



DIVING SAFETY MANUAL

BY

Diving Control Board
Hawaii Pacific University

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SECTION 1.0 GENERAL POLICY

1.1 Scientific Diving Standards

Purpose

The purpose of these Scientific Diving Standards is to ensure that all scientific diving at Hawaii Pacific University (HPU) is in a manner that will maximize the protection of scientific divers from accidental injury and/or illness, and to set forth standards for training and certification that will allow a working reciprocity between other organizations and institutions with similar standards. Fulfillment of these purposes shall be consistent with the furtherance of research and safety, and facilitation of collaborative opportunities between HPU and other like organizations.

The HPU diving safety manual meets the minimum standards for the establishment of American Academy of Underwater Sciences (AAUS) recognized scientific diving programs, the organization for the conduct of these programs, and the basic regulations and procedures for safety in scientific diving operations. It also establishes a framework for reciprocity between AAUS Organizational Members (OM) that adhere to these minimum standards.

Historical Perspective

The foundation for this manual was developed and written by AAUS by compiling the policies set forth in the diving manuals of several university, private, and governmental scientific diving programs. These programs share a common heritage with the scientific diving program at the Scripps Institution of Oceanography (SIO). Adherence to the SIO standards has proven both feasible and effective in protecting the health and safety of scientific divers since 1954.

In 1982, OSHA exempted scientific diving from commercial diving regulations (29CFR1910, Subpart T) under certain conditions that are outlined below. The final guidelines for the exemption became effective in 1985 (Federal Register, Vol. 50, No.6, p.1046). AAUS is recognized by OSHA as the scientific diving standard setting organization.

HPU intends to follow these standards and exceed them when applicable to local operations by HPU and its control board.

Scientific Diving Definition

Scientific diving is defined (29CFR1910.402) as:

“Diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. Scientific diving does not include performing any tasks usually associated with commercial diving such as: Placing or removing heavy objects underwater; inspection of pipelines and similar objects; construction; demolition; cutting or welding; or the use of explosives.”

Scientific Diving Exemption

OSHA has granted an exemption for scientific diving from commercial diving regulations under the following guidelines (Appendix B to 29 CFR 1910 Subpart T):

- The Diving Control Board consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operation.
- The purpose of the project using scientific diving is the advancement of science; therefore, information and data resulting from the project are non-proprietary.
- The tasks of a scientific diver are those of an observer and data gatherer. Construction and trouble-shooting tasks traditionally associated with commercial diving are not included within scientific diving.
- Scientific divers, based on the nature of their activities, must use scientific expertise in studying the underwater environment and therefore, are scientists or scientists-in-training.
- In addition, the scientific diving program must contain, as defined by OSHA in 29 CFR 1910 Subpart T 1910.401(a)(2)(iv):
 - A Diving safety manual which includes at a minimum: Procedures covering all diving operations specific to the program; procedures for emergency care, including recompression and evacuation; and criteria for diver training and certification.
 - A Diving control (safety) board, with the majority of its members being active divers, which must at a minimum have the authority to: Approve and monitor diving projects; review and revise the diving safety manual; assure compliance with the manual; certify the depths to which a diver has been trained; take disciplinary action for unsafe practices; and, assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for SCUBA diving.

Recommendations for Changes to AAUS Manual

As part of HPU's annual report, recommendations for modifications of this manual will be submitted to AAUS for consideration. When changes are made, changes will be documented in Appendix 17 of this manual.

1.2 Operational Control

Organizational Member Auspices and Responsibilities

HPU auspices include any scientific diving operation in which HPU is connected because of ownership of life support equipment used, locations selected, or relationship with the individual(s) concerned. This includes all cases involving the operations of authorized individuals of HPU or auxiliary organizations, where such individuals are acting within the scope of their authorization.

It is HPU's responsibility to adhere to the AAUS Standards for Scientific Diving Certification and Operation of Scientific Diving Programs. The administration of the local diving program will reside with HPU's Diving Control Board (DCB).

The regulations herein must be observed at all locations where scientific diving is conducted.

Organizational Member Diving Safety Manual

Meeting AAUS minimum standards is a requirement for organizational membership in the Academy. HPU must develop and maintain a diving safety manual that includes wording on how HPU defines specific policies and procedures required for the proper function of a scientific diving program. The HPU manual must address environmental and working conditions unique to the program's operations. The HPU diving manual must meet or exceed the AAUS standards. AAUS standards must be the foundation for the development of HPU's scientific diving safety manual. The order and formatting of the HPU manual does not have to conform to the AAUS template. The information contained in Volume 1, Sections 1.0 through 5.0 and the Appendices are required for all manuals. Volume 2, Sections 6.0 through 9.0 are required only when HPU conducts the specifically referenced diving mode or activity. Deviations or significant changes to AAUS minimum standards may require justification before approval is granted by the AAUS Standards Committee.

Diving Control Board

- The Diving Control Board (DCB) consists of a majority of active scientific divers. Voting members include the Diving Safety Officer (DSO), and other representatives of the diving program such as qualified divers and members selected by procedures established by the founding members of the DCB and the DSO.
- A chairperson and a secretary may be chosen from the membership of the board according to local procedure.
- Has autonomous and absolute authority over the scientific diving program's operation.
- The DCB may delegate operational oversight for portions of the program to the DSO; however, the DCB may not abdicate responsibility for the safe conduct of the diving program.
- The DCB must:
 - Establish additional standards, protocols, and operational procedures beyond the AAUS minimums to address HPU specific needs and concerns.
 - Approve and monitor diving projects.
 - Review and revise the diving safety manual.
 - Ensure compliance with the diving safety manual.
 - Approve the depth to which a diver has been authorized to dive.
 - Take disciplinary action for unsafe practices.
 - Ensure adherence to the buddy system for scientific diving.
 - Act as the official representative of HPU in matters concerning the scientific diving program.
 - Act as a board of appeal to consider diver-related problems.
 - Recommend the issue, reissue, or the revocation of diving authorizations.
 - Recommend changes in policy and amendments to AAUS and HPU's diving safety manual as the need arises.
 - Establish and/or approve training protocols or standards through which the applicants for authorization can satisfy the requirements of HPU's diving safety manual.
 - Suspend diving operations considered to be unsafe or unwise.

- Establish criteria for equipment selection and use.
- Recommend new equipment or techniques.
- Establish and/or approve facilities for the inspection and maintenance of diving and associated equipment.
- Ensure that HPU's air station(s) meet air quality standards as described in [Section 3.6](#).
- Periodically review the DSO's performance and program.
- Investigate diving incidents within HPU's diving program or violations of HPU's diving safety manual.

Diving Safety Officer

The Diving Safety Officer (DSO) serves as a voting member of the DCB and is the designated representative to AAUS. This person has extensive experience in research diving and a technical expertise in diving operations.

Qualifications:

1. Must be an active scuba instructor from an internationally recognized certifying agency.
2. Must be appointed by the responsible administrative officer or designee, with the advice and counsel of the DCB.
3. Must qualify as a Full Voting Member of AAUS as defined by AAUS Bylaws:
 - Holds a diving certification from a recognized national certifying agency or equivalent, and
 - Has engaged in sustained or successive scientific diving activities during the past two years, or
 - Has completed a course in scientific diving that meets the requirements as specified by the most current edition of the AAUS Standards for Scientific Diving.
4. Must attend an AAUS DSO Orientation within one year of accepting a position at an AAUS approved OM, unless he/she has served as a DSO for another current AAUS OM within the last year.

Duties and Responsibilities

1. Answers, through the DCB, to the appropriate administrative officer or designee, for the conduct of the scientific diving program of HPU.
2. If delegated by the DCB, the routine operational authority for this program rests with the DSO. This oversight includes, but is not limited to: training, diver authorizations, approval of dive plans, maintenance of diving records, and ensuring compliance with this manual.
3. May permit some duties and responsibilities to be carried out by a qualified delegate, with the approval of the DCB.
4. Must be guided in the performance of the required duties by the advice of the DCB, but operational responsibility for the conduct of the scientific diving program will be retained by the DSO.

5. Must suspend diving operations determined to be unsafe or unwise.

Instructional Personnel Qualifications

All personnel involved in diving instruction under the auspices of HPU must be reviewed and authorized by the DCB.

Lead Diver

For each dive, one individual shall be designated as the Lead Diver who shall be at the dive location during the diving operation. The Lead Diver shall be responsible for:

- Ensuring dives are conducted in accordance with [Section 2.0](#).
- Ensuring all dive team members possess current authorization and are qualified for the type of diving operation.
- Coordination with other known activities in the vicinity that are likely to interfere with diving operations.
- Ensuring safety and emergency equipment is in working order and at the dive site.
- Suspending diving operations if in their opinion conditions are not safe.
- Reporting to the DCB, through the DSO, any physical problems or adverse physiological effects including symptoms of pressure-related injuries.

Reciprocity and Visiting Scientific Diver

- Two or more AAUS OMs engaged jointly in diving activities, or engaged jointly in the use of diving resources, must designate one of the participating DCBs to govern the joint dive project. However, responsibility for individual divers ultimately resides with the home OM.
- A Scientific Diver from one OM must apply for permission to dive under the auspices of another OM by submitting to the DSO of the host OM a document containing all the information listed in Appendix 6, signed by the DSO or designee of the home DCB.
- A visiting Scientific Diver may be asked to demonstrate their knowledge and skills for the planned dive.
- If a host OM denies a visiting Scientific Diver permission to dive, the host DCB must notify the visiting Scientific Diver and their DCB with an explanation of all reasons for the denial.

Waiver of Requirements

The HPU DCB may grant a waiver for specific requirements of training, examinations, depth authorizations, and minimum activity to maintain authorizations. AAUS medical standards may not be waived.

1.3 Consequence of Violation of Regulations by Scientific Divers

Failure to comply with the regulations of HPU's diving safety manual may be cause for the restriction or revocation of the diver's scientific diving authorization by action of HPU's DCB.

1.4 Consequences of Violation of Regulations by Organizational Members

Failure to comply with the regulations of this manual may be cause for the restriction or revocation of HPU's recognition by AAUS.

1.5 Record Maintenance

HPU must maintain consistent records for its diving program and for each participant. These records include but are not limited to: diving safety manual; equipment inspection, testing, and maintenance records; dive plans (project and/or individual); records of dive (project and/or individual); medical approval to dive; diver training records; diver authorization(s); individual dive log; dive incident reports; reports of disciplinary actions by the DCB; and other pertinent information deemed necessary by HPU.

Availability of Records:

- Medical records must be available to an attending physician of a diver or former diver when released in writing by the diver.
- Records and documents required by this manual must be retained by HPU for the following period:
 1. *Diving Safety Manual* – Current document only.
 2. Equipment inspection, testing, and maintenance records – Minimum current entry or tag.
 3. Records of Dive – minimum of 1 year, except 5 years where there has been an incident of pressure-related injury.
 4. Medical approval to dive – Minimum of 1 year past the expiration of the current document except 5 years where there has been an incident of pressure-related injury.
 5. Diver training records – Minimum of 1 year beyond the life of the diver's program participation.
 6. Diver authorization(s) – Minimum of 1 year beyond the life of the diver's program participation.
 7. Pressure-related injury assessment - 5 years.
 8. Reports of disciplinary actions by the DCB – Minimum of 1 year beyond the life of the diver's program participation.

SECTION 2.0 DIVING REGULATIONS

2.1 Introduction

No person shall engage in scientific diving operations under the auspices of HPU's scientific diving program unless they are authorized pursuant to the provisions of this *Manual*.

2.2 Pre-Dive Procedures

Dive Plans

Before conducting any diving operations under the auspices of HPU, a dive plan for the proposed project or dive must be formulated and submitted for approval by the DCB or designee. Dives should be planned around the competency of the least experienced diver. The dive plan (project or individual) should include the following:

- Diving Mode(s) and Gas(es)
- Divers' authorizations
- Approximate number of proposed dives
- Location(s) of proposed dives
- Estimated depth(s) and bottom time(s) anticipated
- Decompression status and repetitive dive plans, if required
- Proposed work, equipment, and boats to be employed
- Any hazardous conditions anticipated
- Emergency Action Plan (Appendix 7)
- In water details of the dive plan should include:
 - Dive Buddy assignments and tasks
 - Goals and objectives
 - Maximum depth(s) and bottom time
 - Gas management plan
 - Entry, exit, descent and ascent procedures
 - Perceived environmental and operational hazards and mitigations
 - Emergency and diver recall procedures

Diver Responsibility and Refusal to Dive

The decision to dive is that of the diver. The ultimate responsibility for safety rests with the individual diver. It is the diver's responsibility and duty to refuse to dive, without fear of penalty, if in his/her judgment, conditions are unsafe or unfavorable, or if he/she would be violating the precepts of regulations in this manual.

No dive team member will be required to be exposed to hyperbaric conditions against his/her will.

No dive team member may dive for the duration, of any known condition, which is likely to adversely affect the safety and health of the diver or other dive team members.

Pre-dive Safety Checks

- Prior to commencing the dive, the team must assure that every team member is healthy, fit, and trained for the type of dive that is being attempted.
- Scientific divers must conduct a functional check of their diving equipment and their buddies or other dive team members equipment before beginning the dive. They must ensure the equipment is functioning properly and suitable for the type of diving operation being conducted.
- Each diver must have the capability of achieving and maintaining positive buoyancy at the surface.
- Environmental conditions at the site will be evaluated prior to entering the water.

Pre-dive Briefings

Before conducting any diving operations under the auspices of HPU, the dive team members must be briefed on:

- Dive Buddy assignments and tasks
- Dive objectives.
- Maximum depth(s) and bottom time
- Turn around pressure and required surfacing pressure
- Entry, exit, descent and ascent procedures
- Perceived environmental and operational hazards and mitigations
- Emergency and diver recall procedures

2.3 Diving Procedures

Solo Diving Prohibition

There will be no solo diving under the auspices of HPU's scientific diving program.

All diving activities must assure adherence to the buddy system. This buddy system is based upon mutual assistance, especially in the case of an emergency.

The HPU Buddy System

Hawaii Pacific University's scientific divers must adhere to a strict buddy system policy both in and out of the water for dive operations. The HPU buddy system begins before the dive as each partner inspects his/her own and buddy's gear prior to getting in the water. The pre-dive check also serves as an informative time, especially if one of the divers is feeling anxious or appears unfit for the task at hand. Many emergencies can be stopped before they have a chance to take root when each diver is paying attention to his/her surroundings. Divers should trust their judgement and act early.

In the water, divers of a buddy team must remain within a reasonable distance of each other in order to render aid in the instance of an emergency, especially for an out of air scenario. An emergency rarely happens when you are expecting it, so you should be vigilant and pay attention to yourself, your buddy, and your surroundings at all times. For an out of air scenario, your buddy is your lifeline. Please note that although HPU scientific divers do thorough buddy checks prior to getting in the water and keep dive gear in pristine condition, a fluke regulator failure gives very little time to act in what is certainly a time-sensitive situation. The diver may not realize the failure until drawing for another breath that is not delivered. This does not provide much time for the buddy team to make contact with each other and render aid. Please be mindful of where your buddy is at all times and ensure that you remain close enough to help each other. Safe distances may be dictated by environmental conditions at times therefore a fixed distance is not given. A diver must use his/her judgement to determine an appropriate maximum distance with the safety of the buddy team as the top priority.

After the dive, the buddy team must remain together for a period of 30 minutes after reaching the surface. Buddies should help each other with gear, participate in the post-dive briefing and talk about their dive, meanwhile paying attention to each other's well-being. If a separation is required of the buddy pair (e.g. a restroom visit or changing into street clothes), you can temporarily swap buddies with another pair or stand outside of the entrance of the separation space, remaining in range of verbal contact.

Please report any instances of divers violating these policies to the DSO immediately.

Decompression Management

- On any given dive, both divers in the buddy pair must follow the most conservative dive profile. In no instance may a dive team forego the more conservative dive plan for that of the other member's profile or computer.
- A safety stop performed during the ascent phase of the dive should be conducted on any dive that exceeds 30 feet (9.14m). The minimum safety stop time is three minutes, with five minutes preferred.

Termination of the Dive

Any dive must be terminated while there is still sufficient cylinder pressure to permit the diver to safely reach the surface, including decompression time, or to safely reach an additional air source at the decompression station.

Dives will be planned with the intent to reach the surface with a reserve tank pressure of no less than 500 psi.

Should the situation arise that this reserve of air is needed, the reserve may be used, but only in the case it is required to safely complete the dive. At no time should this reserve be used to extend dive time to achieve a task underwater other than focused on safety of divers in the water. Divers are to accurately report their starting and ending pressures in their dive logs. A written explanation is required any time a diver surfaces with less than 500 psi.

It is the responsibility of the diver to terminate the dive that he/she considers unsafe, without fear of reprisal, in a way that does not compromise the safety of another diver already in the water.

Emergencies and Deviations from Regulations

Any diver may deviate from the requirements of this manual to the extent necessary to prevent or minimize a situation likely to cause death, serious physical harm, or major environmental damage. A written report must be submitted to the DCB explaining the circumstances and justifications should any deviations from the regulations occur. The penalty for non-compliance will involve revoking of diving privileges.

2.4 Post-Dive Procedures

Post-Dive Safety Checks

After the completion of a dive, each diver must report any physical problems, symptoms of decompression sickness, or equipment malfunctions to the Lead Diver, DSO, and/or DCB.

2.5 Emergency Procedures

HPU will develop emergency procedures which follow the standards of care of the community and must include procedures and implementation criteria for emergency care, recompression, evacuation, and incident reporting.

Required support equipment:

- First aid kit designed for dive support.
- Emergency oxygen supply adequate for the number of divers present.

2.6 Flying After Diving or Ascending to Altitude (Over 1000 feet/304 meters)

- Following a Single No-Decompression Dive: Divers should have a minimum preflight surface interval of 12 hours.
- Following Multiple Dives per Day or Multiple Days of Diving: Divers should have a minimum preflight surface interval of 18 hours.
- Following Dives Requiring Decompression Stops: Divers should have a minimum preflight surface interval of 24 hours.
- Before Ascending to Altitude Above 1000 feet (304 meters): Divers should follow the appropriate guideline for preflight surface intervals unless the decompression procedure used has accounted for the increase in elevation.

2.7 Record Keeping Requirements

Personal Diving Log

Each authorized scientific diver must log every dive made under the auspices of the scientific diving program at HPU and is encouraged to log all other dives. Dive logs will be submitted to the DSO within one week of dive completion. Submitted dive logs will be placed in the diver's permanent file.

The dive log must include at least the following:

- Name and authorization of diver and buddy
- Date, time, and location
- Diving modes used
- General nature of diving activities
- Maximum depth, dive time, and surface interval time
- Diving tables or computers used
- Detailed report of any near or actual incidents

Required Incident Reporting

All diving incidents requiring recompression treatment, or resulting in moderate or serious injury, or death must be reported to the HPU DCB and AAUS in a timely manner. HPU must record and report occupational injuries and illnesses in accordance with requirements of the appropriate Labor Code section. The HPU DCB must investigate and document any incident of pressure-related injury and prepare a report that is to be forwarded to AAUS during the annual reporting cycle.

- If pressure-related injuries are suspected, or if symptoms are evident, the following additional information must be recorded and retained by the DCB, with the record of the dive, for a period of 5 years:
- Written descriptive report shall include:

- Name, address, phone numbers of the principal parties involved.
- Summary of experience of divers involved.
- Location, description of dive site, and description of conditions that led up to incident.
- The circumstances of the incident and the extent of any injuries or illnesses.
- Description of symptoms, including depth and time of onset.
- Description and results of treatment.
- Disposition of case.
- Recommendations to avoid repetition of incident.

In addition to HPU's requirements, all diving incidents will be reported to the AAUS. This report must first be reviewed and released by the DCB and at a minimum contain:

- Complete AAUS Incident Report.
- Summary of experience of divers involved.
- Description of dive site, and description of conditions that led up to incident.
- The circumstances of the incident and the extent of any injuries or illnesses.
- Description of symptoms, including depth and time of onset.
- Description and results of treatment.
- Disposition of case.
- Recommendations to avoid repetition of incident.

SECTION 3.0 DIVING EQUIPMENT

3.1 General Policy

All equipment must meet standards as determined by the DSO and the DCB. All equipment must be regularly examined by the person using it and serviced according to manufacturer and this manual's recommendations. Equipment that is subjected to extreme usage under adverse conditions should require more frequent testing and maintenance. Records of maintenance will be submitted to the DSO to be filed in each diver's record.

3.2 Equipment

The HPU DCB requires the minimum equipment configuration for all dives as follows:

Regulators and Gauges

- Scuba regulators and gauges must be inspected and tested prior to each use and serviced, at a minimum, according to manufacturer's recommendations or at an interval of once a year, whichever period is most conservative.
- Standard open circuit (OC) regulator configuration is:
 - A first stage
 - Primary 2nd stage
 - Back up 2nd stage
 - Submersible Pressure Gauge (SPG)
 - Inflator hose for a Buoyancy Compensator Device
- A Full-Face Mask may be used in place of the primary 2nd stage according to manufacturer's Recommendations. If a full-face mask is used, the DCB requires divers to carry an additional traditional style face mask in their BCD pocket. The purpose of this requirement is to ensure sight is achievable in the case of gear failure.

Equipment for Determination of Decompression Status

- Each member of the buddy team must have an underwater timing device and depth indicator, or dive computer
- If dive tables are being used a set must be available at the dive location
- If a dive computer is used the diver must use the same computer used on repetitive dives.
- In an aquarium or other manmade structure of a known maximum obtainable depth:
 - A depth indicator is not required, except when a diver's decompression status must be taken into consideration on repetitive dives.
 - Only one buddy must be equipped with a timing device.
 - The maximum obtainable depth of the aquarium must be used as the diving depth.

Scuba Cylinders

- Scuba cylinders must be designed, constructed, and maintained in accordance with the applicable provisions of the Unfired Pressure Vessel Safety Orders.
- Scuba cylinders must be hydrostatically tested in accordance with DOT standards.
- Scuba cylinders must have an internal and external inspection at intervals not to exceed 12 months.
- Scuba cylinder valves must be functionally tested at intervals not to exceed 12 months.
- For Enriched Air Nitrox (EAN) cylinders, see [Section 6.0](#).

Buoyancy Compensation Devices (BCD)

- Each diver must have the capability of achieving and maintaining neutral buoyancy underwater and positive buoyancy at the surface.
- BCDs, dry suits, or other variable volume buoyancy compensation devices must be equipped with an exhaust valve.
- These devices must be functionally inspected and tested by the DSO or a designated member of the DCB at intervals not to exceed 12 months.
- BCDs, dry suits, or other variable volume buoyancy compensation devices must not be used as a lifting device in lieu of lift bags.

Backpacks without integrated flotation devices shall have a quick release device designed to permit jettisoning with a single motion from either hand.

Weights are required to be carried in a way that allows their easy jettisoning, independent from the air supply. Weights may not be attached directly to the backpack unless a quick release system is employed.

Additional Required Equipment

- Adequate exposure protection for conditions
- Reel with surface marker – 1 per dive team
- Inflatable surface marker buoy (SMB) that is capable of being inflated at depth
- Knife or cutting device
- Sound producing device
- Dive booties (when conducting shore dives)
- Snorkel

3.3 Auxiliary Equipment

Handheld Underwater Power Tools

- Power tools and equipment used underwater must be specifically approved by the DCB prior to any work being done.

- Tools and equipment supplied with power from the surface must be de-energized before being placed into or retrieved from the water.
- Handheld power tools must not be supplied with power from the dive location until requested by the diver.

3.4 Support Equipment

First Aid Supplies

- A first aid kit and emergency oxygen appropriate for the diving being conducted must be available at the dive site.

Diver's Flag

- A diver's flag must be displayed prominently whenever diving is conducted.
 - For boat operations, the flag must be affixed to the boat so other vessels can clearly see
 - For shore operations, the flag must be affixed to a surface float connected to a reel that is attached to survey location or carried by the diver.

Compressor Systems - HPU Controlled

The following will be considered in design and location of compressor systems:

- Low-pressure compressors used to supply air to the diver if equipped with a volume tank must have a check valve on the inlet side, a relief valve, and a drain valve.
- Compressed air systems over 500 psig must have slow-opening shut-off valves.
- All air compressor intakes must be located away from areas containing exhaust or other contaminants.

3.5 Equipment Maintenance

Record Keeping

Each equipment modification, repair, test, calibration, or maintenance service must be logged, including the date and nature of work performed, serial number of the item (if applicable), and the name of the person performing the work for the following equipment:

- Regulators
- Gauges (SPG, Depth Gauges, Timers, and Dive Computers)
- BCDs
- Dry suits
- Scuba cylinders and valves
- Full Face Masks
- Compressors, air filtration systems, gas control panels, and storage banks
- Surface supplied equipment
- Additional equipment categories as determined by the DCB

A maintenance log can be found in Appendix 14. Please use this and keep it up to date.

Compressor Operation and Air Test Records

Gas analyses and air tests must be performed on each HPU-controlled breathing air compressor at regular intervals of no more than 100 hours of operation or 6 months, whichever occurs first. The results of these tests must be entered in a formal log and be maintained.

3.6 Air Quality Standards

Breathing Gas

Breathing gas must meet the following specifications as set forth by the Compressed Gas Association (CGA Pamphlet G-7.1; see table below).

CGA Grade E	
Component	Maximum
Oxygen	20 - 22%/v
Carbon Monoxide	10 PPM/v
Carbon Dioxide	1000 PPM/v
Condensed Hydrocarbons	5 mg/m ³
Total Hydrocarbons as Methane	25 PPM/v
Water Vapor ppm	(2)
Objectionable Odors	None

For breathing air used in conjunction with self-contained breathing apparatus in extreme cold where moisture can condense and freeze, causing the breathing apparatus to malfunction, a dew point not to exceed -50°F (63 pm v/v) or 10 degrees lower than the coldest temperature expected in the area is required.

Remote Operations

For operations using gas sources not controlled by HPU (dive shop fills or for dive operations conducted in remote places), every effort should be made to verify breathing gas meets the requirements of this standard. Prior to any diving activity, the lead diver in charge of the project must obtain compressor maintenance logs and air quality tests from the breathing gas provider. These results shall be shared with the DSO and DCB in the Dive Plan Proposal (Appendix 13). If CGA Grade E gas is not verifiable, the DCB must develop a protocol to mitigate risk to the diver.

SECTION 4.0 SCIENTIFIC DIVER CERTIFICATION AND AUTHORIZATIONS

4.1 Prerequisites

Administrative

The candidate must complete all administrative and legal documentation required by HPU. These documents include Appendices 1-3 and 10-12 of this Manual. Candidates are also required to be members of the Diver's Alert Network (DAN) and to have active Preferred Liability Insurance Coverage offered through DAN.

Entry Level Diver Certification

The candidate must, at minimum, show documented proof of Diver Certification or equivalent from an internationally recognized training agency and 18 logged dives.

Medical Examination

The candidate must be medically qualified for diving as described in [Section 5.0](#) and Appendices 1-4 of this manual. AAUS medical standards may not be waived.

Swimming/Watermanship Evaluation

The candidate must demonstrate the following in the presence of the DSO or designee. All tests are to be performed without swim aids. However, where exposure protection is needed, the candidate must be appropriately weighted to provide for neutral buoyancy.

- a) Swim underwater for a distance of 25 yards (23 meters) without surfacing.
- b) Swim 400 yards (366 meters) in less than 12 minutes.
- c) Tread water for 10 minutes, and 2 minutes without the use of hands.
- d) Transport a passive person of equal size a distance of 25 yards (23 meters) in the water.

4.2 Training

The candidate must successfully complete prerequisites, theoretical aspects, practical training, and examinations for a minimum cumulative time to meet HPU’s requirement of 120-hours and a minimum of 12 open water dives. Theoretical aspects must include principles and activities appropriate to the intended area of scientific study. Formats for meeting the 120-hour training requirement include successful completion of coursework in *Scientific Diving I and II* offered by HPU, or a combination of formalized and on the job training.

When a diver’s resume provides clear evidence of significant scientific diving experience, the diver can be given credit for meeting portions of the 120-hour course requirements. The DCB will identify specific overlap between on-the-job training, previous scientific diving training/experience and course requirements, and then determine how potential deficiencies will be resolved. However, HPU cannot “test-out” divers, regardless of experience, when they have no previous experience in scientific diving.

Any candidate who does not convince the DCB, through the DSO, that they possess the necessary judgment, under diving conditions, for the safety of the diver and his/her buddy, may be denied HPU scientific diving privileges.

Theoretical Training / Knowledge Development	
Required Topics:	Suggested Topics:
Diving Emergency Care Training <ul style="list-style-type: none"> • Cardiopulmonary Resuscitation (CPR) • AED • Standard or Basic First Aid • Recognition of DCS and AGE • Accident Management • Field Neurological Exam • Oxygen Administration 	Specific Dive Modes (methods of gas delivery) <ul style="list-style-type: none"> • Open Circuit • Hookah • Surface Supplied diving
Dive Rescue <ul style="list-style-type: none"> • To include procedures relevant to HPU specific protocols. (See water skills below) 	Specialized Breathing Gas <ul style="list-style-type: none"> • Nitrox • Mixed Gas
Scientific Method	Small Boat Operation

<p>Data Gathering Techniques (Only items specific to area of study required)</p> <ul style="list-style-type: none"> • Transects and Quadrats • Mapping • Coring • Photography • Tagging • Collecting • Animal Handling • Archaeology • Common Biota • Organism Identification • Behavior • Ecology • Site Selection, Location, and Relocation 	<p>Specialized Environments and Conditions</p> <ul style="list-style-type: none"> • Blue Water Diving • Altitude • Ice and Polar Diving (Cold Water Diving) • Zero Visibility Diving • Polluted Water Diving • Saturation Diving • Decompression Diving • Overhead Environments • Aquarium Diving • Night Diving • Kelp Diving • Strong Current Diving • Potential Entanglement/Entrapment • Live boating
<ul style="list-style-type: none"> • Specialized Data Gathering Equipment 	
Required Topics:	Suggested Topics:
Navigation	HazMat Training
HazMat Training • HP Cylinders	<ul style="list-style-type: none"> • Chemical Hygiene, Laboratory Safety (Use of Chemicals)
Decompression Management Tools <ul style="list-style-type: none"> • Dive Tables • Dive Computers • PC Based Software 	<p>Specialized Diving Equipment</p> <ul style="list-style-type: none"> • Full face mask • Dry Suit • Communications • Dive Propulsion Vehicle (DPV) • SMBs/Lift Bags • Line Reels
AAUS Scientific Diving Regulations and History <ul style="list-style-type: none"> • Scientific Dive Planning • Coordination with other Agencies • Appropriate Governmental Regulations 	
Hazards of breath-hold diving and ascents	
Dive Physics (Beyond entry level scuba)	Other Topics and Techniques as Determined by the DCB
Dive Physiology (Beyond entry level scuba)	
Dive Environments	
Decompression Theory and its Application	

Practical Training / Skill Development	
Confined Water	<p>At the completion of training, the trainee must satisfy the DSO or DCB-approved designee of their ability to perform the following, as a minimum, in a pool or in sheltered water:</p> <ul style="list-style-type: none"> • Enter water fully equipped for diving • Clear fully flooded face mask • Demonstrate air sharing and ascent using an alternate air source, as both donor and recipient, with and without a face mask • Demonstrate buddy breathing as both donor and recipient, with and without a face mask • Demonstrate understanding of underwater signs and signals • Demonstrate ability to remove and replace equipment while submerged • Demonstrate acceptable watermanship skills for anticipated scientific diving conditions
Open Water Skills	<p>The trainee must satisfy the DSO, or DCB-approved designee, of their ability to perform at least the following in open water:</p> <ul style="list-style-type: none"> • Surface dive to a depth of 10 feet (3 meters) without scuba* • Enter and exit water while wearing scuba gear* ^^ • Kick on the surface 400 yards (366 meters) while wearing scuba gear, but not breathing from the scuba unit* • Demonstrate proficiency in air sharing ascent as both donor and receiver* • Demonstrate the ability to maneuver efficiently in the environment, at and below the surface* ^^ • Complete a simulated emergency swimming ascent* • Demonstrate clearing of mask and regulator while submerged* • Underwater communications^^ • Demonstrate ability to achieve and maintain neutral buoyancy while submerged* • Demonstrate techniques of self-rescue and buddy rescue* • Navigate underwater^ • Plan and execute a dive^ • Demonstrate judgment adequate for safe scientific diving *^^
	<p>Rescue Skills:</p> <ul style="list-style-type: none"> • Rescue from depth and transport 25 yards (23 meters), as a diver, a passive simulated victim of an accident: surface diver, establish buoyancy, stabilize victim • Demonstrate simulated in-water mouth-to-mouth resuscitation • Removal of victim from water to shore or boat • Stressed and panicked diver scenarios • Recommendations for Rescue of a Submerged Unresponsive Compressed Gas Diver – Appendix 8

<p>Successfully complete a minimum of one checkout dive and at least eleven additional open water dives in a variety of dive sites, for a cumulative surface to surface time of 6 hours. Dives following the checkout dive(s) may be supervised by an active Scientific Diver holding the necessary depth authorization experienced in the type of diving planned, and with the knowledge and permission of the DSO</p>
<p>The eleven dives (minimum) following the initial checkout dive may be conducted over a variety of depth ranges as specified by the HPU DCB. Depth progression must proceed shallower to deeper after acceptable skills and judgement have been demonstrated, and are not to exceed 100 feet (30 m) during the initial 12 dive cycle</p>
<p>* Checkout dive element ^^ Evaluated on all dives ^ Evaluated at some point during the training cycle</p>

Examinations	
Equipment	<p>The trainee will be subject to examination/review of:</p> <ul style="list-style-type: none"> • Personal diving equipment • Scientific underwater survey equipment and instrumentation • Function and manipulation of decompression computer to be employed by the diver (if applicable)
Written Exams	<p>The trainee must pass a written examination reviewed and approved by the HPU DCB that demonstrates knowledge of at least the following:</p> <ul style="list-style-type: none"> • Function, care, use, and maintenance of diving equipment • Advanced physics and physiology of diving • Diving regulations • Applicable diving environments • Emergency procedures for HPU dive mode(s) and environments, including buoyant ascent and ascent by air sharing • Currently accepted decompression theory and procedures • Proper use of dive tables • Hazards of breath-hold diving and ascents • Planning and supervision of diving operations • Navigation • Diving hazards and mitigations • Cause, symptoms, treatment, and prevention of the following: near drowning, air embolism, hypercapnia, squeezes, oxygen toxicity, nitrogen narcosis, exhaustion and panic, respiratory fatigue, motion sickness, decompression sickness, hypothermia, and hypoxia/anoxia • Applicable theoretical training and knowledge development from the required and suggested topics (above)

4.3 Diver Certification and Authorizations

Only a person diving under the auspices of HPU that subscribes to the practices of HPU is eligible for an HPU scientific diver certification.

Diver-In-Training (DIT) Authorization

This is an authorization to dive, usable only while it is current and for the purpose intended. This authorization signifies that a diver has completed and been certified as at least an entry level diver through an internationally recognized certifying agency and has the knowledge skills and experience necessary to commence and continue training as a scientific diver under supervision, as approved by the DCB. DIT status must only be used when the diver is on his/her way to becoming certified as a scientific diver. While it is recommended for DIT's to have hands-on scientific diver experience during their training, the DIT status is intended to be a temporary authorization, not a substitute for an HPU Scientific Diver Certification.

HPU Scientific Diver Certification

Signifies a diver has completed all requirements in [Section 4.2](#) and is certified by HPU to engage in scientific diving without supervision, as approved by the DCB through the DSO. Submission of documents and participation in aptitude examinations does not automatically result in certification. To be certified, the applicant must demonstrate to the DCB, through the DSO, that s/he is sufficiently skilled and proficient, and possess the necessary judgement for their safety and/or that of the dive team. HPU Scientific Diver Certification is only active when required authorizations are in place and current.

HPU Scientific Aquarium Diver Certification

HPU Scientific Aquarium Diver is a certification authorizing the diver to participate in scientific diving solely in the aquarium environment.

All requirements set forth for HPU Scientific Diver certification must apply, except follows:

- Practical training must include at least 12 supervised aquarium dives for a cumulative bottom time of 6 hours.
- Training requirements for navigation and 400-yard (366-meter) surface swim in scuba gear may be waived at the discretion of the DCB.

HPU Temporary Diver Authorization

Only a diver not under the auspices of HPU may be granted an HPU Temporary Diver Authorization. The individual in question must demonstrate proficiency in diving and can contribute measurably to a planned dive. An HPU Temporary Diver Authorization constitutes a waiver of selected requirements of [Section 4.0](#) and is valid only for a limited time, as approved by the DCB. A Temporary Diver Authorization must be restricted to the planned diving operation and must comply with all other policies, regulations, and standards of this manual, including medical requirements. This authorization is not to be utilized as a repeated mechanism to circumvent existing standards set forth in this Manual.

4.4 Depth Authorizations

Depth Ratings and Progression to Next Depth Level

Indicates the maximum depth in which a diver can conduct science and may supervise other divers holding a lesser depth authorization. A scientific diver requires a valid depth authorization to be considered active.

A diver may be authorized to the next depth level after successfully completing the requirements for that level. A diver may exceed his/her depth authorization when accompanied and supervised by a dive buddy holding a depth authorization greater or equal to the intended depth. Dives must be planned and executed with the permission of the DCB or designee.

In the event a diver within HPU does not hold an authorization at the desired next level, the DCB may authorize a required progression or procedure for a diver to attain a deeper authorization. If local conditions do not conform to traditional AAUS depth progressions, the DCB may devise a reasonable accommodation. However, the total number of dives to obtain a given depth authorization must follow the cumulative number of dives listed below.

- a) Authorization to 30 Foot Depth - Initial science diver depth authorization, approved upon the successful completion of training listed in earlier parts of this. Cumulative minimum supervised dives: 12.
- b) Authorization to 60 Foot Depth - A diver holding a 30-foot authorization may be authorized to a depth of 60 feet after successfully completing and logging 12 supervised dives to depths between 31 and 60 feet under supervision of a diver authorized by the DCB, for a minimum total time of 4 hours. Cumulative minimum supervised dives: 24.
- c) Authorization to 100 Foot Depth - A diver holding a 60-foot authorization may be authorized to a depth of 100 feet after successfully completing and logging 6 supervised dives to depths between 61 and 100 feet under supervision of a dive buddy authorized by the DCB. The diver must also demonstrate proficiency in the use of the appropriate decompression profiling method. Cumulative minimum supervised dives: 30.
- d) Authorization to 130 Foot Depth - A diver holding a 100-foot authorization may be authorized to a depth of 130 feet after successfully completing and logging 6 supervised dives to depths between 100 and 130 feet under supervision of a dive buddy authorized by the DCB. The diver must also demonstrate proficiency in the use of the appropriate decompression profiling method. Cumulative minimum supervised dives: 36.
- e) Authorization to 150 Foot Depth - A diver holding a 130-foot authorization may be authorized to a depth of 150 feet after successfully completing and logging 6 supervised dives to depths between 130 and 150 feet under supervision of a dive buddy authorized by the DCB. The diver must also demonstrate knowledge of the special problems of deep diving and of special safety requirements. Cumulative minimum supervised dives: 42.
- f) Authorization to 190 Foot Depth – A diver holding a 150-foot authorization may be authorized to a depth of 190 feet after successfully completing and logging 6 dives to depths between 150 and 190 feet under supervision of a dive buddy authorized by the DCB. The

diver must also demonstrate knowledge of the special problems of deep diving and of special safety requirements. Cumulative minimum supervised dives: 48.

Diving on air is not permitted beyond a depth of 190 feet for HPU scientific dives.

4.5 Maintaining Active Status

Minimum Activity to Maintain Authorizations

During any 12-month period, each scientific diver must log a minimum of 12 scientific, scientific training, or proficiency dives. At least one dive must be logged near the maximum depth, as defined by the DCB, of the diver's authorization during each 6-month period. Divers authorized to 150 feet or deeper may satisfy these requirements with dives to 130 feet or deeper. Failure to meet these requirements will result in revocation or restriction of authorization by the DSO under procedures established by the DCB.

Requalification of Authorization

Once the initial requirements of [Section 4.0](#) are met, divers whose depth authorization has lapsed due to lack of activity may be requalified by procedures adopted by the DCB.

Medical Examination

All scientific divers must pass a medical examination at the intervals specified in [Section 5.0](#). A medically cleared diver experiencing any Conditions Which May Disqualify Candidates from Diving (Appendix 1) must receive clearance to return to diving from a physician before resuming diving activities. This medical examination requirement cannot be waived for any diver.

Emergency Care Training

The scientific diver must hold current training in the following:

- Adult CPR and AED
- Emergency oxygen administration
- First aid for diving accidents

4.6 Revocation of Authorization

An individual's scientific diver certification can be restricted or revoked for cause by the DCB. Authorizations associated with an individual's scientific diver certification may be restricted or suspended for cause by the DSO. Restrictions or suspensions issued by the DSO may be rescinded by the DSO; these issues will be reported to and reviewed by the DCB, and the outcomes or actions resulting from this review will be documented in the diver's HPU record. Violations of regulations set forth in this manual or other governmental subdivisions not in conflict with this manual, or demonstration of poor judgement, may be considered cause. The DCB or designee must inform the diver in writing of the reason(s) for revocation. The diver will be given the

opportunity to present their case in writing to the DCB for reconsideration. Following revocation, the diver may be reauthorized after complying with conditions the DCB may impose. All such written statements and requests, as identified in this section, are formal documents, and therefore part of the diver's file.

SECTION 5.0 MEDICAL STANDARDS

5.1 Medical Requirements

General

- All medical evaluations required by this manual must be performed by, or under the direction of, a licensed physician of the applicant-diver’s choice, preferably one trained in diving/undersea medicine.
 - A list of suggested local physicians can be found in Appendix 4
- The diver should be free of any chronic disabling disease and any conditions contained in the list of conditions for which restrictions from diving are generally recommended. (Appendix 1)
- HPU must verify that divers have been declared by the examining medical authority to be fit to engage in diving activities.

5.2 Frequency of Medical Evaluations

<i>Medical evaluation must be completed:</i>		
Before Age 40	After age 40 Before Age 60	After Age 60
Before a diver may begin diving, unless an equivalent initial medical evaluation has been given within the preceding 5 years	Before a diver may begin diving, unless an equivalent initial medical evaluation has been given within the preceding 3 years	Before a diver may begin diving, unless an equivalent initial medical evaluation has been given within the preceding 2 years
At 5-year intervals	At 3-year intervals	At 2-year intervals
Clearance to return to diving must be obtained from a healthcare provider following a medically cleared diver experiencing any Conditions Which May Disqualify Candidates from Diving (Appendix 1), or following any major injury or illness, or any condition requiring chronic medication. If the condition is pressure related, the clearance to return to diving must come from a physician trained in diving medicine.		

5.3 Information Provided to Examining Physician

The medical evaluation requirements of HPU can be found in this manual and are to be provided to the examining physician. (Appendices 1, 2, and 3).

5.4 Content of Medical Evaluations

Medical examinations conducted initially and at the intervals specified in Section 5.20 must consist of the following:

1. Diving physical examination (Appendix 2). Modifications or omissions of required tests are not permitted

2. Applicant agreement for release of medical information to the Diving Safety Officer and the DCB (Appendix 2b)
3. Medical history (Appendix 3)

5.5 Physician's Written Report

- A Medical Evaluation of Fitness for Scuba Diving Report (or HPU equivalent) signed by the examining physician stating the individual's fitness to dive, including any recommended restrictions or limitations will be submitted to HPU DCB for the diver's record after the examination is completed.
- The Medical Evaluation of Fitness for Scuba Diving Report will be reviewed by the DCB or designee and the diver's record and authorizations will be updated accordingly.
- A copy of any physician's written reports will be made available to the individual.
- It is the diver's responsibility to provide to the DCB a written statement from the examining medical authority listing any restrictions, limitations, or clearances to dive resulting from medical examinations obtained by the individual outside of their normal diving medical examination cycle. These statements will be reviewed by the DCB or designee and the diver's record and authorizations will be updated accordingly.

Volume 2

1. [Nitrox Diving \(Section 6\)](#)
2. [Surface Supplied Diving Technologies \(Section 7\)](#)
3. [Specialized Diving Environments \(Section 8\)](#)
4. [Scientific Cave and Cavern Diving \(Section 9\)](#)

SECTION 6.0 NITROX DIVING

6.1 Requirements for Nitrox Authorization

Prior to authorization to use nitrox, the following minimum requirements must be met:

Prerequisites

Only a certified Scientific Diver or DIT diving under the auspices of HPU is eligible for authorization to use nitrox.

Application for authorization to use nitrox must be made to the DCB. Submission of documents and participation in aptitude examinations does not automatically result in authorization to use nitrox. The applicant must convince the DCB through the DSO that they are sufficiently knowledgeable, skilled and proficient in the theory and use of nitrox for diving.

Training

In lieu of writing/promulgating AAUS specific training standards for Nitrox divers, AAUS references the standards for Nitrox diver training as defined by the WRSTC and/or ISO. AAUS programs who wish to train Nitrox divers may do so using one of the following options:

- a) Under the auspices and standards of an internationally recognized diver training agency.
- b) Under the auspices of AAUS using the minimum guidelines presented by the most current version of the RSTC/WRSTC and/or ISO Nitrox diver training standards.

References:

"Minimum Course Content for Enriched Air Nitrox Certification" - World Recreational Scuba Training Council (WRSTC), www.wrstc.com.

"Recreational diving services- Requirements for training programs on enriched air nitrox (EAN) diving". ISO 11107:2009 - International Organization for Standardization (ISO), www.iso.org

Practical Evaluation

- Oxygen analysis of nitrox mixtures.
- Determination of MOD, oxygen partial pressure exposure, and oxygen toxicity time limits, for various nitrox mixtures at various depths.
- Determination of nitrogen-based dive limits status by EAD method using air dive tables, and/or using nitrox dive tables, as approved by the DCB.
- Nitrox dive computer use may be included, as approved by the DCB.
- A minimum of two supervised open water dives using nitrox is required for authorization.

Written Evaluation

- Function, care, use, and maintenance of equipment cleaned for nitrox use.
- Physical and physiological considerations of nitrox diving (e.g.: O₂ and CO₂ toxicity)
- Diving regulations, procedures/operations, and dive planning as related to nitrox diving
- Equipment marking and maintenance requirements
- Dive table and/or dive computer usage
- Calculation of: MOD, pO₂, and other aspects of Nitrox diving as required by the DCB

6.2 Minimum Activity to Maintain Authorization

The diver should log at least one nitrox dive per year. Failure to meet the minimum activity level may be cause for restriction or revocation of nitrox authorization.

6.3 Operational Requirements

Oxygen Exposure Limits

- The inspired oxygen partial pressure experienced at depth should not exceed 1.6 ATA.
- The maximum allowable exposure limit should be reduced in cases where cold or strenuous dive conditions, or extended exposure times are expected.

Calculation of Decompression Status

- A set of DCB approved nitrox dive tables should be available at the dive site.
- Dive computers may be used to compute decompression status during nitrox dives. Manufacturers' guidelines and operation instructions should be followed.
- Dive computers capable of pO₂ limit and fO₂ adjustment should be checked by the diver prior to the start each dive to ensure conformity with the mix being used.

Gas Mixture Requirements

- Only nitrox mixtures and mixing methods approved by the DCB may be used.
- HPU personnel mixing nitrox must be qualified and approved by the DCB for the method(s) used.
- Oxygen used for mixing nitrox should meet the purity levels for "Medical Grade" (U.S.P.) or "Aviator Grade" standards.
- In addition to the AAUS Air Purity Guidelines outlined in [Section 3.6](#), any air that may come in contact with oxygen concentrations greater than 40% (i.e.. during mixing), must also have a hydrocarbon contaminant no greater than .01 mg/m₃.
 - For remote site operations using compressors not controlled by HPU where this is not verifiable, the DCB must develop a protocol to mitigate risk to the diver.

Analysis Verification by User

- Prior to the dive, it is the responsibility of each diver to analyze the oxygen content of his/her scuba cylinder. And acknowledge in writing the following information for each cylinder: fO₂, MOD, cylinder pressure, date of analysis, and user's name.
- Individual dive log reporting forms should report fO₂ of nitrox used, if different than 21%.

6.4 Nitrox Diving Equipment

Required Equipment

All of the designated equipment and stated requirements regarding scuba equipment required in the HPU Diving Safety Manual apply to nitrox operations ([Section 3.2](#)). Additional minimal equipment necessary for nitrox diving operations includes:

- Labeled SCUBA Cylinders in Accordance with Industry Standards
- Oxygen Analyzers
- Oxygen compatible equipment as applicable

Requirement for Oxygen Service

- All equipment, which during the dive or cylinder filling process is exposed to concentrations greater than 40% oxygen, should be cleaned and maintained for oxygen service.
- Any equipment used with oxygen or mixtures containing over 40% by volume oxygen must be designed and maintained for oxygen service. Oxygen systems over 125 psig must have slow opening shut-off valves.

Compressor system

- Compressor/filtration system must produce oil-free air, or
- An oil-lubricated compressor placed in service for a nitrox system should be checked for oil and hydrocarbon contamination at least quarterly.

SECTION 7.0 SURFACE SUPPLIED DIVING TECHNOLOGIES

Surface supplied diving technologies include any diving mode in which a diver at depth is supplied with breathing gas from the surface.

7.1 Prerequisites

All surface supplied and hookah divers must be certified scientific divers or divers in training and have completed system specific training as authorized by the DCB of HPU.

7.2 Surface Supplied Diving

Surface Supply Definition

A mode of diving using open circuit, surface supplied, compressed gas delivered by means of a pressurized umbilical hose. The umbilical generally consists of a gas supply hose, strength member, pneumofathometer hose, and communication line. The umbilical supplies a helmet or full-face mask, often with voice communications.

Procedures

- Each diver must be continuously tended while in the water.
- A diver must be stationed at the underwater point of entry when diving is conducted in enclosed or physically confined spaces.
- Each diving operation must have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.
- A diver using Surface Supply may rely on surface personnel to keep the diver's depth, time and diving profile
- Surface supplied air diving must not be conducted at depths deeper than 80 feet (24.4 m).
- The DCB is responsible for developing additional operational protocols

Manning Requirements

The minimum number of personnel comprising a surface supplied dive team is three. They consist of a Designated Person-In-Charge (DPIC), a Diver, and a Tender. Additional dive team members are required when a diving operation or dive site is considered complex, or when the task loading of a dive team member is deemed excessive. It is the DCB's responsibility to define when the surface supplied dive team must be expanded beyond the minimum manning requirements.

Equipment

- The diver will wear a positive buckling device on the safety harness to which the umbilical hose will be secured. The attachment must be of sufficient strength to prevent any strain on

- the helmet/full face mask hose connections and equipment must be configured to allow retrieval of the diver by the surface tender without risk of interrupting air supply to the diver.
- Each diver must be equipped with a diver-carried independent reserve breathing gas supply containing sufficient volume to complete the ascent to the surface, including all required decompression and safety stops.
 - Masks and Helmets
 - Surface supplied and mixed gas masks and helmets must have:
 - A non-return valve at the attachment point between the mask/helmet and hose which must close readily and positively; and
 - An exhaust valve
 - Surface-supplied masks and helmets must have a minimum ventilation rate capability of 4.5 actual cubic feet per minute (acfm) at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 atmospheres absolute (ATA) when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute
 - Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment must be equipped with an exhaust valve
 - Air supplied to the diver must meet the air quality standards outlined in [section 3.6](#)

Surface Supplied in Aquariums

- In an aquarium habitat where the maximum depth is known, a pneumofathometer is not required.
- The maximum obtainable depth of the aquarium may be used as the diving depth
- One tender may line-tend multiple divers, provided the tender is monitoring only one air source, there is mutual assistance between divers, there are no overhead obstructions or entanglements, or other restrictions as defined by the DCB.
- The DCB is responsible for developing additional operational protocols for surface supplied diving specific to the aquarium environment.

7.3 Hookah

Definition

Hookah is an open circuit diving mode comprised of a remote gas supply, a long hose, and a standard scuba second stage or full-face mask. Hookah is generally used in shallow water (30 feet or less), though the configuration has been used to supply breathing gas from a diving bell, habitat, or submersible/submarine.

Equipment Requirements

- The air supply hose must be rated for a minimum operating pressure of 130psi.
- Air supplied to the hookah diver must meet the air quality standards outlined in [section 3.6](#)
- Hookah supply systems must be capable of supplying all divers breathing from the system with sufficient gas for comfortable breathing for the planned depth and workload.

- Hookah system second stage should be capable of being attached to the diver in a way to avoid pulling stress on the second stage mouthpiece and affords easy release if the diver must jettison the regulator and hose.
- An independent reserve breathing gas supplied will be carried by each hookah diver:
- When the diver does not have direct access to the surface or
- At depths or distance from alternate breathing gas source determined by the DCB.

Operational Requirements

- Hookah diving must not be conducted beyond depths or distance from alternate breathing gas source as determined by the DCB.
- A diver's independent reserve breathing gas supply, if worn, must contain sufficient volume to allow the diver(s) to exit to the surface or alternate breathing gas source
- Hookah divers not supported by diving bell, or underwater habitat must not be exposed to dives that require staged decompression.
- The HPU DCB is responsible for developing additional operational protocols.

Hookah Diving in Aquariums

- In an aquarium habitat where the maximum depth is known and planned for, a depth gauge is not required.
- The maximum obtainable depth of the aquarium may be used as the maximum diving depth.
- A hookah configured diver may operate without an in-water buddy in an aquarium provided the diver is tended from the surface; has visual, line pull, or voice communication with the tender; the diver carries an independent reserve breathing gas source containing sufficient volume to allow the diver to exit to the surface or alternate breathing gas source; and under other operational conditions as determined by the HPU DCB.
- The HPU DCB is responsible for developing additional operational protocols for hookah diving specific to the aquarium environment.

SECTION 8.0 SPECIALIZED DIVING ENVIRONMENTS

Certain types of diving, some of which are listed below, require equipment or procedures that require training. Supplementary guidelines for these technologies are in development by the AAUS. HPU must have guidelines established by their Diving Control Board. Divers must comply with all scuba diving procedures in this *Diving Safety Manual* unless specified.

8.1 Blue Water Diving

Blue water diving is defined as diving in open water where the bottom is generally greater than 200 feet deep. It requires special training and the use of multiple-tethered diving techniques. Specific guidelines that should be followed are outlined in “Blue Water Diving Guidelines” (California Sea Grant Publ. No. T-CSGCP-014).

Any divers participating in blue water diving operations must complete specialized practical training in applicable diving techniques and demonstrate proficiency to the satisfaction of the DSO and DCB. Training shall include:

- Buoyancy control and awareness
- Blue water diving equipment deployment
- Entry procedures
- Diver communication
- Scientific procedure familiarization
- Out-of-air procedures
- Dangerous marine life encounters and defense techniques
- Exit procedures
- Emergency communication and protocols

During all blue water diving operations, a boat operator trained in blue water dive tending must be in place and remain vigilant. Divers are required to use a drop line and counterweighted trapeze line system in order to maintain diver contact and depth control. The total weight of the down line and tether array shall be no greater than 10 pounds. All tether attachments shall be made with connectors that can be quickly released by the diver while the line is under tension with these connections never being made to a weight belt.

A safety diver must be stationed at the trapeze attachment point. This diver’s sole function is to monitor and control the dive team and monitor the diving environment for potential hazards. This diver has the authority to terminate the dive for any member or the entire team during the dive.

8.2 Ice and Polar Diving

Divers planning to dive under ice or in polar conditions should use the following: “PESH-POL_2000.08. Standards for the Conduct of Scientific Diving”, National Science Foundation, Division of Polar Programs, 2015.

Divers must receive approval by the DCB and DSO to participate in cold water diving activities not directly under the auspices of Hawaii Pacific University.

8.3 Overhead Environments

Overhead environments include water filled Caverns, Caves, Flooded Mines and Ice diving, as well as portions of Sunken Shipwrecks and other manmade structures.

For the purposes of this manual, Ice diving is a specialized overhead environment addressed in previous section and supplemented by requirements and protocols established by the DCB.

Cavern, Cave, or Flooded Mine Diving see Section 9.0.

It is the responsibility of the DCB to establish the requirements and protocol under which diving will be safely conducted in overhead environment portions of sunken shipwrecks and other manmade structures.

8.4 Aquarium Diving

An aquarium is an artificial, confined body of water, which is operated by or under the control of an institution and is used for the purposes of specimen exhibit, education, husbandry, or research.

It is recognized that within scientific aquarium diving there are environments and equipment that fall outside the scope of those addressed in this manual. In those circumstances it is the responsibility of the DCB to establish the requirements and protocol under which diving will be safely conducted.

SECTION 9.0 SCIENTIFIC CAVE AND CAVERN DIVING

This section defines specific considerations regarding the following issues for Scientific Cavern and Cave diving:

- Training and/or experience verification requirements for authorization
- Equipment requirements
- Operational requirements and additional safety protocols to be used

Application of this standard is in addition to pertinent requirements of all other sections of this manual.

No diver must conduct planned operations in caverns, caves, or other overhead environments without prior review and approval of the DCB or designee. The diver must demonstrate that he/she possesses the proper attitude, judgment, and discipline to safely conduct cave and cavern diving in the context of planned operations.

If a conflict exists between this section and other sections in this manual, the information set forth in this section only takes precedence when the scientific diving being conducted takes place wholly or partly within an underwater cave or cavern environment.

9.1 Definition

A dive team must be considered to be cave or cavern diving if at any time during the dive they find themselves in a position where they cannot complete a direct, unobstructed ascent to the surface because of rock formations. In addition to blocking direct access to surfacing, underwater caves have additional environmental hazards including but not limited to:

- The absence of natural light.
- Current or flow that vary in strength and direction. Of particular note is a condition known as siphoning. Siphoning caves have flow or current directed into the cave. This can cause poor visibility as a result of mud and silt being drawn into the cave entrance. Additionally, shoreline cavern structures in Hawaii are typically heavily influenced by surge. Extra caution must be taken to ensure the safety of the dive team when diving in this environment.
- The presences of silt, sand, mud, clay, etc. that can cause visibility to be reduced to nothing in a very short time.
- Restrictions – Any passage through which two divers cannot easily pass side by side while sharing air make air sharing difficult.
- Cave-Ins – Cave-Ins are a normal part of cave evolution; however, experiencing a cave-in during diving operations is extremely unlikely.

9.2 Prerequisites

Prerequisites	Cavern OC	Cave
Active scientific diver status, with depth qualification sufficient for proposed training location(s)	X	X
Completion of a minimum of 25 dives.	X	
Cavern Diver Authorization		X

9.3 Training

Training	Cavern OC	Cave OC
Key: X = include, R = Review, IA = If Applicable, OC = Open Circuit		
Trainers must be qualified for the type of instruction to be provided. Training must be conducted by agencies or instructors approved by the DCB or their designee	X	X
Academic		
Policy for diving overhead environments	X	X
Environment and environmental hazards	X	X
Accident analysis	X	X
Psychological considerations	X	X
Required equipment and equipment configuration		
Single cylinder with H or Y Valve	IA	IA
Doubles with Isolation Manifold	IA	IA
Stage Cylinder(s)		IA
Communications	X	X
Diving techniques		
Body control	X	X
Navigation and guidelines	X	X
Entry and Exit Protocols (Right of Way)	X	R
Use of line arrows and cookies	X	X
Line Systems Applicable to the Area and/or Cave System	X	R
Line Jumps		X
Circuits		X
Dive planning		
Rule of Sixths	X	R
Rule of Thirds	X	R
Gas Matching	IA	X
Decompression Theory	R	R

Dive Tables	R	R
Mixed Mode Diving	IA	IA
Cave geology	X	R

Cave hydrology	X	R
Cave biology	X	X
Emergency procedures	X	X
Practical Training and Evaluation		
Land Drills		
Line Reel Use	X	R
Techniques and Considerations for Laying a Guideline	X	X
Guideline Following	X	R
Buddy Communication	X	R
Team Positioning for Normal Entry and Exit	X	X
Zero Visibility Drills		
Line Reel Use	X	R
Line and Line Arrow Identification and Following	X	R
Bump and Go (Skills description)		X
Emergency Procedures		
How Far Can You Go Out of Gas?(Skills description)	X	X
Team Positioning for Emergency Situations	X	X
In-Water		
Demonstrated skills must include, at a minimum:		
A minimum of four (4) cavern dives, preferably to be conducted in a minimum of two (2) different caverns	X	
A minimum of twelve (12) cave dives, preferably to be conducted in a minimum of four (4) different cave sites with differing conditions		X
Safety drill (S-drill) – Performed on every dive		
Review of Dive Plan and Turn Pressures	X	X
Essential Gear Identification, Positioning, and Function Check	X	X
Proper Valve Position Check	X	X
Bubble Check	X	X
Proper Buoyancy Compensator Use	X	X
Proper Trim and Body Positioning	X	X
Hovering and Buoyancy with Hand Tasks	X	X
Specialized Propulsion Techniques and Anti-Silting Techniques (modified flutter kick, modified frog kick, pull and glide, ceiling walk or shuffle)	X	X
Proper Light and Hand Signal Use	X	R
Proper Reel and Guideline Use	X	X
Ability to Deploy a Primary Reel and Tie Into a Main Line Under Different Conditions (Flow, Visibility, Bottom/Silt, etc.)	X	X

Proper Line Placement and Etiquette	X	X
Proper Use of Safety Reel		X
Proper Use of Jump/Gap Reel(s)		X
Use of Drop/Stage Cylinders		
Proper Placement and Retrieval of Cylinder(s) With Minimal Disturbance of Environment and Visibility		IA
Ability to Deploy and Retrieve Cylinders with Minimal Loss of Forward Progress		IA
Surveying	IA	IA
Ability to Properly Critique Their Dives and Performance	X	X
Zero Visibility Drills	IA	X
Line Reel Use	X	R
Buddy Communication	X	
Line and Line Arrow Identification and Following	X	R
Bump and Go (Skills Description)		X
Emergency Procedures		
Team Positioning for Emergency Situations	X	X
Lost Line (Skills Description)		X
Lost Buddy	X	X
Gas Sharing While Following Guideline (Conducted with and without visibility, As Donor and Receiver)	X	X
Gas Sharing in a Minor Restriction Using a Single File Method as Donor and Receiver		X
Valve Manipulation	X	X
Proper Attitude, Judgment, and Discipline to Safely Conduct Dives in An Overhead Environment	X	X
Written Examination		
A written evaluation approved by the DCB with a predetermined passing score, covering concepts of both classroom and practical training	X	X

9.4 Equipment Requirements

Equipment used for SCUBA in cave or cavern diving is based on the concept of redundancy. Redundant SCUBA equipment must be carried whenever the planned penetration distances are such that an emergency swimming ascent is not theoretically possible.

Minimum Equipment	Cavern OC	Cave OC
Key: X = include, R = Review, IA = If Applicable, OC = Open Circuit		
At a minimum, a single cylinder with adequate volume and configured to allow divers to exit from farthest/deepest penetration while supporting self and dive buddy equipped with a “K” valve; standard OC regulator configuration (Section 3.2); and BCD	X	
At minimum, a single cylinder equipped with an “H” or “Y” valve Or an alternate gas supply with adequate volume and configured to allow divers to exit from farthest/deepest penetration while supporting self and dive buddy		IA
Off-board/bailout gas supply of sufficient volume and configured to allow diver to exit from farthest/deepest penetration	IA	
A BCD capable of being inflated from the cylinder	X	X
Slate and pencil	X	X
A functioning primary light with sufficient burn time for the planned dive		X
Two functioning battery powered secondary lights	X	X
Two cutting devices	X	X
One primary reel of at least 350 feet (106 m) for each team	X	X
Safety reel with at least 150 feet (45.6 m) of line		X
Directional Line Markers		X
Cylinders with dual orifice isolation valve manifold Or independent SCUBA systems* with enough volume for the planned dive plus required reserve		X
Two completely independent regulators, at least one of each having submersible tank pressure gauge and a low-pressure inflator for the BCD		X
One regulator to be configured with a five foot or longer second stage hose		X

9.5 Operational Requirements and Safety Protocols

Operational Requirements and Safety Protocols	Cavern	Cave
Diving must not be conducted at penetration distance into the overhead environment greater than 150 feet (46 m) from the water's surface, with a depth limit of 100 feet (30 m)	X	
Dive teams must perform a safety drill prior to each dive that includes equipment check, gas management, and dive objectives	X	X
Each team within the overhead zone must utilize a continuous guideline appropriate for the environment leading to a point from which an uninterrupted ascent to the surface may be made	X	X
Gas management must be appropriate for the planned dive	X	X
The entire dive team is to immediately terminate the dive whenever any dive team member calls (terminates) the dive	X	X

Appendices

1. Diving Medical Exam Overview for the Examining Physician
2. Medical Evaluation of Fitness for SCUBA Diving Report
- 2.b Medical Evaluation of Fitness for SCUBA Diving Report Release of Information
3. Diving Medical History
4. Recommended Physicians with Expertise in Diving Medicine
5. Definition of Terms
6. Request for Diving Reciprocity Form – Verification of Diver Training and Experience
7. Emergency Action Plan
8. Recommendations for Rescue of a Submerged Unresponsive Compressed Gas Diver
9. AAUS Statistics Collection Criteria and Definitions
10. Scientific Diver Applicant's Diving Resume
11. Waiver of Liability and Assumption of Risk
12. HPU Diving Proof of Liability Insurance
13. HPU Scientific Diving Dive Plan Proposal
14. Pre and Post Dive Checklists
15. Diving Incident Report
16. Personal Equipment and Maintenance Log
17. Documentation of Manual Edits

APPENDIX 1

DIVING MEDICAL EXAM OVERVIEW FOR THE EXAMINING PHYSICIAN

TO THE EXAMINING PHYSICIAN:

This person, _____, requires a medical examination to assess their fitness for certification as a Scientific Diver for Hawaii Pacific University. Their answers on the Diving Medical History Form (attached) may indicate potential health or safety risks as noted. Your evaluation is requested on the attached Scuba Diving Fitness Medical Evaluation Report. If you have any questions about diving medicine, you may wish to consult on the of the references on the attached list or contact one of the physicians with expertise in diving medicine whose names and phone numbers appear on an attached list, the Undersea Hyperbaric and Medical Society, or the Divers Alert Network. Please contact the undersigned Diving Safety Officer if you have any questions or concerns about diving medicine or the Hawaii Pacific University standards. Thank you for your assistance.

Diving Safety Officer: _____ Date: _____

Printed Name: _____ Phone Number: _____

Scuba and other modes of compressed-gas diving can be strenuous and hazardous. A special risk is present if the middle ear, sinuses, or lung segments do not readily equalize air pressure changes. The most common cause of distress is eustachian insufficiency. Recent deaths in the scientific diving community have been attributed to cardiovascular disease. Please consult the following list of conditions that usually restrict candidates from diving. (Adapted from Bove, 1998: bracketed numbers are pages in Bove)

CONDITIONS WHICH MAY DISQUALIFY CANDIDATES FROM DIVING

1. Abnormalities of the tympanic membrane, such as perforation, presence of a monomeric membrane, or inability to auto-inflate the middle ears. [5 ,7, 8, 9]
2. Vertigo, including Meniere's Disease. [13]
3. Stapedectomy or middle ear reconstructive surgery. [11]
4. Recent ocular surgery. [15, 18, 19]
5. Psychiatric disorders including claustrophobia, suicidal ideation, psychosis, anxiety states, untreated depression. [20 - 23]
6. Substance abuse, including alcohol. [24 - 25]
7. Episodic loss of consciousness. [1, 26, 27]
8. History of seizure. [27, 28]
9. History of stroke or a fixed neurological deficit. [29, 30]
10. Recurring neurologic disorders, including transient ischemic attacks. [29, 30]
11. History of intracranial aneurysm, other vascular malformation or intracranial hemorrhage. [31]
12. History of neurological decompression illness with residual deficit. [29, 30]
13. Head injury with sequelae. [26, 27]
14. Hematologic disorders including coagulopathies. [41, 42]
15. Evidence of coronary artery disease or high risk for coronary artery disease. [33 - 35]
16. Atrial septal defects. [39]
17. Significant valvular heart disease - isolated mitral valve prolapse is not disqualifying. [38]
18. Significant cardiac rhythm or conduction abnormalities. [36 - 37]
19. Implanted cardiac pacemakers and cardiac defibrillators (ICD). [39, 40]
20. Inadequate exercise tolerance. [34]
21. Severe hypertension. [35]

22. History of spontaneous or traumatic pneumothorax. [45]
23. Asthma. [42 - 44]
24. Chronic pulmonary disease, including radiographic evidence of pulmonary blebs, bullae, or cysts. [45,46]
25. Diabetes mellitus. [46 - 47]
26. Pregnancy. [56]

SELECTED REFERENCES IN DIVING MEDICINE

Available from Best Publishing Company, P.O. Box 30100, Flagstaff, AZ 86003-0100, the Divers Alert Network (DAN) or the Undersea and Hyperbaric Medical Society (UHMS), Durham, NC

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- U.S. NAVY DIVING MANUAL. Superintendent of Documents, Washington, DC: U.S. Government Printing Office, Washington, D.C.
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APPENDIX 2
MEDICAL EVALUATION OF FITNESS FOR SCUBA DIVING REPORT

Name of Applicant (Print or Type) _____

Date of Medical Evaluation (Month/Day/Year) _____

To The Examining Physician: Scientific Divers require periodic scuba diving medical examinations to assess their fitness to engage in diving with self-contained underwater breathing apparatus (SCUBA). Their answers on the Diving Medical History Form may indicate potential health or safety risks as noted. Scuba diving is an activity that puts unusual stress on the individual in several ways. Your evaluation is requested on this Medical Evaluation Form. Your opinion on the applicant's medical fitness is requested. Scuba diving requires heavy exertion. The diver must be free of cardiovascular and respiratory disease (see references). An absolute requirement is the ability of the lungs, middle ears, and sinuses to equalize pressure. Any condition that risks the loss of consciousness should disqualify the applicant. Please proceed in accordance with the AAUS Medical Standards (Sec. 5.00). If you have questions about diving medicine, please consult with the Undersea and Hyperbaric Medical Society.

TESTS: THE FOLLOWING TESTS ARE *REQUIRED*:

INITIAL PHYSICAL EXAMINATION AND PERIODIC RE-EXAMS (UNDER AGE 40):

- Complete physical exam
- Complete Blood Count (CBC) w/Diff
- Sickle Cell
- Complete Urinalysis
- Chest X-ray - 2 view
- Spirometry Test - results and interpretation
- Audiogram - results and interpretation
- Vision Test
- Any further test deemed necessary by physician

ADDITIONAL TEST DURING FIRST EXAM OVER AGE 40 AND PERIODIC RE-EXAMS (40+):

- 12-Lead resting EKG - results and interpretation
 - Lipid screening (total cholesterol, HDL, LDL, and triglycerides)
 - Hemoglobin or fasting glucose screening
-

PHYSICIAN'S STATEMENT:

I have evaluated the above mentioned individual according to the tests listed above. I have discussed with the patient any medical conditions(s) that would not disqualify him/her from diving but which may seriously compromise subsequent health. The patient understands the nature of the hazards and the risks involved in diving with these conditions.

I find no medical conditions that may be disqualifying for participation in scuba diving.

Diver **IS** medically qualified to dive for: _____ 2 years (over age 60)
_____ 3 years (age 40-59)
_____ 5 years (under age 40)

Diver **IS NOT** medically qualified to dive: _____ Permanently _____ Temporarily

Name: _____

Address: _____

Phone: _____ Email: _____

Signature: _____

APPENDIX 2b

**MEDICAL EVALUATION OF FITNESS FOR SCUBA DIVING REPORT
APPLICANT'S RELEASE OF MEDICAL INFORMATION FORM**

Name of Applicant (Print or Type)

I authorize the release of this information and all medical information subsequently acquired in association with my diving to the Hawaii Pacific University Diving Safety Officer and Diving Control Board or their designee at

(place) _____ on (date) _____

Signature of Applicant _____

Date _____

APPENDIX 3 DIVING MEDICAL HISTORY

Name: _____ DOB: _____ Height: _____ Weight: _____

Sponsor: _____ Date: _____

(Professor's Name)

TO THE APPLICANT:

Scuba diving places considerable physical and mental demands on the diver. Certain medical and physical requirements must be met before beginning a diving or training program. Your accurate answers to the questions are more important, in many instances, in determining your fitness to dive than what the physician may see, hear or feel as part of the diving medical certification procedure. Please answer truthfully.

This form must be kept confidential by the examining physician. If you believe any question amounts to invasion of your privacy, you may elect to omit an answer, provided that you must subsequently discuss that matter with your own physician who must then indicate, in writing, that you have done so and that no health hazard exists.

Should your answers indicate a condition, which might make diving hazardous, you will be asked to review the matter with your physician. In such instances, their written authorization will be required in order for further consideration to be given to your application. If your physician concludes that diving would involve undue risk for you, remember that they are concerned only with your well-being and safety.

No	Yes	No	Please indicate whether or not the following apply to you	Comments
1			Convulsions, seizures or epilepsy	
2			Fainting spells or dizziness	
3			Been addicted to drugs	
4			Diabetes	
5			Motion sickness or sea/air sickness	
6			Claustrophobia	
7			Mental disorder or nervous breakdown	
8			Are you pregnant	
9			Do you suffer from menstrual problems	
10			Anxiety spells or hyperventilation	
11			Frequent sour stomachs or vomiting spells	
12			Had a major operation	
13			Presently being treated by a physician	
14			Taking any medication regularly (prescription and non-prescription drugs)	
15			Been rejected or restricted from sporting activity	
16			Headaches (frequent or severe)	
17			Wear dental plates	
18			Wear glasses or contact lenses	
19			Bleeding disorders	
20			Alcoholism	
21			Any problems related to diving	

No	Yes	No	Please indicate whether or not the following apply to you	Comments
22			Nervous tension or emotional problems	
23			Take tranquilizers	
24			Perforated ear drums	
25			Hay fever	
26			Frequent sinus trouble, frequent drainage from the nose, post-nasal drip, or stuffy nose	
27			Frequent earaches	
28			Drainage from the ears	
29			Difficulty with your ears in airplanes or on mountains	
30			Ear surgery	
31			Ringing in your ears	
32			Hearing problems	
33			Trouble equalizing pressure in your ears (underwater or on planes or at altitude)	
34			Asthma	
35			Wheezing attacks	
36			Abnormal chest x-ray	
37			Cough (chronic or recurrent)	
38			Frequently raise sputum	
39			Pleurisy	
40			Collapsed lung (pneumothorax)	
41			Lung cysts	
42			Pneumonia	
43			Tuberculosis	
44			Shortness of breath	
45			Lung problem or abnormality	
46			Spit blood	
47			Breathing difficulty after eating particular foods, after particular exposure to particular pollens or animals	
48			Are you subject to bronchitis	
49			Subcutaneous emphysema (air under the skin)	
50			Air embolism after diving	

No	Yes	No	Please indicate whether or not the following apply to you	Comments
51			History of decompression sickness	
52			Rheumatic fever	
53			Scarlet fever	
54			Heart murmur	
55			Large heart	
56			High blood pressure	
57			Angina (heart pains or pressure in the chest)	
58			Heart attack	
59			Low blood pressure	
60			Recurrent or persistent swelling of the legs	
61			Pounding, rapid heartbeat or palpitations	
62			Easily fatigued or short of breath	
63			Abnormal EKG	
64			Joint problems, dislocations or arthritis	
65			Back trouble or injuries	
66			Ruptured or slipped disk	
67			Hernia	
68			Muscle cramps	
69			Varicose veins	
70			Amputations	
71			Head injuries causing unconsciousness	
72			Paralysis	
73			Have you ever had an adverse reaction to medication	
74			Do you smoke	
75			Limiting physical handicaps	
76			Family history of heart disease or stroke	
77			Family history of high cholesterol	
78			Family history of asthma	
80			Family history of diabetes	

APPENDIX 5 DEFINITION OF TERMS

Air sharing - Sharing of an air supply between divers.

ATA(s) - “Atmospheres Absolute”, Total pressure exerted on an object, by a gas or mixture of gases, at a specific depth or elevation, including normal atmospheric pressure.

Alternate Gas Supply - Fully redundant system capable of providing a gas source to the diver should their primary gas supply fail.

Authorization -The DCB authorizes divers to dive using specialized modes of diving, and the depth they may dive to.

Breath-hold Diving - A diving mode in which the diver uses no self-contained or surface-supplied air or oxygen supply.

Bubble Check - Visual examination by the dive team of their diving systems, looking for O-ring leaks or other air leaks conducted in the water prior to entering a cave. Usually included in the "S" Drill.

Buddy Breathing - Sharing of a single air source between divers.

Buddy System -Two comparably equipped scuba divers in the water in constant communication.

Buoyant Ascent - An ascent made using some form of positive buoyancy.

Cave Dive - A dive, which takes place partially or wholly underground, in which one or more of the environmental parameters defining a cavern dive are exceeded.

Cavern Dive - A dive which takes place partially or wholly underground, in which natural sunlight is continuously visible from the entrance.

Certified Diver - A diver who holds a recognized valid certification from an AAUS OM or internationally recognized certifying agency.

(Scientific Diver) Certification- A diver who holds a recognized valid certification from an AAUS OM

Controlled Ascent - Any one of several kinds of ascents including normal, swimming, and air sharing ascents where the diver(s) maintain control so a pause or stop can be made during the ascent.

Cylinder - A pressure vessel for the storage of gases.

Decompression Sickness - A condition with a variety of symptoms, which may result from gas, and bubbles in the tissues of divers after pressure reduction.

Designated Person-In-Charge – Surface Supplied diving mode manning requirement. An individual designated by the OM DCB or designee with the experience or training necessary to direct and oversee in the surface supplied diving operation being conducted.

Dive - A descent into the water, an underwater diving activity utilizing compressed gas, an ascent, and return to the surface.

Dive Computer - A microprocessor-based device which computes a diver's theoretical decompression status, in real time, by using pressure (depth) and time as input to a decompression model, or set of decompression tables, programmed into the device.

Dive Location - A surface or vessel from which a diving operation is conducted.

Dive Site - Physical location of a diver during a dive.

Dive Table - A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

Diver – A person who stays underwater for long periods by having compressed gas supplied from the surface or by carrying a supply of compressed gas.

Diver-In-Training - An individual gaining experience and training in additional diving activities under the supervision of a dive team member experienced in those activities.

Diving Mode - A type of diving required specific equipment, procedures, and techniques, for example, snorkel, scuba, surface-supplied air, or mixed gas.

Diving Control Board (DCB) - Group of individuals who act as the official representative of the membership organization in matters concerning the scientific diving program ([See Diving Control Board under Section 1.0](#)).

Diving Safety Officer (DSO) - Individual responsible for the safe conduct of the scientific diving program of the membership organization ([See Diving Safety Officer under Section 1.0](#)).

DPIC – See Designated Person-In-Charge.

EAD - Equivalent Air Depth (see below).

Emergency Swimming Ascent - An ascent made under emergency conditions where the diver may exceed the normal ascent rate.

Enriched Air (EANx) - A name for a breathing mixture of air and oxygen when the percent of oxygen exceeds 21%. This term is considered synonymous with the term “nitrox” ([Section 6.00](#)).

Equivalent Air Depth (EAD) - Depth at which air will have the same nitrogen partial pressure as the nitrox mixture being used. This number, expressed in units of feet seawater or saltwater, will always be less than the actual depth for any enriched air mixture.

Flooded Mine Diving - Diving in the flooded portions of a man-made mine.

Necessitates use of techniques detailed for cave diving. fO_2 - Fraction of oxygen in a gas mixture, expressed as either a decimal or percentage, by volume.

FSW - Feet of seawater.

Gas Management - Gas planning rule which is used in cave diving environments in which the diver reserves a portion of their available breathing gas for anticipated emergencies (See Rule of Thirds, Sixths).

Gas Matching – The technique of calculating breathing gas reserves and turn pressures for divers using different volume cylinders. Divers outfitted with the same volume cylinders may employ the Rule of Thirds for gas management purposes. Divers outfitted with different volume cylinders will not observe the same gauge readings when their cylinders contain the same gas volume, therefore the Rule of Thirds will not guarantee adequate reserve if both divers must breathe from a single gas volume at a Rule of Thirds turn pressure. Gas Matching is based on individual consumption rates in volume consumed per minute. It allows divers to calculate turn pressures based on combined consumption rates and to convert the required reserve to a gauge-based turn pressure specific to each diver's cylinder configuration.

Guideline - Continuous line used as a navigational reference during a dive leading from the team position to a point where a direct vertical ascent may be made to the surface.

Hookah - While similar to Surface Supplied in that the breathing gas is supplied from the surface by means of a pressurized hose, the supply hose does not require a strength member, pneumofathometer hose, or communication line. Hookah equipment may be as simple as a long hose attached to a standard scuba cylinder supplying a standard scuba second stage. The diver is responsible for the monitoring his/her own depth, time, and diving profile.

Hyperbaric Chamber - See Recompression chamber.

Hyperbaric Conditions - Pressure conditions in excess of normal atmospheric pressure at the dive location.

Independent Reserve Breathing Gas - A diver-carried independent supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by another diver.

Jump/Gap Reel - Spool or reel used to connect one guide line to another thus ensuring a continuous line to the exit.

Life Support Equipment – Underwater equipment necessary to sustain life.

Lead Diver - Certified scientific diver with experience and training to conduct the diving operation.

Manifold with Isolator Valve - A manifold joining two diving cylinders, that allows the use of two completely independent regulators. If either regulator fails, it may be shut off, allowing the remaining regulator access to the gas in both of the diving cylinders.

Maximum Operating Depth (MOD) - usually determined as the depth at which the pO_2 for a given gas mixture reaches a predetermined maximum.

Mixed Gas - Breathing gas containing proportions of inert gas other than nitrogen greater than 1% by volume.

Mixed Gas Diving - A diving mode in which the diver is supplied in the water with a breathing gas other than air.

Nitrox - Any gas mixture comprised predominately of nitrogen and oxygen, most frequently containing between 22% and 40% oxygen. Also be referred to as Enriched Air Nitrox, abbreviated EAN.

Normal Ascent - An ascent made with an adequate air supply at a rate of 30 feet per minute or less.

Organizational Member (OM) - An organization which is a current member of the AAUS, and which has a program, which adheres to the standards of the AAUS as, set forth in the AAUS Manual.

OTU - Oxygen Toxicity Unit

Oxygen Compatible - A gas delivery system that has components (O-rings, valve seats, diaphragms, etc.) that are compatible with oxygen at a stated pressure and temperature.

Oxygen Service - A gas delivery system that is both oxygen clean and oxygen compatible.

Oxygen Toxicity - Any adverse reaction of the central nervous system ("acute" or "CNS" oxygen toxicity) or lungs ("chronic", "whole-body", or "pulmonary" oxygen toxicity) brought on by exposure to an increased (above atmospheric levels) partial pressure of oxygen.

Penetration Distance - Linear distance from the entrance intended or reached by a dive team during a dive at a dive site.

Pressure-Related Injury - An injury resulting from pressure disequilibrium within the body as the result of hyperbaric exposure. Examples include: decompression sickness, pneumothorax, mediastinal emphysema, air embolism, subcutaneous emphysema, or ruptured eardrum.

Pressure Vessel - See cylinder.

pO_2 - Inspired partial pressure of oxygen, usually expressed in units of atmospheres absolute.

Primary Reel - Initial guideline used by the dive team from open water to maximum penetration or a permanently installed guideline.

Psi - Unit of pressure, "pounds per square inch."

Psig - Unit of pressure, "pounds per square inch gauge."

Recompression Chamber - A pressure vessel for human occupancy. Also called a hyperbaric chamber or decompression chamber.

Restriction - Any passage through which two divers cannot easily pass side by side while sharing air.

Rule of Thirds - Gas planning rule which is used in cave diving environments in which the diver reserves 2/3's of their breathing gas supply for exiting the cave or cavern.

Rule of Sixths - Air planning rule which is used in cave or other confined diving environments in which the diver reserves 5/6's of their breathing gas supply (for DPV use, siphon diving, etc.) for exiting the cave or cavern.

Safety Drill - ("S" Drill) - Short gas sharing, equipment evaluation, dive plan, and communication exercise carried out prior to entering a cave or cavern dive by the dive team.

Safety Reel - Secondary reel used as a backup to the primary reel, usually containing 150 feet of guideline that is used in an emergency.

Safety Stop – A stop made between 15-20 feet (5-6 meters) for 3-5 minutes during the final ascent phase of a dive.

Scientific Diving - Scientific diving is defined (29CFR1910.402) as diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks.

Scuba Diving - A diving mode independent of surface supply in which the diver uses open circuit self-contained underwater breathing apparatus.

Side Mount - A diving mode utilizing two independent SCUBA systems carried along the sides of the diver's body; either of which always has sufficient air to allow the diver to reach the surface unassisted.

Siphon - Cave into which water flows with a generally continuous in-current.

Standby Diver - A diver at the dive location capable of rendering assistance to a diver in the water.

Surface Supplied Diving - Surface Supplied: Dives where the breathing gas is supplied from the surface by means of a pressurized umbilical hose. The umbilical generally consists of a gas supply hose, strength member, pneumofathometer hose, and communication line. The umbilical supplies a helmet or full-face mask. The diver may rely on the tender at the surface to keep up with the divers' depth, time and diving profile.

Swimming Ascent - An ascent, which can be done under normal or emergency conditions accomplished by simply swimming to the surface.

Tender - Used in Surface supplied and tethered diving. The tender comprises the topsides buddy for the in-water diver on the other end of the tether. The tender must have the experience or training to perform the assigned tasks in a safe and healthful manner.

Turn Pressure – The gauge reading of a diver’s open circuit scuba system designating the gas limit for terminating the dive and beginning the exit from the water.

Umbilical - Composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies a diver or bell with breathing gas, communications, power, or heat, as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

APPENDIX 6
AAUS REQUEST FOR DIVING RECIPROCITY FORM
VERIFICATION OF DIVER TRAINING AND EXPERIENCE

Diver: _____ Date: _____

This letter serves to verify that the above listed person has met the training and pre-requisites as indicated below, and has completed all requirements necessary to be certified as a (*Scientific Diver / Diver in Training*) as established by the Hawaii Pacific University Diving Safety Manual, and has demonstrated competency in the indicated areas. Hawaii Pacific University (HPU) is an AAUS OM and meets or exceeds all AAUS training requirements.

The following is a brief summary of this diver's personnel file regarding dive status at HPU:

(Date) _____

_____ Original diving authorization
 _____ Written scientific diving examination
 _____ Last diving medical examination
 _____ Medical examination expiration date
 _____ Most recent checkout dive
 _____ Scuba regulator/equipment service/test
 _____ CPR training (Agency) _____ CPR Exp. _____
 _____ Oxygen administration (Agency) _____ O2 Exp. _____
 _____ First aid for diving (Agency) _____ F.A. Exp. _____
 _____ Date of last dive _____ Depth _____
 Number of dives completed within previous 12 months? _____ Depth Authorization _____ feet
 Total number of career dives? _____

Any restrictions or Waivers of Requirements? (Y/N) _____ if yes, explain:

Please indicate any pertinent authorizations or training:

Emergency Information:

Name: _____ Relationship: _____

Telephone: _____ (cell ph) _____ (home ph)

Address: _____

Diving Safety Officer: I certify the above information is correct.

 (DSO Signature) (Date) (DSO Phone no.)

 (DSO Printed name) (DSO Email)

APPENDIX 7 EMERGENCY ACTION PLAN FOR SCIENTIFIC DIVING

Sources for the following information include the University of Miami's Dive Safety Manual and the NOAA diving manual.

All divers are required to be familiar with HPU's emergency action plan for diving activities. It is your responsibility to review emergency procedures regularly so that we may all be confident that if an accident were to occur that we could both respond accordingly and render aid or be confident that we will be taken care of. Scuba diving is inherently risky, and it is each diver's responsibility to plan dives according to the participant's training and physical capabilities and to stop any unsafe practices as soon as noticed. The community of scientific divers at HPU must self-regulate and look out for each other at all times. Please do your part and be prepared. If at any time a diver shows complete lack of awareness to these emergency procedures, his/her diving privilege will be revoked.

BASIC STEPS FOR MANAGING DIVING ACCIDENTS

1. **Stop** everything going on and try to think clearly.
2. **Assess** the scene of the incident for hazards. If the scene appears unsafe, do not proceed with rescue efforts. Call 9-1-1. If the scene can be made safe while ensuring the safety of all rescuers, proceed with rescuing the injured diver.
3. **Use** any pertinent resources available to you. If you need others to help, direct them with clear and concise instructions. People will follow a leader's instruction in stressful times. In Hawaii, there can be many experienced ocean people near the shoreline at any given time. Ask for help if you need.
4. **Exposure** protection – Use nitrile gloves and a face mask if bodily fluids are present. These items are in the emergency dive first aid kit.
5. **Check** the victim for level of responsiveness using the acronym AVPU.
 - a. A – Injured diver is aware and oriented to him/herself, the time, and the location.
 - b. V – Injured diver gives a response when presented with a verbal stimulus.
 - c. P – Injured diver gives a response only when presented with a painful stimulus.
 - d. U – Injured diver is completely unresponsive and shows no mental function.
6. **Call** for help - 9-1-1. If the injured diver is not A on AVPU scale or if there is any question whether EMS may be needed, call 9-1-1.
 - a. Reference the *Scientific Diving Emergency Contacts* page at the end of this plan and the copy of your dive plan for numbers and addresses of care facilities near the dive site.
 - b. If appropriate, call the Diver's Alert Network for consultation and advice.
 - c. Call the DSO or other DCB members for help and further guidance.

7. **Care** for the victim. Always prioritize ABC's – circulation, airway, and breathing. If the victim is unconscious, start your care with Look-Listen-Feel for both breathing and the presence of a pulse. If a pulse is present without breathing, rescue breaths are appropriate. If neither pulse nor breathing are present, initiate CPR.
 - a. Position the injured diver on his/her back.
 - b. Give 30 compressions about 2" deep on the center of the sternum at a rate of 100-120 compressions per minute.
 - c. Open victim's airway with head-tilt, chin-lift method.
 - d. Provide two breaths to the victim.
 - e. Continue this pattern of 30 compressions to 2 breaths for 2 minutes (about 5 sets of 30:2).
 - f. Look, listen, and feel for signs of life every 2 minutes.
 - g. Continue this process as long as possible.
8. **Oxygen.** Generally, the best thing for the majority of diving accidents is administration of 100% Oxygen. The first choice of oxygen delivery equipment for any injured diver is the demand regulator included in the oxygen kit. Second choice is the non-resuscitator bag with the oxygen hook up.
9. Treat for **shock** by:
 - a. Maintaining the diver's temperature.
 - b. If possible, place the injured diver supine with legs elevated 10-12" (if head, neck, or back injury is not suspected). If this is not possible, place diver in a position of comfort.
 - c. Provide oxygen.
 - d. Do not administer fluids orally.
10. **Notes.** If there are enough people present, assign someone to take notes on the patient's state. Note times of readings and/or changes in symptoms. Write clearly. This information should be handed off to paramedics when they arrive on the scene and should stay with the patient.
11. **Accident reports.** Each diver at the scene should fill out an accident report while details are fresh in his/her mind. As time passes, many details often slip. Please be honest and accurate as to what you saw. Each diver is to submit their own story and to not corroborate stories with others. Accident reports will be submitted to the HPU Diving control board within 24 hours of the incident.
12. **Dive gear.** Do not disassemble the dive gear of the injured diver in the case of a serious accident. Please keep in-tact and label with the diver's name. The dive gear will be passed on to the DSO and the DCB.

DIVE ACCIDENT NOTES

Patient's Name: _____ Date/Time: _____

Describe pain/numbness: _____

HISTORY

Number of dives in past 24 hours: _____ Depth of last dive(ft): _____ Duration: _____

Symptoms notice before, during, or after the dive? _____

If during the dive, was it while descending, at depth, or ascending? _____

Symptoms increased or decreased since first noticed? _____

Other symptoms since onset? Describe. _____

Experienced similar symptoms before: _____

Ever previously had DCS or air embolism? _____ If yes, when: _____

VITALS

Time	Pulse (beats/min)	Breathing (breaths/min)	AVPU (Alert, Verbal, Pain, Unresponsive)

Medications: _____ Allergies: _____

Time started on Oxygen: _____ CPR started: _____ CPR ended: _____

Calls placed (Check the appropriate boxes): 9-1-1 DAN Kuakini DSO

Diver's Alert Network suggestions for treatment: _____

Data recorded by: _____ Contact Phone: _____

LUNG OVER-EXPANSION INJURIES

ARTERIAL GAS EMBOLISM (AGE)

As a diver surfaces without exhaling, air trapped in the lungs expands and may rupture lung tissue releasing gas bubbles into the circulatory system where they may be distributed to the body tissues. The ascending diver is normally in a vertical position and the bubbles tend to travel upward toward the brain, eventually reaching a small artery blocking circulation. The effects of halting circulation to the brain are critical and require immediate treatment. Symptoms of embolism may be present when the victim reaches the surface or within a few minutes afterwards.

CAUSES

- Holding breath during ascent while breathing compressed air
- Lung disease causing air trapping
- Diving with cold or chest congestion
- Airway obstruction from foreign object in the mouth (gum, etc)

SYMPTOMS

- Unconsciousness within five minutes of surfacing
- Dizziness or staggering
- Visual disturbances
- Paralysis
- Bloody froth from the mouth or nose
- Respiratory arrest

NOTE: Symptoms usually appear within 15 minutes of surfacing from a dive

TREATMENT

- EVACUATE TO RECOMPRESSION CHAMBER/HOSPITAL ASAP!
- ABC's - circulation, airway, breathing
- Administer 100% oxygen with diver in supine position
- Administer fluids (water) to conscious patients

LUNG OVER-EXPANSION INJURIES

PNEUMOTHORAX

As a diver ascends, the lungs typically vent expanding air without problem. If the air is blocked from exiting normally, the lungs can over inflate and damage the alveoli and bronchial passages. If expanding air ruptures the lung, air escapes into the small, normally airless area between the lungs and chest. This is a pneumothorax. The two types of pneumothorax include: 1) *simple pneumothorax* - involves a one time event of air escaping from the lungs into the pleural cavity AND 2) *tension pneumothorax* involves a repeated leaking of air into the pleural cavity with each breath. Both are very serious and require immediate medical attention.

CAUSES

- Holding breath during ascent while breathing compressed air
- Lung disease causing air trapping
- Diving with cold or chest congestion
- Airway obstruction from foreign object in the mouth (gum, etc)

SYMPTOMS

- Difficulty or rapid breathing
- Shortness of breath
- Hypotension
- Cyanosis and shock
- Chest pains (deep breath hurts) and intense pressure in the chest
- Leaning towards affected side (and absent lung sounds on affected side)
- Loss of consciousness or death

TREATMENT

- EVACUATE TO HOSPITAL ASAP!
- ABC's - circulation, airway, breathing
- Administer 100% oxygen
- Position patient on injured side
- Treat for shock
- In the case of a tension pneumothorax, air must be vented from the chest cavity by a medical professional

LUNG OVER-EXPANSION INJURIES

SUBCUTANEOUS EMPHYSEMA

Upon ascent, air escapes from a lung over-pressurization into the tissues beneath the skin of the neck. It can be associated with mediastinal emphysema or can occur alone.

CAUSES

- Holding breath during ascent while breathing compressed air
- Lung disease causing air trapping
- Diving with cold or chest congestion
- Airway obstruction from foreign object in the mouth (gum, etc)

SYMPTOMS

- Feeling of fullness in the neck area
- Swelling or inflation around the neck and upper chest
- Crackling sensation when skin is pressed
- Change in sound of voice
- Cough

TREATMENT

- Transport to nearest medical facility
- ABC's - circulation, airway, breathing
- Administer 100% oxygen if breathing is impaired
- Monitor for shock
- Unless showing signs of a gas embolism as well, recompression is not normally required

LUNG OVER-EXPANSION INJURIES

MEDIASTINAL EMPHYSEMA

Upon ascent, air escapes from a lung overpressurization into the tissues surrounding the heart, major blood vessels, and trachea (windpipe). This gas expands on ascent, causing pain under the sternum (breast-bone), shortness of breath, or in extreme cases, fainting from impaired blood return to the heart.

CAUSES

- Holding breath during ascent while breathing compressed air
- Lung disease causing air trapping
- Diving with cold or chest congestion
- Airway obstruction from foreign object in the mouth (gum, etc)

SYMPTOMS

- Difficulty breathing
- Shortness of breath
- Faintness
- Pain under breastbone that may radiate to the neck, collarbone, or shoulder
- Cyanosis (blueness) of the skin, lips, or nailbeds
- Shock
- Swelling around the neck
- A brassy quality to the voice
- A sensation of pressure on the windpipe
- Cough
- Deviation of adam's apple to affected side

TREATMENT

- Transport to nearest medical facility
- Mediastinal emphysema causing respiratory or circulatory impairment may require recompression
- ABC's - circulation, airway, breathing
- Administer 100% oxygen
- Monitor for shock

DECOMPRESSION SICKNESS (DCS)

The result of inadequate decompression following exposure to increased pressure. Typically occurs as a result of ascending too quickly and not allowing the proper amount of time required for decompression to occur. An important note is that DCS can occur even when divers follow dive tables and computers and remain within recommended decompression limits. Please listen to your body for the 24 hours following a dive and consult a physician familiar with dive medicine should you experience any of these symptoms.

PREVENTION

- Make safety stops
- Ascend slowly (maximum of 30 feet per minute)
- Allow for longer surface intervals
- Plan dives conservatively
- Hydrate well when diving
- Maintain good physical fitness and nutrition
- Do not dive when dehydrated, intoxicated, hungover, or overly fatigued

SYMPTOMS

- * Symptoms often occur within 6 hours of dive completion, but can be delayed up to 24 hours*
- Joint pain (most commonly in the elbow, shoulder, hip, or knee)
 - Extreme fatigue and weakness
 - Dizziness, tunnel vision, or staggering, occasionally leading to unconsciousness
 - Paralysis or numbness
 - Itchy skin and/or blotchy rash on the abdomen
 - Ringing in the ears or partial deafness, confusion or disorientation

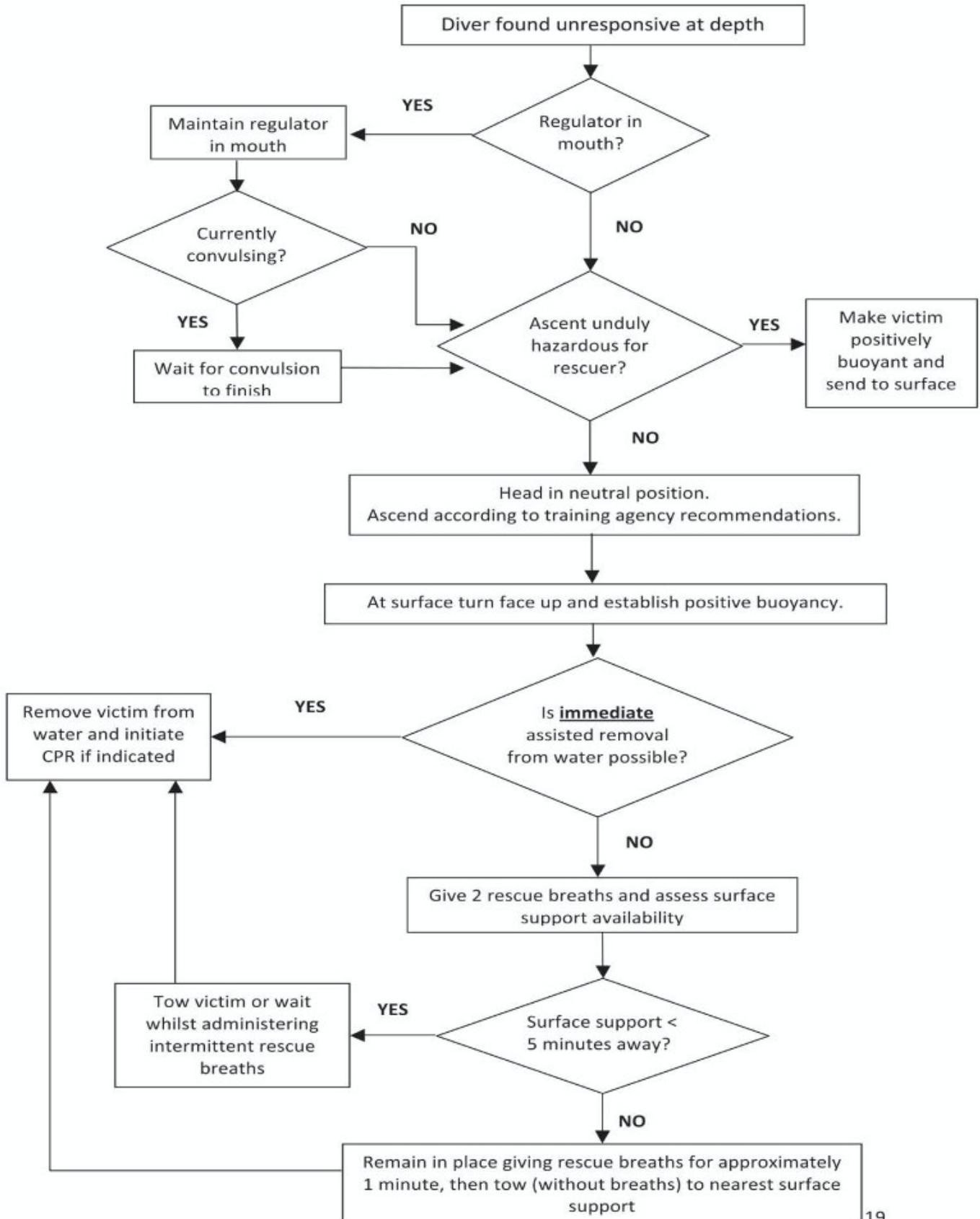
TREATMENT

- Transport to recompression chamber ASAP and consult with physician familiar with diving injuries
 - * DO NOT attempt to treat in the water
- Monitor ABC's (circulation, airway, breathing)
- Administer 100% oxygen
- Administer fluids (water preferred)
- Rest in supine position

APPENDIX 8

Recommendations For Rescue Of A Submerged Unresponsive Compressed-Gas Diver

From: S.J. Mitchell et al., Undersea and Hyperbaric Medicine 2012, Vol. 39, No. 6, pages 1099-1108



APPENDIX 9

AAUS STATISTICS COLLECTION CRITERIA AND DEFINITIONS

COLLECTION CRITERIA:

The "Dive Time in Minutes", "The Number of Dives Logged", and the "Number of Divers Logging Dives" will be collected for the following categories:

- Dive Classification
- Breathing Gas
- Diving Mode
- Decompression Planning and Calculation Method
- Depth Ranges
- Specialized Environments
- Incident Types

Dive Time in Minutes is defined as the surface-to-surface time including any safety or required decompression stops.

A *Dive* is defined as a descent underwater utilizing compressed gas and subsequent ascent/return to the surface with a minimum surface interval of 10 minutes.

Dives will not be differentiated as open water or confined water dives. But open water and confined water dives will be logged and submitted for AAUS statistics classified as either scientific or training/proficiency.

A "Diver Logging a Dive" is defined as a person who is diving under the auspices of your scientific diving organization. Dives logged by divers from another AAUS Organization will be reported with the diver's home organization. Only a diver who has actually logged a dive during the reporting period is counted under this category.

Incident(s) that occur during the collection cycle: Only incidents that occurred during, or resulting from, a dive where the diver is breathing a compressed gas will be submitted to AAUS.

DEFINITIONS:

Dive Classification:

- **Scientific Dives:** Dives that meet the scientific diving exemption as defined in 29 CFR 1910.402. Diving tasks traditionally associated with a specific scientific discipline are considered a scientific dive. Construction and trouble-shooting tasks traditionally associated with commercial diving are not considered a scientific dive.
- **Training and Proficiency Dives:** Dives performed as part of a scientific diver-training program, or dives performed in maintenance of a scientific diving certification/authorization.

Breathing Gas:

- Air: Dives where the bottom gas used for the dive is air.
- Nitrox: Dives where the bottom gas used for the dive is a combination of nitrogen and oxygen percentages different from those of air.

Diving Mode:

- Open Circuit SCUBA: Dives where the breathing gas is inhaled from a self-contained underwater breathing apparatus and all of the exhaled gas leaves the breathing loop.
- Surface Supplied: Dives where the breathing gas is supplied from the surface by means of a pressurized umbilical hose. The umbilical generally consists of a gas supply hose, strength member, pneumofathometer hose, and communication line. The umbilical supplies a helmet or full-face mask. The diver may rely on the tender at the surface to monitor the divers' depth, time and diving profile.
- Hookah: While similar to Surface Supplied in that the breathing gas is supplied from the surface by means of a pressurized hose, the supply hose does not require a strength member, pneumofathometer hose, or communication line. Hookah equipment may be as simple as a long hose attached to a standard scuba cylinder supplying a standard scuba second stage. The diver is responsible for monitoring his/her own depth, time, and diving profile.

Decompression Planning and Calculation Method:

- Dive Tables
- Dive Computer
- PC Based Decompression Software

Depth Ranges:

Depth ranges for sorting logged dives are as follows:

Depth range (ft)	Depth range (m)
0 – 30	0 – 10
31 – 60	11 – 18
61 – 100	19 – 30
101 – 130	31 – 39
131 – 150	40 – 45
151 – 190	46 – 58

A dive is logged to the maximum depth reached during the dive.

Note: Only "The Number of Dives Logged" and "The Number of Divers Logging Dives" will be collected for this category.

Specialized Environments:

- Required Decompression: Any dive where the diver exceeds the no-decompression limit of the decompression planning method being employed.
- Overhead Environments: Any dive where the diver does not have direct access to the surface due to a physical obstruction.
- Blue Water Diving: Open-water diving where the bottom is generally greater than 200 feet deep and requires the use of multiple-tethers diving techniques.
- Ice and Polar Diving: Any dive conducted under ice or in polar conditions. Note: An Ice Dive would also be classified as an Overhead Environment dive.
- Saturation Diving: Excursion dives conducted as part of a saturation mission are to be logged by "classification", "mode", "gas", etc. The "surface" for these excursions is defined as leaving and surfacing within the Habitat. Time spent within the Habitat or chamber must not be logged by AAUS.
- Aquarium: An aquarium is a shallow, confined body of water, which is operated by or under the control of an institution and is used for the purposes of specimen exhibit, education, husbandry, or research (Not a swimming pool).

Incident Types:

- Hyperbaric: Decompression Sickness, AGE, or other barotrauma requiring recompression therapy.
- Barotrauma: Barotrauma requiring medical attention from a physician or medical facility, but not requiring recompression therapy.
- Injury: Any non-barotrauma injury occurring during a dive that requires medical attention from a physician or medical facility.
- Illness: Any illness requiring medical attention that can be attributed to diving.
- Near Drowning/ Hypoxia: An incident where a person asphyxiates to the minimum point of unconsciousness during a dive involving a compressed gas. But the person recovers.
- Hyperoxic/Oxygen Toxicity: An incident that can be attributed to the diver being exposed to too high a partial pressure of oxygen.
- Hypercapnea: An incident that can be attributed to the diver being exposed to an excess of carbon dioxide.
- Fatality: Any death accruing during a dive or resulting from the diving exposure.
- Other: An incident that does not fit one of the listed incident types

Incident Classification Rating Scale:

- Minor: Injuries that the OM considers being minor in nature. Examples of this classification of incident would include, but not be limited to:
 - ✦ Mask squeeze that produced discoloration of the eyes.
 - ✦ Lacerations requiring medical attention but not involving moderate or severe bleeding.

- ✦ Other injuries that would not be expected to produce long term adverse effects on the diver's health or diving status.
- *Moderate*: Injuries that the OM considers being moderate in nature. Examples of this classification would include, but not be limited to:
 - ✦ DCS symptoms that resolved with the administration of oxygen, hyperbaric treatment given as a precaution.
 - ✦ DCS symptoms resolved with the first hyperbaric treatment.
 - ✦ Broken bones.
 - ✦ Torn ligaments or cartilage.
 - ✦ Concussion.
 - ✦ Ear barotrauma requiring surgical repair.
- *Serious*: Injuries that the OM considers being serious in nature. Examples of this classification would include, but not be limited to:
 - ✦ Arterial Gas Embolism.
 - ✦ DCS symptoms requiring multiple hyperbaric treatment.
 - ✦ Near drowning.
 - ✦ Oxygen Toxicity.
 - ✦ Hypercapnea.
 - ✦ Spinal injuries.
 - ✦ Heart attack.
 - ✦ Fatality.

APPENDIX 10
SCIENTIFIC DIVER APPLICANT'S DIVING RESUME

Applicant Information:

Name: _____ Date of Birth: _____

Phone: _____ Email: _____

Circle one: Student Faculty Staff Major/Department: _____

For students: Undergraduate Graduate

Emergency response course	Agency	Date	Location	Expiration date
First Aid				
CPR				
Oxygen Administration				

Dive Training:

Years SCUBA Diving: _____

Years Skin-diving: _____

Dive courses	Agency	Date	Location	Certification No.

Please provide copies of all certifications when submitting this resume (front/back of card or certificate).

Total career open water dives: _____ Total dives in past 12 months: _____

Date of last logged dive: _____ Depth of last dive (ft): _____ Location: _____

Deepest career dive (ft): _____ Location of dive: _____

Please indicate the number of dives for each type of diving experience listed below. If zero, enter zero.

	Fresh water		High visibility (>40')		Boat dive
	Salt water		Moderate visibility (20-40')		Shore dive
	Blue water		Low visibility (5-20')		Pier dive
	Cave/Overhead obstruction		Very low visibility (0-5')		Moderate-high surf
	Water Temp > 70 deg F		Night time		Compass navigation
	Water Temp 51-70 deg F		High current		Search/Recovery
	Water Temp <50 deg F		Moderate current		Commercial diving
	Drysuit		Drift dive		Military diving
	Depth 100-130 ft		Nitrox		Surface-supplied air
	Depth > 130 ft		Mixed gas		Aquarium
	Rebreather		Dive computer		Research/survey

Have you ever run out of air while diving? _____

Have you ever been treated in a hyperbaric chamber for a diving related accident? _____

Have you ever experienced symptoms of decompression sickness (DCS)? _____

Have you ever experienced another type of diving related injury? _____

Use the following space to briefly discuss any "yes" answers to the questions above:

Please list the geographic locations of your diving experience in the following box:

Please briefly discuss your general level of comfort in the water and freediving capabilities.

Please state your objectives and intent for scientific diver certification through HPU/AAUS.

Dive References:

Name: _____ Organization/relation: _____

Phone: _____ Email: _____

Name: _____ Organization/relation: _____

Phone: _____ Email: _____

This resume is an accurate representation of my diving activity and capabilities.

Signature: _____ Date: _____

APPENDIX 11
LIABILITY RELEASE AND ASSUMPTION OF RISK

In consideration of being allowed to participate in this activity, I hereby personally assume all risks in connection with any dive(s) for any harm, injury, damage or death that may befall me, including all risks connected therewith, whether foreseen or unforeseen. I further save and hold harmless said activity and Hawaii Pacific University, and any of its employees, agents, or board members from any demand, claim or lawsuit for personal injury, property damage, or wrongful death, by me, my family, heirs, executors, representatives, administrators and assigns, arising out of my participation in this activity.

I am fully aware of the inherent risks involved in SCUBA diving and ocean immersion, and I choose to voluntarily participate in such activities with the understanding that the activities may be hazardous to me and my property.

I also understand that in the process of training and future scientific diving work, my colleagues may also be in the process of training and agree not to take legal action upon Hawaii Pacific University based on the behavior and decision making of those others.

I understand that most personal liability insurances do not cover diving related incidents and agree to carry at least the minimum coverage required by Hawaii Pacific University and the Diving Control Board.

I agree to abide by the policies, procedures, and standards of Hawaii Pacific University's Diving Safety Manual and any recommendations or regulations set forward by the Diving Control Board or its members. I understand that familiarization with this manual is essential to my safe participation in these activities, with full understanding that accidents do happen, and I once again agree not to hold Hawaii Pacific University or any of its agents liable.

I further declare that I am of lawful age and legally competent to sign this liability release. I hereby affirm that I have read this liability release and that I fully understand its contents.

Printed name: _____ Date: _____

Signature: _____

If under 18:

Parent's printed name: _____ Date: _____

Signature: _____

APPENDIX 12
HPU DIVING PROOF OF LIABILITY INSURANCE

HPU Scientific Divers are required to carry liability insurance offered by the Diver's Alert Network (DAN) at the level of the Preferred Plan or greater. The plans offered by DAN are the most comprehensive plans that cover scuba diving accidents available and ensure proper coverage should an accident take place. Coverage must be active in order to participate in scientific diving activities. Use the space below to list your insurance coverages and a means by which they can be verified.

DAN insurance coverages can be viewed at the following site or by calling (919) 684-

2948: <https://www.diversalertnetwork.org/insurance/dive/>

General Liability/Medical Insurance:

Name: _____

Insurance Company: _____

Policy Number: _____

Expiration Date: _____

Verification Phone Number: _____

DAN Liability Insurance:

Name: _____

Plan Type: _____

Policy Number: _____

Expiration Date: _____

I certify the above information is accurate and up to date and agree to inform the DCB should any changes be made to these coverages.

Signature

Date

APPENDIX 13
HPU SCIENTIFIC DIVING DIVE PLAN PROPOSAL

Name: _____ Date submitted: _____

Dive Site (location description): _____

Dive Site Coordinates: _____ Planned Depth: _____

Proposed date(s) for planned diving: _____ Planned bottom time per dive: _____

Number of dives planned: _____ If #>1, surface interval time: _____

Time of day start diving: _____ Time end diving: _____

Breathing Gas: Air Nitrox (% EAN) Source of air fill: _____

Dive planning mode: Computer Tables Computer model/table: _____

Type of dive/platform: Shore Boat Pier

If boat, name/type: _____ Boat operator: _____

Project name: _____ Contact info: _____

Project supervisor: _____ Contact #: _____

Lead Diver: _____

Email: _____

Diver and Phone #	Certification Level	Depth Rating	DAN #	Emergency Contact		
				Name	Phone	Relationship

* Certification level - SD (scientific diver) or DIT (scientific diver in training) AND highest rec. certification

Describe the goals and objectives of the proposed dive operations

Equipment plan to use/need:

RISK ASSESSMENT:

List any potential safety hazards you may encounter for your planned operations and site.

Describe how you plan to mitigate the risks listed above.

EMERGENCY INFORMATION

Kuakini Chamber ph: _____ Distance to chamber: _____ Transit time to chamber: _____

Nearest emergency room: _____ Phone: _____

Distance to ER: _____ Transit time to ER: _____

Anticipated means of emergency transport: _____

Backup means of transport: _____

General considerations for dive plans:

Dive plans must be submitted for approval at least five business days before the diving is to occur.

All divers included in this plan are authorized to dive under HPU diving control board policies.

Any diver has the right to refuse to dive without fear of penalty if he or she feels any of the following:

- discomfort or lack of mental awareness or health to safely partake in the operations
- the conditions are unsafe or unfavorable
- the dive violates the precepts of their training
- the dive violates the regulations set forth by the HPU Scientific Diving Manual

ALL dive plans MUST be planned and acted upon based on the level of training for the least experienced diver.

Divers will ascend no faster than 30 feet/min and perform a safety stop for 3-5 minutes at 15-20 feet.

Dive plans will be planned *conservatively* and planned for deepest dives first progressing to shallower depths in subsequent dives.

Surface intervals between dives will be maximized as much as possible.

Divers should only use SCUBA gear that is within HPU regulations and service limits.

Each diver must dive according to his/her plan (i.e. buddy teams cannot disregard no-decompression-limits suggested by one member's computer in order to extend dive time based on a buddy's computer).

All divers will review the Dive Accident Management Plan prior to participating in the planned dive and a copy of the Emergency Action Plan will be present and easily accessible at the dive site.

Emergency oxygen supply, a diver's first aid kit, and a save-a-dive kit will be present at the dive site.

I attest that all the information above is accurate and carefully considered prior to submitting this plan.

Signature and date - lead diver

- HPU Dive Safety Officer/Dive Control Board Use Only-

Approved

Denied

Conditional

Remarks, conditions, or restrictions: _____

Diving Safety Officer Signature

Date

**APPENDIX 14
PRE AND POST-DIVE CHECKLIST**

Dive Plan Reference #: _____ Date: _____ Location: _____

PRE-DIVE CHECKLIST

Dive Plan Safety

- | | |
|--------------------------|---|
| <input type="checkbox"/> | The dive objectives and goals are well defined and understood by all divers and support personnel involved. |
| <input type="checkbox"/> | Each team member understands his/her role in the planned operations and is authorized to conduct that role. |
| <input type="checkbox"/> | The Diving Emergency Action Plan is accurate, present on-site, and been reviewed by all personnel. |

Dive Briefing

- | | |
|--------------------------|--|
| <input type="checkbox"/> | Dive site conditions and hazards have been assessed and discussed with all team members. |
| <input type="checkbox"/> | Entry and exit points have been identified and understood by all team members. |
| <input type="checkbox"/> | Maximum depth and dive profiles have been discussed with all team members. |
| <input type="checkbox"/> | Repetitive dive designations have been considered when planning any dives to come. |
| <input type="checkbox"/> | Minimum cylinder pressure upon return is understood by all team members. |
| <input type="checkbox"/> | Support personnel understand all communication methods and emergency protocol in the event of an incident and can properly respond |
| <input type="checkbox"/> | The planned dive is designated a scientific dive and operates within those constraints defined in the dive safety manual. |

Equipment

- | | |
|--------------------------|--|
| <input type="checkbox"/> | All equipment is in good working order and ready for the planned operations. |
| <input type="checkbox"/> | All equipment is appropriate for the planned activity and team members are trained to use the equipment. |
| <input type="checkbox"/> | Essential equipment is present and ready for use, including but not limited to emergency oxygen supply, first aid kit, a set of no-decompression dive tables, a phone, and the appropriate dive flags. |

Lead Diver Signature Date Time of day

POST-DIVE CHECKLIST

- | | |
|--------------------------|--|
| <input type="checkbox"/> | A post-dive meeting and discussion of operations has been conducted. |
| <input type="checkbox"/> | Dive team buddies have remained together for the 30 minutes after surfacing from the dive. |
| <input type="checkbox"/> | All dive and support equipment is properly rinsed, cleaned, and returned to the correct locations. |

Lead Diver Signature

Date

Time of day

APPENDIX 15
DIVING INCIDENT REPORT FORM

Use this form to report diving related accidents, injuries, and incidents. Dive logs must be submitted with this report. Reports must be submitted within 24 hours of any incident. Contact the HPU DSO with any questions.

Your name: _____ Phone: _____ Role at scene: _____

GENERAL DETAILS

Diver's Name: _____

Date: _____ Time: _____

Diver's Address: _____

Phone: _____

Diving certifications: (AAUS/HPU) _____

(Recreational)

Dive Buddy: _____

Phone: _____

Diving Certifications: (AAUS/HPU) _____

(Recreational)

Location of Incident: _____

Dive Plan Reference No.: _____

Description of Scene of Incident: _____

Description of conditions: _____

Lead Diver: _____

Phone: _____

Diving certifications: (AAUS/HPU)

(Recreational)

Dive Type: Scientific Training Proficiency Other: _____

Incident occurred: At depth At surface On Shore

**RESPONSE**

Calls placed:	<input type="checkbox"/> 9-1-1	<input type="checkbox"/> DAN	<input type="checkbox"/> USCG	<input type="checkbox"/> DSO	
Oxygen on-site:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Oxygen used:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Oxygen ran out:	Yes	No	O2 notes: (duration, etc)		
First Aid on-site:	Yes	No	First Aid used:	Yes	<input type="checkbox"/> No

Insufficient First
Aid on site:

Yes

No

Insufficient
training:

Yes

No

If applicable, time elapsed until paramedics arrived: _____

Destination for medical care: _____

Recompression chamber treatment: No Yes Schedule: _____

Hospitalization: No Yes Diagnosis: _____

PERSONAL ACCOUNT

Please describe the incident in detail. Include any details you believe to be relevant in the cause or handling of the incident. Attach additional pages if necessary.

What can be done in future dive operations to avoid repeat occurrences?

CONTRIBUTING FACTORS

Check all that apply:

- | | | |
|--|--|---|
| <input type="checkbox"/> Inexperienced Diver | <input type="checkbox"/> Poor dive planning | <input type="checkbox"/> Negligent boating traffic |
| <input type="checkbox"/> Inexperienced Buddy | <input type="checkbox"/> Poor dive execution | <input type="checkbox"/> No dive float |
| <input type="checkbox"/> Poor communication | <input type="checkbox"/> Buoyancy problem | <input type="checkbox"/> Boat staff inadequacies |
| <input type="checkbox"/> Diving beyond skill level | <input type="checkbox"/> Low on air situation | <input type="checkbox"/> Hazardous marine life |
| <input type="checkbox"/> Inadequate supervision | <input type="checkbox"/> Out of air situation | <input type="checkbox"/> Allergic reaction |
| <input type="checkbox"/> Buddy separation | <input type="checkbox"/> Rapid ascent | <input type="checkbox"/> Entanglement |
| <input type="checkbox"/> Buddy negligence | <input type="checkbox"/> Uncontrolled ascent | <input type="checkbox"/> Lack of buddy checks |
| <input type="checkbox"/> Buddy breathing | <input type="checkbox"/> Missed deco stop | <input type="checkbox"/> Equipment malfunction |
| <input type="checkbox"/> Poor buddy pairing/match | <input type="checkbox"/> No safety stop | <input type="checkbox"/> Equipment misuse |
| <input type="checkbox"/> Post-dive buddy system fail | <input type="checkbox"/> Trouble equalizing | <input type="checkbox"/> Unfamiliar equipment |
| <input type="checkbox"/> Pre-dive jitters/stress | <input type="checkbox"/> Reverse block | <input type="checkbox"/> Lack of essential equip |
| <input type="checkbox"/> Fatigue | <input type="checkbox"/> High surf | <input type="checkbox"/> Emergency gear not present |
| <input type="checkbox"/> Anxiety | <input type="checkbox"/> Strong current | <input type="checkbox"/> Cylinder air - strange taste |
| <input type="checkbox"/> Hurried actions | <input type="checkbox"/> Poor visibility | <input type="checkbox"/> Dive computer misuse |
| <input type="checkbox"/> Error in judgement | <input type="checkbox"/> Lifeguard warnings posted | <input type="checkbox"/> Ignored dive computer |
| <input type="checkbox"/> Sea sickness | <input type="checkbox"/> Conditions changed fast | <input type="checkbox"/> Ignored buddy |
| <input type="checkbox"/> Dehydration | <input type="checkbox"/> Challenging conditions | <input type="checkbox"/> Ignored lead diver |
| <input type="checkbox"/> Hungover | <input type="checkbox"/> Disregarded warnings | <input type="checkbox"/> Nitrox misuse |
| <input type="checkbox"/> Drugs/Alcohol | <input type="checkbox"/> Unfamiliar location | <input type="checkbox"/> Diving too deep |
| <input type="checkbox"/> Inadequate fitness | <input type="checkbox"/> Lost diver | <input type="checkbox"/> Exercise after diving |
| <input type="checkbox"/> Lack of attention/focus | <input type="checkbox"/> Couldn't find exit | <input type="checkbox"/> Flying after diving |
| <input type="checkbox"/> Result of panic | <input type="checkbox"/> Overhead environment | <input type="checkbox"/> No fault/freak accident |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Other:

EQUIPMENT - In the case of equipment failure/malfunction, check the appropriate boxes

Dive gear used: Answer all questions in regards to the injured diver (except the question about buddy's gear)

Injured Diver:	<input type="checkbox"/> Owned	<input type="checkbox"/> Rented	<input type="checkbox"/> Borrowed	Incomplete
Buddy:	<input type="checkbox"/> Owned	<input type="checkbox"/> Rented	<input type="checkbox"/> Borrowed	e
Air tank:	<input type="checkbox"/> Closed	<input type="checkbox"/> Partially Open		Incomplete
				e Open

Leaking from neck Leaking from valve Empty

Air hoses:

Good Rupture Hose loose at 1st stage Hose loose at working end

Primary 2nd stage:	<input type="checkbox"/> Good	<input type="checkbox"/> Failed	<input type="checkbox"/> Free-flowing	<input type="checkbox"/> Resistance
Secondary 2nd stage:	<input type="checkbox"/> Good	<input type="checkbox"/> Failed	<input type="checkbox"/> Free-flowing	<input type="checkbox"/> Resistance
BCD Inflator:	<input type="checkbox"/> Good	<input type="checkbox"/> Stuck	<input type="checkbox"/> Hose disconnect	<input type="checkbox"/> Not working
BCD Jacket:	<input type="checkbox"/> Good	<input type="checkbox"/> Too big	<input type="checkbox"/> Not holding air	<input type="checkbox"/> Tank slipped
BCD Dump Valves:	<input type="checkbox"/> Good	<input type="checkbox"/> Leak	<input type="checkbox"/> Don't open	
Face mask:	<input type="checkbox"/> Good	<input type="checkbox"/> Leak	<input type="checkbox"/> Fogging	<input type="checkbox"/> Dislogged
Weights:	<input type="checkbox"/> Integrated	<input type="checkbox"/> Belt	<input type="checkbox"/> Too heavy	<input type="checkbox"/> Too light
	<input type="checkbox"/> Dropped weights		<input type="checkbox"/> Stuck in place	<input type="checkbox"/> Unfamiliar
Fins:	<input type="checkbox"/> Too tight	<input type="checkbox"/> Loose	<input type="checkbox"/> Strap broke	<input type="checkbox"/> Lost fin (s)
Dive Computer:	<input type="checkbox"/> Good	<input type="checkbox"/> Lost	<input type="checkbox"/> Ignored	<input type="checkbox"/> Stopped working
				<input type="checkbox"/>

Wrong breathing mix set

Borrowed

Exchanged with other
diver between dives

Watch (time device):	<input type="checkbox"/> Good	Ignored	<input type="checkbox"/> Lost	Stopped working
Depth gauge:	Good	Ignored	<input type="checkbox"/> Not working	Unreadable

Please list any additional comments you have about equipment involved in the incident.

ADDITIONAL COMMENTS

Use this space for any additional comments or concerns.

I certify the above information is accurate and as detailed as I can recall. Should any extra details be recalled in the future, I will submit that information to the Diving Control Board as soon as possible. I understand that altering the facts in my story in an attempt to cover up information of the incident is severely punishable.

Punishment shall include revocation of diving privileges and any further action the university shall see fit.

Signature

Printed name

Date

**APPENDIX 16
PERSONAL EQUIPMENT AND MAINTENANCE LOG**

Personal dive gear used for scientific diving under the auspices of Hawaii Pacific University must be serviced at regular intervals and service logs must be kept. It is the responsibility of each diver to keep their gear in service and good standing. Dive gear is considered life support and therefore should be well taken care of with all precautions taken. Should your maintenance not fall within the scheduled timeframe, you are not authorized to use that gear for scientific diving. Each time your gear is serviced, this form must be updated and submitted to the Diving Safety Officer and the Dive Control Board to be added to your file.

Equipment	Manufacturer/Model	Serial No.	Date of Purchase	Date of last servicing by qualified technician
1st Stage Regulator				
Primary 2nd Stage Regulator				
Secondary 2nd Stage Regulator				
Pressure gauge				
BCD				
Cylinder 1				
Cylinder 2				