California Department of Boating and Waterways “Course for Small Boating” satisfies this requirement.

1) Personal Safety
   a. Safety equipment
   b. Homeland security
   c. Carbon monoxide poisoning

2) Boating Law, Rules of the Road and Navigational Aids
   a. Boating law
   b. Officer authority
   c. Age of operator
   d. Required safety equipment
   e. Alcohol and operating a boat
   f. Boat ownership and registration
   g. Environmental laws
   h. Navigational rules
   i. Navigational aids

3) Vessel Operation
   a. The anatomy of a boat
   b. Trailering and storage
   c. General rules
   d. Operating a boat and docking
   e. Fueling
   f. Anchoring
   g. Marlinspike seamanship
   h. Power boating
   i. Sailing
   j. Paddling
Personal Watercraft (PWC)

a. Anatomy of a PWC
b. Safety equipment and personal safety
c. Legal requirements
d. Operating a PWC
e. Navigational rules and aids
f. PWC accident prevention and rescue

5) Accident prevention and rescue
   a. Environmental hazards
   b. Basic rescue
   c. Capsizing and sinking
   d. Passenger overboard
   e. Collisions
   f. Grounding

6) Checklists
7) Float plans
8) Accident reporting
9) Basic boating terminology
3.10 UNDERSTANDING WEATHER

Storms and their associated wind and waves do not “come out of nowhere.” Whether it’s a light breeze or full-blown hurricane, weather phenomena has a definite life cycle that can be tracked and, in a general sense, predicted. Obtaining a good weather briefing is in the interest of safety. Every SIO boat operator should develop a good “weather eye,” the ability to judge local weather conditions. It is the boat operator’s responsibility to ensure that all the needed information is obtained to make a safe voyage.

Southern California weather does not behave like many national publications say it should, so the boat operator cannot rely safely upon many of the signs learned elsewhere. Don’t go out when advisories or warnings are in effect unless adequate boating experience says you can handle the boat in forecast conditions. If you’re already out, safety may require heading for safe refuge. If you’re in a harbor or cove that’s likely to be exposed, as nearly all are in some direction, get out and head for protected waters that you can reach in time.

3.11 Marine Forecasts

The National Weather Service's Marine and Coastal Weather Services Branch provides the most accurate general weather information relating to U.S. coast, coastal and offshore waters. Local National Weather Service Forecast Offices have regionally focused marine web pages that are overflowing with information such as local forecasts, predicted tides and buoy observations.

3.12 Swell Reports and Forecasts

At the time of this writing, the Coastal Data Information Program has the most comprehensive and accurate swell reporting and forecast system for Southern California. Specific forecast models for La Jolla and Scripps Pier should be reviewed prior to boating in the La Jolla Bay area.

3.13 Radio Reports

The NOAA Weather Radio system is a direct broadcast by the National Weather Service on the VHF-FM band.

The broadcast is a continuous cycle of individual products, providing a tailored weather information package for residents within the weather radio broadcast area. The product format varies with the time of day and with the season. A warning alarm is transmitted whenever severe weather, national emergency, or other hazardous event requires rapid public warnings.

NOAA Weather Radio broadcasts can usually be heard approximately 50 miles from the antenna site, sometimes farther. The effective range depends on many factors, particularly the height of the broadcasting antenna, terrain, quality of the receiver, and type of receiving antenna. The closest marine radio station to SIO is located on Mt. Soledad, broadcasting on VHF WX4.
3.14 Wind

Few elements have as powerful an impact on human life as the wind. Prevailing winds in Southern California average 6-10 knots from the west in the early afternoon. When the normal winds blowing from the northwest along the southern California coast are stronger than normal, particularly during spring and summer, they interact with the local coastal topography to form an atmospheric counterclockwise vortex off Los Angeles called Catalina Eddy. The gentle winds of the Eddy may direct the offshore marine layer toward the Los Angeles Basin. The Eddy is only 100 km (60 miles) in diameter; it is actually too small to appear in the operational weather forecast models and is too shallow to have a strong influence on the cloud structure viewed by weather satellites.

Santa Ana Winds during the fall and winter are the most deceiving and deadly weather phenomena a boat operator may experience in Southern California. This is a violent offshore desert wind that occurs when a strong high-pressure system builds in the high-altitude Great Basin between the Sierra Nevada and the Rocky Mountains. This air mass spills out of the Great Basin and is pulled by gravity into the surrounding lowlands. The air circulates clockwise around the high-pressure area, bringing winds from the east and northeast to Southern California. These warm winds have reached speeds of 50 knots along the coast. However, beyond 50 miles from shore, Santa Anas are of little concern.

Aside from weather forecasts, there is little warning of the onset of a Santa Ana. They are normally preceded by hours of clear air with good visibility, unusually low humidity, and ‘twinkling windows’ onshore. Shortly before its arrival on the coast, the Santa Ana may be observed as an approaching dark-brown dust cloud from the N-NE. If visible, this will often give only 10 to 30 minutes warning, and is a positive indication. The Santa Ana may come at any time of day or night.

3.15 Fog

Reduced visibility of any kind is an insidious hazard to life and boats. Fogs forming over offshore waters move slowly toward shore and are less dense then shoreline fogs. Fog seldom forms when the air is at least 5°F warmer than the water. Very dense near-shore fogs form very quickly when moist air cools to the range 1°F above to 4°F below water temperature. These fogs usually lift or have improved visibility in the afternoon.

At first indication of growing fog while underway:

1) Establish boat position from still-visible buoys and landmarks; if none in sight, use GPS.
2) Mark position on a chart
3) Draw course to nearest safe landing
4) Estimate time en route at reduced speed
5) Hoist radar reflector (if available) before fog closes in
6) In low visibility, hold speed down so that boat can be stopped dead within HALF the visibility distance
7) Listen and watch continuously for other boats from a forward position of least engine noise
8) Mark chart position whenever speed or course is changed, or at least every 15 minutes and recalculate time to arrive at landing.
SECTION FOUR

Vessels and Boating Equipment

4.10 GENERAL POLICY

All boats and boating equipment shall meet minimum federal requirements as determined by the United States Coast Guard. The nature of specific scientific operations may require vessels and boating equipment to meet higher standards as determined by the MBRD Boating Operations Manager and the Boating Safety Committee.

4.20 EQUIPMENT

1) The following US Coast Guard minimum required safety equipment is mandatory:

   a. One type I, II, III or V personal floatation device (PFD) for each person (also applies to kayaks and row boats)
   b. One Type IV PFD available to be thrown
   c. One B-1 class fire extinguisher
   d. Sound signaling device
   e. Visual distress signals
   f. Registration
   g. Navigation lights (if operating at night)
   h. Backfire flame arrester if required
   i. Operational ventilation system if required

2) In addition, all vessels operating under SIO auspices should be equipped with the following equipment:

   a. Anchor (tied on)
   b. Alternative propulsion (oars, kicker motor, paddle, sail kit)
   c. Drinkable water
   d. Tool kit
   e. First aid kit
   f. Bailing device (bucket)
   g. Communication device (VHF radio, cell phone, EPIRB, satellite telephone)
   h. Dive flag (in support of SCUBA operations only)
   i. Oxygen kit (in support of SCUBA operations)
   j. Emergency Contact Phone List
   k. SIO Boat Operator Phone List
   l. Local chart
   m. Knife
   n. Float
   o. Fuel reserve for unanticipated events
   p. Spare boat plug
   q. Spare kill switch
   r. Gloves
4.30 SCRIPPS PIER

Equipment requirements in addition to the fore mentioned that are pertinent to launching, retrieving, and maneuvering from and around Scripps Pier follow:

4.31 Vessels suitable to launch from SIO Pier include:
   1) Boston Whalers of the square bow type to 19 feet
   2) Inflatable boats of most types to 22 feet.
   3) Jet skis with adequate lifting fittings
   4) Other unsinkable craft approved by the Boating Operations Manager and Boating Safety Committee.

4.32 Additional specific equipment required for launching and retrieving from Scripps Pier
   1) Boat launching bridle
   2) Bow line (compatible with the pier launching procedure)
   3) One set of oars
   4) Two anchors. The bow (primary) anchor must have at least 200’ of 5/16” or larger Nylon line and 10’ of 5/16” chain attached. (Bow anchor must be tied on)
   5) Boat hook
   6) Engine crash bar (optional)

4.40 VESSEL EXAMINATIONS

All MBRD boat owners shall ensure a through check is made of all safety related equipment onboard. It is urged that a member of the Coast Guard Auxiliary Vessel Examination program provide a Courtesy Marine Examination (CME) to the vessel. The examination is free of charge and a decal is awarded to each boat that meets federal safety requirements and additional safety items established by the Auxiliary including:

   1) Personal floatation devices
   2) Fire extinguishers
   3) Navigation lights
   4) Visual distress signals
   5) Ground tackle
   6) Bilge pump and/or bailer
   7) Alternative propulsion
   8) Fuel systems
   9) Seaworthiness
   10) Appliances
   11) Electrical wiring
   12) Registration/documentation papers
   13) Numbering
   14) State requirements

CME decal award numbers shall be submitted to the Boating Operations Manager.

4.50 LOADING, WEIGHT, AND BALLANCE

No person may operate a vessel loaded in a manner that will jeopardize the safety of the operator or crew.

The general US Coast Guard small boat loading formula for PERSONAL is “Length multiplied by width divided by sixteen.” Small boat loading formula for DIVERS doing one dive on a calm day is “Length multiplied by width divided by twenty.”
SECTION FIVE
Boating Regulations

5.10 CERTIFICATION REQUIRED

No person shall engage in MBRD boating operations unless she/he is authorized.

5.20 BOATING PROCEDURES

All boat operators shall obey local, state, federal and international laws while conducting boating and trailering operations under SIO auspices. Vessels launched and retrieved from Scripps Pier shall adhere to the guidelines in the Procedure for launching a small boat from SIO Pier. All SCUBA diving operations conducted from SIO boats shall be in accordance with the SIO Diving Safety Program.

5.30 EMERGENCY PROCEDURES

The local emergency medical system should only be activated if grave and imminent danger treating life or property exists and immediate help is required. A local emergency contact list should be available in all vessels. If there is a genuine concern for the safety or welfare of any persons onboard a vessel that have not returned or checked in within a reasonable amount of time, the USCG Boating Emergency Guide should be followed.

In an emergency requiring immediate action, the boat operator may deviate from any rule of this manual to the extent required to meet that emergency.

5.40 FLOAT PLANS

Before departing, a pre-departure float plan should be given to a responsible party on shore. The float plan should include at minimum:

1) Names of operator and crew
2) Description of boat
3) Trip expectations
4) Estimated time of return

5.50 REQUIRED ACCIDENT, SAFETY AND CITATION REPORTING

All boating accidents, safety concerns, and criminal offences shall be reported to the MBRD Boating Operations Manager in a timely manner.

5.60 CARELESS OR RECKLESS OPERATION

No person may operate a boat in a careless or reckless manner so as to endanger the life or property of another.

5.70 PRE-BOATING ACTION

Each boat operator shall, before going boating, become familiar with all available information concerning that boating activity. This information must include:

1) For an operation not in the immediate vicinity of the original launch site, marine weather reports and forecasts, fuel requirements, and alternative points of landing if the original launch site is unavailable.
2) Seaworthiness and equipment operation of all components pertaining to the boating mission.
3) Swimming ability of crew.
SECTION SIX

Emergency Procedures

6.10 EMERGENCY AT SEA

Some emergencies require fast and correct action to save life and property. A good boat operator thinks through the required action ahead of time and periodically while underway to make action automatic. She/he makes sure that at least one other person aboard knows the action and boat operation in case the primary boat operator is out of commission.

6.11 Foul Weather

When wind and waves start to build or are immediately forecasted, determine their present and forecasted direction. Then:

1) Locate the nearest cove or harbor protected from that wind and wave direction. If you are moored in it, stay there. If not, head for it.
2) Don lifejackets and keep calm.
3) If the swell exhibits extremely steep or breaking waves, steer to take each wave 45° to one side of bow. Use only enough power to steer well, without pounding. Do not let bow get far off angle; waves may broach or roll boat. If propeller lifts out of water, throttle down to prevent ‘engine racing’.
4) If shelter direction requires driving down hill in a following sea and control is difficult, a sea anchor or drogue may be deployed off transom.
5) If engine fails, immediately deploy sea anchor, bucket, Danforth anchor, shirt with knotted sleeves or other drag on a line to bow bitt to hold bow into the waves and avoid broaching.
6) Call for help when you foresee loosing control.

6.12 Capsize

Most small boats will float with outboard motors attached.

1) Stay with the boat. It is easier seen by rescue personal then people alone and provides your floatation. Swimming distances are always several times what they seem from the water.
2) Don lifejackets.
3) Right the boat if possible. Get in and bail it out; or use paddles or hands to get it closer to shore.
4) Call for help.

6.13 Fire

1) Throw burning materials overboard if possible.
2) Slow the boat to idle and change heading to keep fire and smoke downwind.
3) Don lifejackets ASAP
4) Turn off electricity
5) If in or under upholstery or bedding, rip it out and jettison. If inside engine compartment, shut off fuel tanks and discharge fixed CO₂ system if available.
6) Close all hatches, doors, ports and ventilators that will confine fire to the smallest space and reduce its O₂ supply. Don’t open until extinguisher is ready to trigger and point.
7) Direct hand extinguisher at base of flames and sweep side to side. If heat and smoke prevent working close enough, lock the extinguisher on and throw it into the center of the area and close all openings around it.
8) Use buckets of water only on burning wood, cloth and upholstery. Never use water on fuel, oil or grease.
9) Call for help

6.14 Submerged Object Hit

1) Stop engines instantly, drift and/or set anchor
2) Open all floorboards and hatches and look for leaks. If water is rising, look around stern, propeller shaft or out-drive area.
3) For moderate leaks, use bilge pumps or hand bail with buckets.
4) If leaking badly, close a through-hull cooling-water intake valve, remove bottom of hose, cover with screen if possible, and use engine (in neutral) to pump bilge. Watch water level so that engine does not overheat for lack of water.
5) If leak can be reached, try an internal patch of something soft like cushion or clothing. Back up with a flat hard piece of wood or metal, shored and wedged.
6) Otherwise, get a sail, side curtain, plastic sheet, or boat cover over the OUTSIDE of the hull. Pull into place and hold by ropes to its corners, at least one of which must go under the keel to the far side.
7) If there is no serious leak, or it is under control, slowly try to get underway to nearest harbor with haul-out facilities.
8) If vibration is excessive due to bent shaft or propeller, stop engine and try to get a tow or row.

6.15 Grounded

1) Stop engine
2) Check tide direction, bottom composition, direction, and proximity of deeper water.
3) Determine what part of boat is aground and whether there are any leaks. If leaking, see above section ‘Submerged Object Hit.’
4) To refloat a small boat, do not start the engine. Try shifting weight in the boat and push off with oars.
5) Alternatively, try taking anchor out and plant it in deeper water. Then pull and keep heavy strain holding boat bow/stern to sea and deeper water. Move all people and gear to the end opposite to that grounded. With continuous strain, it should come off in a rising tide.
6) If in soft sand or mud, ‘suction’ on a flat wide hull may be broken by another boat making a good wake seaward of your anchor line. Do not run engine and plug cooling water intakes.
7) If the tide is falling and you can’t get it off in a few minutes, you are probably stuck until the next flood tide. Have a mattress, cushions, or other padding standing by to cover over any rocks against which it may pound.
8) If you are towed off, secure to more than one bit or cleat. For a very heavy expected pull, run bridle all around hull just below deck level.

6.16 Sinking

1) If bilge pumps, hand bailing, engine cooling jury rig, etc cannot keep up with a bad leak, lifeguard boats, harbor patrol and Coast Guard usually carry portable engine driven high volume pumps for use while waiting for a tow.
2) It may be possible to haul it to shallow water at high tide:
   a. Set anchor in deep water on your way into shore
   b. Land
   c. Drain or pump as the tide goes down
   d. Temporarily stop and fix leak
   e. Float off at the next high tide if you have set anchor at water deep enough to help you off.
3) Small boats usually have enough flotation within the hull that they will not sink.
6.17 Abandoning

Before abandoning your boat due to fire, swamping, capsizing or other emergency, don’t forget to:

1) Don lifejackets
2) Call for help. Use visual or sound signal devices if help is close, but do not waste flares or other resources with little likelihood of being seen or heard. Wait for something to signal to.
3) Hoist a radar reflector or other piece of irregular shaped metallic piece as high as possible on the raft.
4) Before abandoning, tell your radio contact what channels you have available and agree upon one for direction finder homing. Then, lock or wire the microphone button down for continuous transmission.
5) Estimate distance to shore, which will be farther then it looks. See Life Expectancy table below. Consider the distance, water temperature, injuries, and swimming capabilities of all aboard before deciding that anyone should try it.
6) Put mirrors, flashlight, dye markers, flares, matches and anything else potentially useful for attracting attention into one or more plastic bags and close by twisting and rubber banding. Take them with you along with fresh water.
7) Don’t leave the area unless you are only minutes from shore. If surf conditions won’t let you ashore, get back near the boat. A damaged boat can be sighted much more easily than people alone and it may help you to keep afloat. Many burned out hulls have floated indefinitely.

6.18 Life Expectancy While in the Water for Various Water Temperatures

65°F = Safe to 4 hours, marginal over 4 hours
60°F = Safe to 2 hours, marginal over 2 hours
55°F = Safe to 72 minutes, marginal over 72 minutes
50°F = Safe to 50 minutes, lethal over 3.9 hours
45°F = Safe to 40 minutes, lethal over 2.7 hours
40°F = Safe to 30 minutes, lethal over 2 hours
35°F = Safe to 25 minutes, lethal over 1.5 hours
30°F = Safe to 15 minutes, lethal over 1.1 hours
APPENDIX A

Participant’s name: __________________________

UNIVERSITY OF CALIFORNIA, SAN DIEGO

Name of Class or Activity:

________________________________________

Waiver of Liability, Assumption of Risk, and Indemnity Agreement

Waiver: In consideration of being permitted to participate in any way in: ____________________________________________________________ on this ___ day of ________, 20___ hereinafter called "The Activity", I, for myself, my heirs, personal representatives or assigns, do hereby release, waive, discharge, and covenant not to sue The Regents of the University of California, its officers, employees, and agents from liability for any and all claims including the negligence of The Regents of the University of California, its officers, employees and agents, resulting in personal injury, accidents or illnesses (including death), and property loss arising from, but not limited to, participation in The Activity.

______________________________________    ___________________________________
Signature of Participant                        Date           Signature of Parent/Guardian of Minor     Date

Assumption of Risks: Participation in The Activity carries with it certain inherent risks that cannot be eliminated regardless of the care taken to avoid injuries. The specific risks vary from one activity to another, but the risks range from 1) minor injuries such as scratches, bruises, and sprains 2) major injuries such as eye injury or loss of sight, joint or back injuries, heart attacks, and concussions to 3) catastrophic injuries including paralysis and death.

I have read the previous paragraphs and I know, understand, and appreciate these and other risks that are inherent in The Activity. I hereby assert that my participation is voluntary and that I knowingly assume all such risks.

Indemnification and Hold Harmless: I also agree to INDEMNIFY AND HOLD The Regents of the University of California HARMLESS from any and all claims, actions, suits, procedures, costs, expenses, damages and liabilities, including attorney's fees brought as a result of my involvement in The Activity and to reimburse them for any such expenses incurred.

Severability: The undersigned further expressly agrees that the foregoing waiver and assumption of risks agreement is intended to be as broad and inclusive as is permitted by the law of the State of California and that if any portion thereof is held invalid, it is agreed that the balance shall, notwithstanding, continue in full legal force and effect.

Acknowledgment of Understanding: I have read this waiver of liability, assumption of risk, and indemnity agreement, fully understand its terms, and understand that I am giving up substantial rights, including my right to sue. I acknowledge that I am signing the agreement freely and voluntarily, and intend by my signature to be a complete and unconditional release of all liability to the greatest extent allowed by law.

________________________________________     ____________________________________
Signature of Participant                        Date       Signature of Parent/Guardian of Minor     Date

Participant's Age (if minor) ______

VolWaiver 7/01
APPENDIX B

PROCEDURE FOR LAUNCHING AND RECOVERING A BOAT FROM SCRIPPS PIER

Description of Boat Hoist:
1) The 3-ton Craneveyer bridge crane has two control boxes located on the northeast and south-east support pipes, consisting of “UP-DOWN” and “NORTH-SOUTH” push buttons. Speeds are approximately 75 feet per minute (FPM) and 25 FPM. Full speed is accomplished by pushing the button in fully. For slow speed, the button is pushed halfway in.

2) The hoist has enough wire to reach the bottom of the ocean at this point; approximately 65 feet from fully retracted to fully extended. The vertical lift clearance from the pier deck to fully retracted or “Two Blocked” is approximately 15 feet.

3) The wire diameter is 5/8 inch. The breaking strength far exceeds the 3-ton safe work load limit. There is a load cell on the hoist, presently set at 5600 lbs. There is a limit switch to prevent “Two Blocking”. There is also an internal counter on the winch drum set to shut off just after the limit switch, so in effect, there are three safety devices to prevent “Two Blocking”; yet it has been done. The effect was to break the very strong wire, drop the boat and destroy the hoist. The costs were 25K for the hoist and three months down time. Three months of pier-dependant, funded research was lost. It was a catastrophe that could have been prevented by the fourth and far most important safety device, the operator. NEVER TWO BLOCK THE HOIST!

4) The gantry or bridge that the hoist is mounted on can travel from 8 feet south of the pier deck, to 8 feet north of the pier deck. It travels on rails and is powered by two synchronous motors, one on each end. It pulls its power cord behind it on another track. If the cars that hold the cord hang up, the powerful motors will rip the cord out of the hoist. Only operator vigilance can prevent that. There are limit switches on each end of the gantry tracks to prevent the gantry from going off the ends. There are also I-beam stops welded to each end and they are stronger than the drive motors. We need to use the full travel length, so the operator’s objective is to stop just as the limit switches are hit.

5) The hoisting cable is 7x24 galvanized hoisting cable terminated with a swaged thimble. Above this thimble, a fifty lb. two piece spherical weight is clamped. This is the minimum weight needed to keep the wire on the hoist drum. Below the thimble, a shackle attaches a three-ton ball bearing sealed swivel. Shackled below this is a ¾” pear shaped link. The reason for a link instead of a hook is because of the destructive nature of a hook on the boats. A hook will snatch steering wheels, pipe rails, engine controls etc. right out of the boat. Now the hooks live on the boat bridles.

Safe Work Loads
1) A short discussion on the 3-ton weight limit is in order at this point. The safe work load of 3-tons is very easy to exceed with a boat that weighs but 1100 lbs. (average 16’ Boston Whaler weight with 55 hp. engine and standard operating equipment). The surface tension of seawater from a wave passing beneath the boat as it is hanging, is enough. A flooded boat will far exceed it. Most boating operations involve collecting, so boats often come back with twice the weight they left with.

2) The snap strain is tempered by the use of oversize Nylon boat lifting bridles. Nylon is used in our bridles because it has good elasticity, 15% before elastic limits begin to be exceeded. The 22’ Panga (the longest boat on the pier) weighs 1200 lbs. and requires advanced boat handling techniques for use from the pier. Operating larger boats from the pier is dangerous to the pier, the boat, and the boat crew.

Boat Launching
1) Suitable boats to launch from SIO pier
   a) Boston Whalers of the square bow type to 18’.
   b) Inflatable boats of most types to 22’. Whalers and inflatables are unsinkable, at least for the short period of time that they spend under the boat hoist. Their bows tend not to hang up on the chain ladders (a very desirable feature near the surf zone) and they are very stable.
   c) Many other unsinkable craft can be made suitable with the help of, and operated by, the most experienced of SIO boathandlers.
2) Essential pre launch boat equipment
   a) Boat launching bridle.
   b) Bow line.
   c) Two sets of oars.
   d) Two anchors with 200' of nylon line and 10' of 5/16" or larger nylon line and 10' of 5/16" chain attached. (Bow anchor must be tied on)
   e) Boat hook.

3) Pre-launch boat preparation
   a) Bridles: Many boats come with adequate attachment fittings for pier launching bridles. Most do not. Boston whalers come with above average lifting bridle bolts that can be readily adaptable for pier launching bridles. All that is needed is to build a 1” diameter Nylon bridle and attach it. Copying existing bridles off the most used, similar boats is a good idea. Lengths may be copied exactly and short lengths of 1/2” diameter chain added to the bridle ends can correct differences in boat balance. Most bridles are built and attached by industrial marine hardware with “stamped on” safe workloads.
   b) Bridle Hooks: Hooks should be 3-ton galvanized steel safety hooks. Over engineering, to some extent, is a good idea in all the lifting gear.
   c) Bow Line: The bow line used to attach the boat to the chain ladder is the next most important piece of rigging on the boat. It should be made just long enough for it to reach the chain ladder when the boat is hanging directly below the hoist. Any longer and the boat is likely to crash it’s engine into a pier piling. This usually results in total loss of the engine. Any shorter, and you won’t be able to easily hook and unhook from the chain ladder. The bow line should have the largest “Witchard snap” for a snap hook.
   d) Bow Line Hook: Most bow line hooks, even very similar ones, have incompatible features with the chain ladder, or are just not strong enough. Strength is surprisingly important. A wave can grab the boat, and the only thing between it and the beach is that line. The hook shape is also important. It is possible to have the hook jerked through your hand. We take pains to avoid this by splicing a “pigtail” of line, a couple of feet long, into the bow line so that most of the time we hold the pigtail and not the hook. The bow line is held lightly at all times when ascending or descending the chain ladder.
   e) Oars: The oars should be good ones, and at least 7' long for boats over 16'. Oar locks must be strong.
   f) Boat Hook: The boat hook can be extendable or solid, as long as it is strong.
   g) Crash Bars: Crash bars are a good idea to protect the engines from being smashed against the pilings.

4) Loading:
   a) The US Coast Guard has a small-boat loading formula for PERSONNEL only: • “Length multiplied by width divided by sixteen”
   b) MBRD recommends this small-boat loading formula for DIVERS doing one dive on a CALM day only: “Length multiplied by width divided by twenty” This above formula works well on 16’ whalers.
   c) The center of gravity (CG) is directly below the center of the hoisting bridle when it is taut. All gear should be loaded equally fore and aft of the CG. If it is necessary to load unequally, it is better to load a little heavier aft.
   d) Load gear so that it cannot shift. Experience is the best teacher, so use an experienced hand to load anything but light, stable loads. When loading gear back into a boat while at sea, keep in mind where CG is so that the boat will hoist evenly out of the water.
   e) This section does not speak of the obvious other equipment required by the US Coast Guard (PFDs, Whistle, Flares Throwable cushions, etc.), or the communications equipment (VHF RADIO, Cell phones & GPS) needed for work away from the pier.
Weather and Wave Judgement:
1) In all but flat calm conditions, a period of fifteen minutes (one cup of coffee) is needed to properly judge wind, wave, current and swell.
2) To begin, waves or swells over one meter in height are too high.
3) Current over one knot is too much.
4) Wind over ten Knots is too much. Winds are usually much stronger in the afternoon.
5) Future conditions are determined by Marine Weather reports. Strange as it may seem, Santa Ana conditions can be the worst prediction for any offshore work. You could be blown many miles off shore. Any adverse predictions should be heeded.
6) Tides must be taken into account. The waves will be shorter and steeper at low tide. Spring tides create along shore currents that reverse at the turn of the tide. You must launch and retrieve on the lee side of the Pier. A combination of all the above forces will determine which side that is. The wind is usually, but not always, the strongest of the forces.
7) If you feel you must launch in spite of adverse conditions, enlist the help of one of the senior boat operators.

Launching
1) With the bow line in his hand, the operator (Cox’n) signals the crane operator to lift the boat high enough to clear the safety lines.
2) When the boat is clear of the trailer and has a clear path to the rail, the Cox’n signals the crane operator to take the boat north or south at a steady speed till the boat is at the full extension of crane.
3) The Cox’n now signals to have the boat lowered just enough to hook the bow line onto the guide line to the chain ladder.
4) The Cox’n kills the swing of the boat, lines it up to clear the rail, then signals to have the boat lowered at full speed till the bow line is not quite taught.
5) The Cox’n now descends the ladder, un-hooks the bow line from the guidline and exchanges the hook in his hand with the bow line pigtail.
6) With the pigtail held loosely in one hand, the Cox’n descends with the boat to a point about one meter above the swell height. (The job of the crane operator during this operation has been to keep up with the Cox’n, not to get ahead of him)
7) At this point, the Cox’n clips the bow line to the shoreward chain of the ladder and asks the crane operator to lower the boat into the water when it ‘looks good’. That is to say, when there is no eminent large wave coming. Try to set the boat in the water between two of the smaller swells.
8) The Cox’n now enters the boat, unhooks the hoist, and signals it to be raised while still holding the headache ball. He holds on to it until it is too high to hang onto.
9) The Cox’n now starts the engine in neutral gear at idle speed, then shifts to reverse while backing the boat steadily at idle speed to a position 90° (or at right angles) to the pier.
10) At this point, still idling in reverse gear, he calls the crew down one at a time. With the boat pulling slightly on the chain ladder, it makes descending down the ladder slightly more difficult, but it is infinitely safer to the boat and the crew. If the crew cannot pull the boat in against the pull of the boat, the Cox’n may shift into neutral gear for the personnel transfer, but as soon as that person is aboard, he should shift into reverse gear again until all are aboard.
11) At this point, the crew unclips from the ladder and the Cox’n backs slowly away from the pier, turns on course, and proceeds to their destination.
Returning to Scripps Pier and Retrieving:

1) Conditions are likely different if some time has passed since launching, so slow to idle speed at least 150 feet from the pier. Assess the new conditions. Determine the true lee side of the pier. Look for swimmers, divers, and snorkelers. Is the wooden accommodation ladder down? Is the hoist in use?

2) With a good assessment of the new conditions, approach the lee side ladder at idle speed, slowing to a stop at the ladder by reversing the engine in idle speed. Have the crew hook up to the shoreward chain, four or five rungs up. Back away at idle speed at 90° to the pier, then send the crew up, one at a time. When all the crew are up on the pier, the Cox’n backs at idle speed to a position directly beneath the boat hoist. He then calls for the hoist to be lowered, grabs hold of the headache ball with one hand, kills the engine with the other, then calls for the crane operator to hoist just short of taught.

3) At this point, the Cox’n jumps up the ladder to a safe height (four or five rungs above the bow line hook). He now calls for the crane operator to hoist the boat up as soon as it looks good. With the hoist cable plumb, the crane operator pulls the boat up to a height one-meter above the wave height. When the swing is mostly killed, the Cox’n descends, kills the rest of the swing completely, unhooks the bow line, exchanges the hook for the pigtail and ascends with the boat to a position just below the “surfer exclusion cage”. Here he stops the hoist, aligns the boat parallel to the pier, hooks the bow line to the guide line, and has the crane operator bring the boat up to a position that will just clear the safety lines.

4) The Cox’n climbs up onto the pier, unclips the boat from the guide-line and directs the crane operator to steadily bring the boat to a position directly above the trailer. The Cox’n refines this position to perfect, then lowers the boat to a position about one foot above the trailer. At this point, the trailer is moved to a position perfectly under the boat. With two people steadying the boat, one forward and one aft, the Cox’n makes sure all is clear, then has the crane operator lower the boat onto the trailer.

5) The Cox’n now unhooks the bridle and returns the hoist to a position either all the way north, or all the way south so that bird droppings fall in the sea and not on the deck.

6) Now the boat is washed, the engine flushed, the log is filled out, the boat is stowed, and a careful search for keys or other possible items left behind,

7) The gas is stowed and the person in charge of the boat is informed of any damages or boat necessities (such as gas).