



**Dauphin Island Sea Lab**  
**Scientific Diving Program**

MARINE ENVIRONMENTAL SCIENCES CONSORTIUM  
DAUPHIN ISLAND SEA LAB

Organizational Member of the  
AMERICAN ACADEMY OF UNDERWATER SCIENCES



STANDARDS FOR SCIENTIFIC DIVING

January 2025

## Revision History

|                  |  |
|------------------|--|
| April 1987       |  |
| October 1990     |  |
| May 1994         |  |
| January 1996     |  |
| March 1999       | Added Sec 7.6.1 Nitrox Diving Guidelines.<br>Revised Appendix 7 and 11.  |
| January 2001     | Revised Section 1.23.1 DSO Qualifications.<br>Revised Section 5.31.4 Emergency Care Training.<br>Revised Section 6 Medical Standards.<br>Made Sec 7.6.1 Nitrox Diving Guidelines into Section 7.<br>Added Section 8.0 Scientific Aquarium Diving.<br>Moved Section 7.0 to Section 9.0 Other Diving Technologies.   |
| April 2002       | Removed Appendix 7 AAUS Checkout Dive and Training Evaluation.<br>Revised Section 5.33.3.<br>Revised Section 4.23.2.   |
| August 2003      | Section 1.27.3 Delete reference to Appendix 9 (checkout dive).<br>Section 1.4 Remove word "waiver".<br>Section 2.21 Change "supervisor" to "lead diver".<br>Section 2.72.2.1 Remove reference to Appendix 13, and remove Appendix 13. Replace with "at www.aaus.org" after Incident Report.<br>Section 3.28.3 Remove Appendix 10 (dive computers).<br>Section 5.32 Training and 100-hour requirement, eliminate "beyond the DIT level".<br>Section 5.32.1 Eliminate paragraph "Suggested topics include" and replace it with a list of topics for inclusion in the 100 hours. Some of these topics would be designated "R" (required).<br>Section 4.0 Remove lead sentence "This section describes for diving". Alter the lead sentence read as follows: "This section describes training for the non-diver applicant, previously not certified for diving, and equivalency for the certified diver."<br>Section 4.3 Delete this section.<br>Section 9 Update Required Decompression (9.10) and Mixed Gas Diving (9.60) to individual sections.<br>Appendices 9, 10, 11, and 12 Remove these and make available online as historic documents in the Virtual Office.<br>Formatted document for consistency.<br>Separated manual into two volumes. Volume 1 and the appendices are required for all manual and Volume 2 sections only apply when the referenced diving activity is being conducted.<br>Volume 2 is where organizational specific information is contained. |
| October 2005     | Section 11.70 Deleted section for rebreathers.<br>Section 12.00 Added new section for rebreathers.   |
| March-April 2006 | Section 13.00 Added new section for cave and cavern diving.<br>Section 11.5 and 11.6, revised definitions for Hookah and surfaced supplied diving.<br>Section 5.30 Deleted emergency care training prerequisite.<br>Section 5.50 Added emergency care training requirements to Continuation of Certificate.  |
| November 2006    | Section 2.60 flying after diving rules updated to meet current DAN standards.<br>Section 3.20 dive computers reference changed to "appendix 8".<br>Section 3.60 air quality guidelines updated to meet current CGA standards.<br>Section 5.30 – added words "Transect Sampling" to item #9.<br>Appendix 1 – Updated one medical web link.<br>Appendix 2 - Added the abbreviation "DO" to the MD signature line.<br>Appendix 6 – new LOR template.<br>Updated and added Appendix 8 dive computer recommendations<br>Added Appendix 9 (criteria for entering diving statistics).   |
| December 2009    | Appendix 2 – Revised   |

|               |   |
|---------------|---|
| December 2011 | Section 6 – Revised after Medical Review Panel review<br>Appendix 1 - Revised   |
| May 2013      | Section 3.10- added “and serviced according to manufacturers’ recommendations”<br>Section 9.1(c) (1)- added “omitted decompression”<br>Section 9.1(c) (7)- added “qualified” to DSO’s designee<br>Section 9.30 (k)- replaced “mixed gas” with “decompression”<br>Section 4.0- removed specific requirements for Entry-Level Training. Adopted WRSTC/ISO standards by reference.<br>Section 5.0- merged requirements for Entry-Level Diver Training with Scientific Diver Training<br>Formatted document for consistency |
| December 2016 | Section 5.10 - changed “400 yards/meters in 12 minutes” to “10 minutes”.<br>Section 5.20 – removed item “d)” from Confined Water Evaluation<br>Section 5.20 - removed item “f)” from Confined Water Evaluation<br>Appendix 7 (5)(b) – Changed “(A)irway, (B)reathing, (C)irculation” to “(C)irculation, (A)irway, (B)reathing”.<br>Appendix 7 – Added “DISL Personnel to Notify of Accident”<br>Added Dr. Meekin to Appendix 4  |
| March 2019    | Adopted AAUS updates to Standards   |
| October 2024  | Adopted AAUS updates to Standards (2024)<br>Removed/Reserved Sections: <i>9.0 Mixed Gas Diving, 11.0 Rebreathers, 12.0 Cave-Cavern Diving</i><br>Added/replaced name of existing DSO and other administrative updates.  |

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## Section 1.00 General Policy

### 1.10 Scientific Diving Standards

#### Purpose

The purpose of these Scientific Diving Standards is to ensure scientific diving is conducted 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 Organizational Members (OMs or OM). Fulfillment of these purposes shall be consistent with the furtherance of research and safety, and facilitation of collaborative opportunities between AAUS OMs.

This *Manual* sets 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 OMs that adhere to these minimum standards.

#### Historical Perspective

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.

#### 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

The two elements that a diving program must contain as defined by OSHA in 29 CFR 1910 Subpart T 1910.401(a)(2)(iv) are:

- 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.
- b) 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.

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.

## **Recommendations for Changes to AAUS Manual**

As part of each OMs annual report, recommendations for modifications of this *Manual* must be submitted to AAUS for consideration.

### **1.20 Operational Control**

#### **Organizational Member Auspices and Responsibilities**

DISL auspices include any scientific diving operation in which DISL 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 the DISL or auxiliary organizations, where such individuals are acting within the scope of their authorization.

It is DISL'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 the DISL 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. Each OM must develop and maintain a diving safety manual that includes wording on how the OM defines specific policies and procedures required for the proper function of a scientific diving program. The OM manual must address environmental and working conditions unique to the program's operations. The OM diving manual must meet or exceed the AAUS standards.

AAUS standards must be the foundation for the development of an OM's scientific diving safety manual. The order and formatting of the OM manual does not have to conform to the AAUS template. The information contained in Volume 1, Sections 1.00 through 5.00 and the Appendices are required for all manuals. Volume 2, Sections 6.00 through 12.00 are required only when the OM 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) must consist 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 each OM. 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 must:
  - o Establish additional standards, protocols, and operational procedures beyond the AAUS minimums to address DISL specific needs and concerns.
  - o Approve and monitor diving projects.
  - o Review and revise the diving safety manual.
  - o Ensure compliance with the diving safety manual.

- o Approve the depth to which a diver has been authorized to dive.
- o Take disciplinary action for unsafe practices.
- o Ensure adherence to the buddy system for scientific diving.
- o Act as the official representative of the DISL in matters concerning the scientific diving program.
- o Act as a board of appeal to consider diver-related problems.
- o Recommend the issue, reissue, or the revocation of diving authorizations.
- o Recommend changes in policy and amendments to AAUS and the DISL diving safety manual as the need arises.
- o Establish and/or approve training protocols or standards through which the applicants for authorization can satisfy the requirements of the DISL diving safety manual.
- o Suspend diving operations considered to be unsafe or unwise.
- o Establish criteria for equipment selection and use.
- o Recommend new equipment or techniques.
- o Establish and/or approve facilities for the inspection and maintenance of diving and associated equipment.
- o Ensure that the DISL air station(s) meet air quality standards as described in Section 3.60.
- o Periodically review the DSO's performance and program.
- o Investigate diving incidents within the DISL diving program or violations of the DISL diving safety manual.
- 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.

### **Diving Safety Officer**

The Diving Safety Officer (DSO) serves as a voting member of the DCB, and should be designated one of the DISL Representatives to AAUS. This person should have broad technical expertise and experience in research related diving.

#### **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:
  - (a) Holds a diving certification from a recognized national certifying agency or equivalent, and
  - (b) Has engaged in sustained or successive scientific diving activities during the past two years, or
  - (c) 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 the DISL.
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 the DISL 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 OM's 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 DISL 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.

## **1.30 Consequence of Violation of Regulations by Scientific Divers**

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

## **1.40 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 the OM recognition by AAUS.

## **1.50 Record Maintenance**

DISL 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 the DISL.

**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 the DISL 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 2.00 Diving Regulations

### 2.10 Introduction

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

### 2.20 Pre-Dive Procedures

#### Dive Plans

Before conducting any diving operations under the auspices of the DISL, 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 in the presence of the dive buddy or tender. 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 the DISL, 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

## **2.30 Diving Procedures**

### **Solo Diving Prohibition**

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.

### **Decompression Management**

- On any given dive, both divers in the buddy pair must follow the most conservative dive profile
- A safety stop performed during the ascent phase of the dive should be conducted on any dive that exceeds 30 feet (9.14m).

### **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.

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.

## **2.40 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.

## **2.50 Emergency Procedures**

DISL 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.

## **2.60 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.

## **2.70 Record Keeping Requirements**

### **Personal Diving Log**

Each authorized scientific diver must log every dive made under the auspices of the DISL program and is encouraged to log all other dives. DISL may allow dives to be logged in any format of DISL's choosing. Logs must be submitted per local protocol and must remain in the divers' file. The dive log must include at least the following:

- Name of diver and buddy
- Date, time, and location
- Diving modes used
- General nature of diving activities
- Maximum depth and dive 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 DISL DCB and AAUS in a timely manner. DISLs must record and report occupational injuries and illnesses in accordance with requirements of the appropriate Labor Code section. DISL 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 DISL, 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 the 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 the incident.

In addition to requirements specific to the DISL, all diving incidents will be reported to the AAUS. This report must first be reviewed and released by the DISL 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 the 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 the incident.

## Section 3.00 Diving Equipment

### 3.10 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 recommendations. Equipment that is subjected to extreme usage under adverse conditions should require more frequent testing and maintenance.

### 3.20 Equipment

The DISL DCB must establish the minimum equipment configuration for all dives.

#### 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
- Standard open circuit (OC) regulator configuration is:
  - A first stage
  - Primary 2<sup>nd</sup> stage
  - Back up 2<sup>nd</sup> stage
  - Submersible Pressure Gauge (SPG)
  - Inflator hose for a Buoyancy Compensator Device
- A Full Face Mask may be used in place of the primary 2<sup>nd</sup> stage according to manufacturer's recommendations

#### 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.

#### 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 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.

### 3.30 Auxiliary Equipment

#### Handheld Underwater Power Tools

- Power tools and equipment used underwater must be specifically approved for this purpose.

- 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.

### **3.40 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 under circumstances where required or where water traffic is probable.

#### **Compressor Systems - Organizational Member 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.

### **3.50 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
- Rebreather systems
- Additional equipment categories as determined by the DCB

#### **Compressor Operation and Air Test Records**

Gas analyses and air tests must be performed on each DISL-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.

### 3.60 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 <sup>3</sup> |
| 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 remote site operations using gas sources not controlled by the DISL, every effort should be made to verify breathing gas meets the requirements of this standard. If CGA Grade E gas is not verifiable, the DCB must develop a protocol to mitigate risk to the diver.



## Section 4.00 Scientific Diver Certification and Authorization

This section describes the training and performance standards for AAUS Scientific Divers and represent the minimum required level of knowledge and skills presented in a generalized format. Individual diving programs are encouraged to expand upon and augment these requirements, develop or utilize appropriate educational materials, and optimize instructional programs to suit and reflect their specific needs.

### 4.10 Prerequisites

#### Administrative

The candidate must complete all administrative and legal documentation required by the DISL.

#### Entry Level Diver Certification

The candidate must, at minimum, show documented proof of Diver Certification or equivalent from an internationally recognized training agency. OMs who wish to train and certify entry level divers may do so under the standards of the most current version of the RSTC/WRSTC and/or ISO entry-level diver standards. Entry level diver training is a prerequisite to scientific diver training and therefore no part of entry level training may be counted in any way toward scientific diver training.

<sup>1</sup> “Minimum Course Content for Open Water Diver Certification”- World Recreational Scuba Training Council (WRSTC), [www.wrstc.com](http://www.wrstc.com).

<sup>2</sup> “Safety related minimum requirements for the training of recreational scuba divers -- Part 2: Level 2 -- Autonomous diver”. ISO 24801-2:2014- International Organization for Standardization (ISO) - [www.iso.org](http://www.iso.org).

#### 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.

#### Diving Competence Evaluation

Candidates must demonstrate competence in diving ability and equipment function. This will be done by conducting a checkout dive under the supervision of the DSO or designee. Evaluation of diving ability will be based on the candidate’s ability to prepare and assemble equipment, maintain buoyancy, awareness, stability, and trim while conducting task loading exercises underwater, and follow instructions/communication underwater. Successful completion of diving competence evaluation will be at the DSO or designee’s discretion.

### 4.20 Training

The candidate must successfully complete prerequisites, theoretical aspects, practical training, and examinations for a minimum cumulative time of 100 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 100 hour training requirement include a DISL developed formalized training course, 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 100 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, DISL 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 DISL scientific diving privileges.

| <b>Theoretical Training / Knowledge Development</b>   |  |
|---|--|
| <b>Required Topics:</b>   | <b>Suggested Topics:</b>   |
| Diving Emergency Care Training <ul style="list-style-type: none"> <li>• Cardiopulmonary Resuscitation (CPR)</li> <li>• AED</li> <li>• Standard or Basic First Aid</li> <li>• Recognition of DCS and AGE</li> <li>• Accident Management</li> <li>• Field Neurological Exam</li> <li>• Oxygen Administration</li> </ul>   | Specific Dive Modes (methods of gas delivery) <ul style="list-style-type: none"> <li>• Open Circuit</li> <li>• Hookah</li> <li>• Surface Supplied diving</li> <li>• Rebreathers (closed and/or semi-closed)</li> </ul>   |
| Dive Rescue <ul style="list-style-type: none"> <li>• To include procedures relevant to DISL specific protocols. (See water skills below)</li> </ul>   | Specialized Breathing Gas <ul style="list-style-type: none"> <li>• Nitrox</li> <li>• Mixed Gas</li> </ul>  |
| Scientific Method   | Small Boat Operation   |
| Data Gathering Techniques<br>(Only items specific to area of study required) <ul style="list-style-type: none"> <li>• Transects and Quadrats</li> <li>• Mapping</li> <li>• Coring</li> <li>• Photography</li> <li>• Tagging</li> <li>• Collecting</li> <li>• Animal Handling</li> <li>• Archaeology</li> <li>• Common Biota</li> <li>• Organism Identification</li> <li>• Behavior</li> <li>• Ecology</li> <li>• Site Selection, Location, and Re-location</li> <li>• Specialized Data Gathering Equipment</li> </ul> | Specialized Environments and Conditions <ul style="list-style-type: none"> <li>• Blue Water Diving</li> <li>• Altitude</li> <li>• Ice and Polar Diving (Cold Water Diving)</li> <li>• Zero Visibility Diving</li> <li>• Polluted Water Diving</li> <li>• Saturation Diving</li> <li>• Decompression Diving</li> <li>• Overhead Environments</li> <li>• Aquarium Diving</li> <li>• Night Diving</li> <li>• Kelp Diving</li> <li>• Strong Current Diving</li> <li>• Potential Entanglement/Entrapment</li> <li>• Live boating</li> </ul> |
| <b>Required Topics:</b>   | <b>Suggested Topics:</b>   |
| Navigation  | HazMat Training <ul style="list-style-type: none"> <li>• Chemical Hygiene, Laboratory Safety (Use of Chemicals)</li> </ul>   |
| HazMat Training <ul style="list-style-type: none"> <li>• HP Cylinders</li> </ul>  |  |
| Decompression Management Tools <ul style="list-style-type: none"> <li>• Dive Tables</li> <li>• Dive Computers</li> <li>• PC Based Software</li> </ul>   | Specialized Diving Equipment <ul style="list-style-type: none"> <li>• Full face mask</li> <li>• Dry Suit</li> <li>• Communications</li> <li>• Dive Propulsion Vehicle (DPV)</li> <li>• SMBs/Lift Bags</li> <li>• Line Reels</li> </ul>   |
| AAUS Scientific Diving Regulations and History <ul style="list-style-type: none"> <li>• Scientific Dive Planning</li> <li>• Coordination with other Agencies</li> <li>• Appropriate Governmental Regulations</li> </ul>   |  |
| Hazards of breath-hold diving and ascents   |  |
| Dive Physics (Beyond entry level scuba)   |  |
| Dive Physiology (Beyond entry level scuba)  | Other Topics and Techniques as Determined by the DCB   |
| Dive Environments   |  |
| Decompression Theory and its Application  |  |

| <b>Practical Training / Skill Development</b> |  |
|---|--|
| Confined Water                                | By the completion of training, 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. |

|            |   |
|------------|---|
|            | <ul style="list-style-type: none"> <li>● Swim underwater for a distance of 25 yards (23 meters) without surfacing.</li> <li>● Swim 400 yards (366 meters) in less than 12 minutes.</li> <li>● Tread water for 10 minutes, or 2 minutes without the use of hands.</li> <li>● Transport a passive person of equal size a distance of 25 yards (23 meters) in the water.</li> </ul> <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"> <li>● Enter water fully equipped for diving</li> <li>● Clear fully flooded face mask</li> <li>● Demonstrate air sharing and ascent using an alternate air source, as both donor and recipient, with and without a face mask</li> <li>● Demonstrate stationary buddy breathing as both donor and recipient, with and without a face mask</li> <li>● Demonstrate understanding of underwater signs and signals</li> <li>● Demonstrate ability to remove and replace equipment while submerged</li> <li>● Demonstrate acceptable watermanship skills for anticipated scientific diving conditions</li> </ul>   |
| Open Water | <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"> <li>● Surface dive to a depth of 10 feet (3 meters) without scuba*</li> <li>● Enter and exit water while wearing scuba gear* ^^</li> <li>● Kick on the surface 400 yards (366 meters) while wearing scuba gear, but not breathing from the scuba unit*</li> <li>● Demonstrate proficiency in air sharing ascent as both donor and receiver*</li> <li>● Demonstrate the ability to maneuver efficiently in the environment, at and below the surface* ^^</li> <li>● Complete a simulated emergency swimming ascent*</li> <li>● Demonstrate clearing of mask and regulator while submerged*</li> <li>● Underwater communications^^</li> <li>● Demonstrate ability to achieve and maintain neutral buoyancy while submerged*</li> <li>● Demonstrate techniques of self-rescue and buddy rescue*</li> <li>● Navigate underwater ^</li> <li>● Plan and execute a dive^</li> <li>● Demonstrate judgment adequate for safe scientific diving* ^^</li> </ul> <p>Rescue Skills:</p> <ul style="list-style-type: none"> <li>● 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</li> <li>● Demonstrate simulated in-water mouth-to-mouth resuscitation</li> <li>● Removal of victim from water to shore or boat</li> <li>● Stressed and panicked diver scenarios</li> <li>● Recommendations For Rescue Of A Submerged Unresponsive Compressed Gas Diver – Appendix 9</li> </ul> <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 OM DCB. Depth progression must</p> |

|  |   |
|--|---|
|  | <p>proceed shallower to deeper after acceptable skills and judgment have been demonstrated, and are not to exceed 100 feet (30 m) during the initial 12 dive cycle</p> <p>* Checkout dive element</p> <p>^^ Evaluated on all dives</p> <p>^ Evaluated at some point during the training cycle</p> |
|--|---|

| <b>Examinations</b> |  |
|---------------------|--|
| Equipment           | <p>The trainee will be subject to examination/review of:</p> <ul style="list-style-type: none"> <li>● Personal diving equipment</li> <li>● Task specific equipment</li> <li>● Function and manipulation of decompression computer to be employed by the diver (if applicable)</li> </ul>   |
| Written Exams       | <p>The trainee must pass a written examination reviewed and approved by the DISLDCB that demonstrates knowledge of at least the following:</p> <ul style="list-style-type: none"> <li>● Function, care, use, and maintenance of diving equipment</li> <li>● Advanced physics and physiology of diving</li> <li>● Diving regulations</li> <li>● Applicable diving environments</li> <li>● Emergency procedures for specific dive mode(s) and environments, including buoyant ascent and ascent by air sharing</li> <li>● Currently accepted decompression theory and procedures</li> <li>● Proper use of dive tables</li> <li>● Hazards of breath-hold diving and ascents</li> <li>● Planning and supervision of diving operations</li> <li>● Navigation</li> <li>● Diving hazards &amp; mitigations</li> <li>● 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</li> <li>● Applicable theoretical training and knowledge development from the Required and Suggested Topics (above)</li> </ul> |

#### 4.30 Diver Certification and Authorizations

Only a person diving under the auspices of an OM that subscribes to the practices of the AAUS is eligible for a 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 Scientific Diver Certification.

##### **Scientific Diver Certification**

Signifies a diver has completed all requirements in Section 4.20 and is certified by the AAUS OM 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 judgment for their safety

and/or that of the dive team. Scientific Diver Certification is only active when required authorizations are in place and current.

### **Scientific Aquarium Diver Certification**

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

All requirements set forth for 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.

### **Temporary Diver Authorization**

Only a diver not under the auspices of an AAUS OM may be granted a Temporary Diver Authorization. The individual in question must demonstrate proficiency in diving and can contribute measurably to a planned dive. A 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.

## **4.40 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 the DISL 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 Section 4.00. 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. Dives beyond 190 feet require the use of mixed gas.**

- g) Authorization to 250 Foot Depth - A diver holding a 190-foot authorization may be authorized to a depth of 250 feet after successfully completing and logging 6 supervised dives to depths between 190 and 250 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.
- h) Authorization to 300 Foot Depth - A diver holding a 250-foot authorization may be authorized to a depth of 300 feet after successfully completing and logging 6 supervised dives to depths between 200 and 250 feet under supervision of dive buddy authorized by the DCB. The diver must also demonstrate knowledge of the special problems of deep diving and of special safety requirements.
- i) Authorizations deeper than 300 Feet – Depth authorizations deeper than 300 feet progress in 50-foot depth/6 dive increments. A diver holding a 300 foot, or deeper authorization may be authorized to the next depth authorization increment after successfully completing and logging 6 supervised dives under supervision of dive buddy authorized by the DCB. The diver must also demonstrate knowledge of the special problems of deep diving and of special safety requirements.

## **4.50 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 and must be completed in the gear configuration and gasses similar to those the diver utilizes to complete these dives to 150 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 4.00](#) 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
- 

## **4.60 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 record. Violations of regulations set forth in this Manual or other governmental subdivisions not in conflict with this Manual, or demonstration of poor judgment, 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 5.00 Medical Standards

### 5.10 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.
- 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).
- DISL must verify that divers have been declared by the examining medical authority to be fit to engage in diving activities.

### 5.20 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.

### 5.30 Information Provided Examining Physician

The DISL must provide a copy of the medical evaluation requirements of this *Manual* to the examining physician. (Appendices 1, 2, and 3).

### 5.40 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)

### 5.50 Physician's Written Report

- A Medical Evaluation of Fitness For Scuba Diving Report (or DISL equivalent) signed by the examining or supervising physician stating the individual's fitness to dive, including any recommended restrictions or limitations will be submitted to the DISL 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 DISL 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.



**Sections 6.00 through 12.00**

**Required Only When Conducting Described Diving Activities  
and/or  
Organizational Member Specific Sections**

## Section 6.00 Nitrox Diving

This section describes the requirements for authorization and use of nitrox for Scientific Diving.

### 6.10 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 DISL 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](http://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](http://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 (eg.: O<sub>2</sub> and CO<sub>2</sub> 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, pO<sub>2</sub>, and other aspects of Nitrox diving as required by the DCB

### 6.20 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.

## 6.30 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 pO<sub>2</sub> limit and fO<sub>2</sub> 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.
- DISL 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 3.60](#), 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 0.1 mg/m<sup>3</sup>.
  - For remote site operations using compressors not controlled by the DISL 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: fO<sub>2</sub>, MOD, cylinder pressure, date of analysis, and user's name.
- Individual dive log reporting forms should report fO<sub>2</sub> of nitrox used, if different than 21%.

## 6.40 Nitrox Diving Equipment

### Required Equipment

All of the designated equipment and stated requirements regarding scuba equipment required in the *AAUS Manual* apply to nitrox operations. 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 7.00 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.

### 7.10 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 DISL.

### 7.20 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.
- For dives deeper than 100 feet (30 m) or outside the no-decompression limits:
  - A separate dive team member must tend each diver in the water;
  - A standby diver must be available while a diver is in the water;
- 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 190 feet (57.9 m).
- The DISL DCB is responsible for developing additional operational protocols

#### Staffing 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 DISL 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 3.60

### **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 DISL DCB.
- The DISL DCB is responsible for developing additional operational protocols for surface supplied diving specific to the aquarium environment.

## **7.40 Hookah**

### **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 3.60
- 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 DISL 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 DISL DCB.
- The DISL DCB is responsible for developing additional operational protocols for hookah diving specific to the aquarium environment.

## Section 8.00 Staged Decompression Diving

Decompression diving is defined as any diving during which the diver cannot perform a direct return to the surface without performing a mandatory decompression stop to allow the release of inert gas from the diver's body.

The following procedures must be observed when conducting dives requiring planned decompression stops.

### 8.10 Minimum Experience and Training Requirements

#### Prerequisites

1. Scientific Diver qualification according to [Section 4.00](#).
2. Minimum of 100 logged dives with experience in the depth range where decompression dives will be conducted.
3. Demonstration of the ability to safely plan and conduct dives deeper than 100 feet.
4. Nitrox certification/authorization according to AAUS [Section 6.00](#) recommended.

#### Training

Training must be appropriate for the conditions in which dive operations are to be conducted. Minimum Training must include the following:

1. A minimum of 6 hours of classroom training to ensure theoretical knowledge to include: physics and physiology of decompression; decompression planning and procedures; gas management; equipment configurations; decompression method, emergency procedures, and omitted decompression.
2. It is recommended that at least one training session be conducted in a pool or sheltered water setting, to cover equipment handling and familiarization, swimming and buoyancy control, to estimate gas consumption rates, and to practice emergency procedures.
3. At least 6 open-water training dives simulating/requiring decompression must be conducted, emphasizing planning and execution of required decompression dives, and including practice of emergency procedures.
4. Progression to greater depths must be by 6-dive increments at depth intervals as specified in [Section 4.40](#).
5. No training dives requiring decompression shall be conducted until the diver has demonstrated acceptable skills under simulated conditions.
6. The following are the minimum skills the diver must demonstrate proficiently during dives simulating and requiring decompression:
  - Buoyancy control
  - Proper ascent rate
  - Proper depth control
  - Equipment manipulation
  - Stage/decompression bottle use as pertinent to planned diving operation
  - Buddy skills
  - Gas management
  - Time management
  - Task loading
  - Emergency skills

7. Divers must demonstrate to the satisfaction of the DSO or the DSO's qualified designee proficiency in planning and executing required decompression dives appropriate to the conditions in which diving operations are to be conducted.
8. Upon completion of training, the diver must be authorized to conduct required decompression dives with DSO approval.

## **8.20 Minimum Equipment Requirements**

1. Valve and regulator systems for primary (bottom) gas supplies must be configured in a redundant manner that allows continuous breathing gas delivery in the event of failure of any one component of the regulator/valve system.
2. Cylinders with volume and configuration adequate for planned diving operations
3. One of the second stages on the primary gas supply must be configured with a hose of adequate length to facilitate effective emergency gas sharing in the intended environment.
4. Minimum dive equipment should include:
  - a) Diver location devices adequate for the planned diving operations and environment.
  - b) Compass
5. Redundancy in the following components may be required at the discretion of the DCB:
  - a) Decompression Schedules
  - b) Dive Timing Devices
  - c) Depth gauges
  - d) Buoyancy Control Devices
  - e) Cutting devices
  - f) Lift bags and line reels

## **8.30 Minimum Operational Requirements**

1. The maximum  $pO_2$  to be used for planning required decompression dives is 1.6 for open circuit. It is recommended that a  $pO_2$  of less than 1.6 be used during bottom exposure.
2. Decompression dives may be planned using dive tables, dive computers, and/or PC software approved by the DCB.
3. Breathing gases used while performing in-water decompression must contain the same or greater oxygen content as that used during the bottom phase of the dive.
4. The dive team prior to each dive must review emergency decompression procedures appropriate for the planned dive.
5. If breathing gas mixtures other than air are used for required decompression, their use must be in accordance with those regulations set forth in the appropriate sections of this Manual.
6. Use of additional nitrox and/or high-oxygen fraction decompression mixtures as travel and decompression gases to decrease decompression obligations is recommended.
7. Use of alternate inert gas mixtures to limit narcosis is recommended for depths greater than 150 feet.
8. The maximum depth for required decompression using air as the bottom gas is 190 feet.
9. If a period of more than 6 months has elapsed since the last decompression dive, a series of progressive workup dives defined by the DCB to return the diver(s) to proficiency status prior to the start of project diving operations are required.
10. Mission specific workup dives are recommended.

## **Section 9.00 Mixed Gas Diving**

Mixed gas diving is defined as dives done while breathing gas mixes containing proportions greater than 1% by volume of an inert gas other than nitrogen.

*-RESERVED-*

*Currently no Mixed Gas Diving at DISL*



## Section 10.00 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. OM's using these, must have guidelines established by their Diving Control Board. Divers must comply with all scuba diving procedures in this *Manual* unless specified.

### 10.10 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-057 2005).

### 10.20 Ice and Polar Diving

Divers planning to dive under ice or in polar conditions should use the most current NSF Office of Polar Programs, Standards for Conduct of Scientific Diving as outlined in the NSF Office of Polar Programs Safety and Occupational Health Policy

### 10.30 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 [Section 10.20](#) and supplemented by requirements and protocols established by the DISL's DCB.

Cavern, Cave, or Flooded Mine Diving see [Section 12](#)

It is the responsibility of the DISL's 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.

### 10.40 Saturation Diving

If conducting saturation diving operations, divers must comply with the saturation diving guidelines of the DISL.

### 10.50 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 DISL DCB to establish the requirements and protocol under which diving will be safely conducted.

### 10.60 Altitude Diving

Diving in altitudes higher than 300 meters/1000 feet above sea level requires special considerations and procedures and divers must comply with the guidelines of the OM.

## **Section 11.00 Rebreathers**

This section defines specific considerations regarding the following issues for the use of rebreathers:

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

*-RESERVED-*

*Currently no Rebreather Diving at DISL*

## **Section 12.00 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

*-RESERVED-*

*Currently no Cave-Cavern Diving at DISL*

## **Appendices**

**Appendix 1 Through 8 Or Equivalent  
Required For All Organizational Members**

## 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 the Dauphin Island Sea Lab.. 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 questions about diving medicine, you may wish to consult one 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 Dauphin Island Sea Lab scientific diving standards. Thank you for your assistance.

*Christopher Rigaud*  
*DISL Diving Safety Officer*  
*crigaud@disl.org*  
*207-949-2289*

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 autoinflate 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

- Elliott, D.H. ed. 1996. *Are Asthmatics Fit to Dive?* Kensington, MD: Undersea and Hyperbaric Medical Society.
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- Douglas, P.S. 2011. Cardiovascular screening in asymptomatic adults: Lessons for the diving world. *Undersea and Hyperbaric Medicine* 38(4): 279-287.
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- Edmonds, C., Lowry, C., Pennefather, J. and Walker, R. 2002. DIVING AND SUBAQUATIC MEDICINE, Fourth Edition. London: Hodder Arnold Publishers.
- Bove, A.A. ed. 1998. MEDICAL EXAMINATION OF SPORT SCUBA DIVERS, San Antonio, TX: Medical Seminars, Inc.
- NOAA DIVING MANUAL, NOAA. Superintendent of Documents. Washington, DC: U.S. Government Printing Office.
- U.S. NAVY DIVING MANUAL. Superintendent of Documents, Washington, DC: U.S. Government Printing Office, Washington, D.C.

## Appendix 2 AAUS Medical Evaluation Of Fitness For Scuba Diving Report

\_\_\_\_\_  
Name of Applicant (Print or Type)

\_\_\_\_\_  
Date of Medical Evaluation

**To The Examining or Supervising 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, following page). 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 Hyperbaric Medical Society or Divers Alert Network.

*(\*) NOTE: Although portions of this exam may be conducted by other medical professionals (P.A. or N.P.), final signature for diving must come from a Medical Doctor (M.D.) or Osteopath (D.O.).*

**TESTS: THE FOLLOWING TESTS ARE REQUIRED:**

|  |
|--|
| <b>DURING ALL INITIAL AND PERIODIC RE-EXAMS (UNDER AGE 40):</b>  |
| • Medical history  |
| • Complete physical exam, with emphasis on neurological and otological components  |
| • Urinalysis   |
| • Any further tests deemed necessary by the physician  |
| <b>ADDITIONAL TESTS DURING FIRST EXAM OVER AGE 40 AND PERIODIC RE-EXAMS (OVER AGE 40):</b>   |
| • Chest x-ray (Required only during first exam over age 40)  |
| • Resting EKG  |
| • Assessment of coronary artery disease using Multiple-Risk-Factor Assessment <sup>1</sup> (age, lipid profile, blood pressure, diabetic screening, smoking) |
| Note: Exercise stress testing may be indicated based on Multiple-Risk-Factor Assessment <sup>1</sup>   |

**PHYSICIAN'S STATEMENT:**

I have evaluated the above mentioned individual according to the tests listed above. I have discussed with the patient any medical condition(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.

\_\_\_\_\_ 01 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)

\_\_\_\_\_ 02 Diver **IS NOT** medically qualified to dive: \_\_\_ Permanently \_\_\_ Temporarily

\_\_\_\_\_  
Printed Name

\_\_\_\_\_; MD or DO (\*)  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Address

\_\_\_\_\_  
Phone

\_\_\_\_\_  
E-Mail Address

My familiarity with applicant is: \_\_\_\_\_ This exam only \_\_\_\_\_ Regular physician for \_\_\_\_\_ years

My familiarity with diving medicine is: \_\_\_\_\_

**Appendix 2b**  
**AAUS Medical Evaluation Of Fitness For Scuba Diving Report**  
**APPLICANT'S RELEASE OF MEDICAL INFORMATION FORM**

I authorize the release of this information and all medical information subsequently acquired in association with my diving to the Dauphin Island Sea Lab Diving Safety Officer and Diving Control Board or their designee.

Name of Applicant: \_\_\_\_\_

Signature of Applicant \_\_\_\_\_ Date: \_\_\_\_\_

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**REFERENCES**

<sup>1</sup> Grundy, S.M., Pasternak, R., Greenland, P., Smith, S., and Fuster, V. 1999. Assessment of Cardiovascular Risk by Use of Multiple-Risk-Factor Assessment Equations. AHA/ACC Scientific Statement. *Journal of the American College of Cardiology*, 34: 1348-1359. <http://content.onlinejacc.org/cgi/content/short/34/4/1348>



### Appendix 3 Diving Medical History Form

(To Be Completed By Applicant-Diver)

Name \_\_\_\_\_ DOB \_\_\_\_ Age \_\_\_\_ Wt. \_\_\_\_ Ht. \_\_\_\_

Sponsor \_\_\_\_\_ Date \_\_\_\_/\_\_\_\_/\_\_\_\_  
(Dept./Project/Program/School, etc.) (Mo/Day/Yr)

**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.

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.

|    | 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, nervous stomachs or vomiting spells |          |
| 12 |     |    | Had a major operation                                       |          |
| 13 |     |    | Presently being treated by a physician                      |          |
| 14 |     |    | Taking any medication regularly (even non-prescription)     |          |
| 15 |     |    | Been rejected or restricted from sports                     |          |
| 16 |     |    | Headaches (frequent and severe)                             |          |
| 17 |     |    | Wear dental plates  |          |
| 18 |     |    | Wear glasses or contact lenses                              |          |
| 19 |     |    | Bleeding disorders  |          |
| 20 |     |    | Alcoholism  |          |
| 21 |     |    | Any problems related to diving                              |          |
| 22 |     |    | Nervous tension or emotional problems                       |          |

|    | Yes | No | Please indicate whether or not the following apply to you   | Comments |
|----|-----|----|---|----------|
| 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 |     |    | Frequent dizzy spells   |          |
| 33 |     |    | Hearing problems  |          |
| 34 |     |    | Trouble equalizing pressure in your ears  |          |
| 35 |     |    | Asthma  |          |
| 36 |     |    | Wheezing attacks  |          |
| 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 exposure to particular pollens or animals |          |
| 48 |     |    | Are you subject to bronchitis   |          |
| 49 |     |    | Subcutaneous emphysema (air under the skin)   |          |
| 50 |     |    | Air embolism after diving   |          |
| 51 |     |    | 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  |          |

|    | Yes | No | Please indicate whether or not the following apply to you                                      | Comments |
|----|-----|----|--|----------|
| 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 back injuries  |          |
| 66 |     |    | Ruptured or slipped disk   |          |
| 67 |     |    | Limiting physical handicaps  |          |
| 68 |     |    | Muscle cramps  |          |
| 69 |     |    | Varicose veins   |          |
| 70 |     |    | Amputations  |          |
| 71 |     |    | Head injury causing unconsciousness  |          |
| 72 |     |    | Paralysis  |          |
| 73 |     |    | Have you ever had an adverse reaction to medication?   |          |
| 74 |     |    | Do you smoke?  |          |
| 75 |     |    | Have you ever had any other medical problems not listed? If so, please list or describe below; |          |
| 76 |     |    | Is there a family history of high cholesterol?   |          |
| 77 |     |    | Is there a family history of heart disease or stroke?  |          |
| 78 |     |    | Is there a family history of diabetes?   |          |
| 79 |     |    | Is there a family history of asthma?   |          |
| 80 |     |    | Date of last tetanus shot?<br>Vaccination dates?   |          |

Please explain any "yes" answers to the above questions.

---



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I certify that the above answers and information represent an accurate and complete description of my medical history.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **Appendix 4**

### **Recommended Physicians With Expertise In Diving Medicine**

A List of Medical Doctors that have training and expertise in diving or undersea medicine can be found through the Undersea and Hyperbaric Medical Society or Divers Alert Network. See links below.

<https://www.uhms.org/resources/diving-medical-examiners-list.html>

<https://www.diversalertnetwork.org/medical/physicians.asp>

Local Clinics/Physicians:

– Jan. 2025 –

*Contact Diving Safety Officer for most up to date local medical providers.*

1. Name: Dr. Marla Lambert  
Address: 6701 Airport Boulevard, Suite A-10; Mobile AL 36608  
Phone: 251-633-8880
  
2. Name: Dr. Marcia Littles  
Address: 6701 Airport Boulevard; Mobile AL 36608  
Phone: 251-633-6332
  
3. Name: Dr. Greg Meekin  
Address: 1201 31<sup>st</sup> Ave.; Gulfport MS 39501  
Phone: 228-284-2177
  
4. Name: Dauphin Island Medical  
Address: 1008 Alabama Ave, Dauphin Island, AL 36528  
Phone: 251- 313-2115

## **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* - Supervision requirement for Surface Supplied diving mode. An individual designated by the OM DCB or designee with the experience or training necessary to direct and oversee surface supplied diving operations.

*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.

*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*.

*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.

*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.

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

*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.

*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 (*Organizational Member*) Diving Safety Manual, and has demonstrated competency in the indicated areas. (*Organizational Member*) 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

\_\_\_\_\_  
(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 \_\_\_\_\_                      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:

(work)

(home)

Address:

This is to verify that the above information is complete and correct

Diving Safety Officer:

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Print)

## **Appendix 7 Emergency Action Plan**

### **Introduction**

A diving accident victim could be any person who has been breathing compressed gas underwater regardless of depth. It is essential that emergency procedures are pre-planned and that medical treatment is initiated as soon as possible. It is the responsibility of DISL to develop procedures for diving emergencies including evacuation and medical treatment for each dive location.

### **General Procedures**

Depending on and according to the nature of the diving accident:

1. Make appropriate contact with victim or rescue as required.
2. Establish (A)irway (B)reathing (C)irculation or (C)irculation (A)irway (B)reathing as appropriate
3. Stabilize the victim
3. Administer 100% oxygen, if appropriate (in cases of Decompression Illness, or Near Drowning).
4. Call local Emergency Medical System (EMS) for transport to nearest medical treatment facility. Explain the circumstances of the dive incident to the evacuation teams, medics and physicians. Do not assume that they understand why 100% oxygen may be required for the diving accident victim or that recompression treatment may be necessary.
5. Notify DSO or designee according to the Emergency Action Plan of the DISL.
6. Complete and submit Incident Report Form ([www.aaus.org](http://www.aaus.org)) to the DCB of the organization and the AAUS (Section 2.70 Required Incident Reporting).

### **List of Emergency Contact Numbers Appropriate For Dive Location**

*For all emergencies, Dial 911*

- Dauphin Island Sea Lab – 251-861-2141
- Dauphin Island Fire and Rescue – 251-861-5523
- Dauphin Island Police Department – 251-861-5523
- Springhill Memorial Hospital – 251-344-9630
- Bay Memorial Hospital (Panama City, FL) – 850-769-1511
- US Coast Guard (New Orleans, LA) – 504-589-6225
- US Coast Guard (Group Mobile) – 251-441-6211
- Lifeflight – 855-562-4900
- Divers Alert Network (Emergency) – 919-684-9111
- Divers Alert Network (Information) – 919-684-2948
- West Jefferson Hospital (New Orleans, LA) – 504-347-5511
- West Jefferson Hyperbaric Unit (New Orleans, LA) – 504-349-6558

### **DISL Personnel to Notify of Accident**

- Christopher Rigaud, Diving Safety Officer- 207-949-2289
- John Valentine, Executive Director – 251-861-2141 x 2261
- Angela Levins, Public Relations Consultant – 251-861-2141 x 7509

### **Emergency Plan Content**

- Name, telephone number, and relationship of person to be contacted for each diver in the event of an emergency.
- Nearest operational recompression chamber.
- Nearest accessible hospital.
- Available means of transport.

## **Appendix 8**

### **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.
- Mixed Gas: Dives Where The Bottom Gas Used For The Dive Is A Combination Of Oxygen, Nitrogen, And Helium (Or Other Inert Gas), Or Any Other Breathing Gas Combination Not Classified As Air Or Nitrox.

##### 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.
- Rebreathers: Dives Where The Breathing Gas Is Repeatedly Recycled In A Breathing Loop. The Breathing Loop May Be Fully Closed Or Semi-Closed. Note: A Rebreather Dive Ending In An Open Circuit Bailout Is Still Logged As A Rebreather Dive.

#### Decompression Planning And Calculation Method:

- Dive Tables
- Dive Computer
- Pc Based Decompression Software

#### Depth Ranges:

Depth Ranges For Sorting Logged Dives Are: 0-30, 31-60, 61-100, 101-130, 131-150, 151-190, 191-250, 251-300, And 301->.

Depths Are In Feet Seawater (When Measured In Meters: 0-10, >10-30, >30-40, >40-45, >45-58, >58-76, >76-92, And >92->).

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: Openwater 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

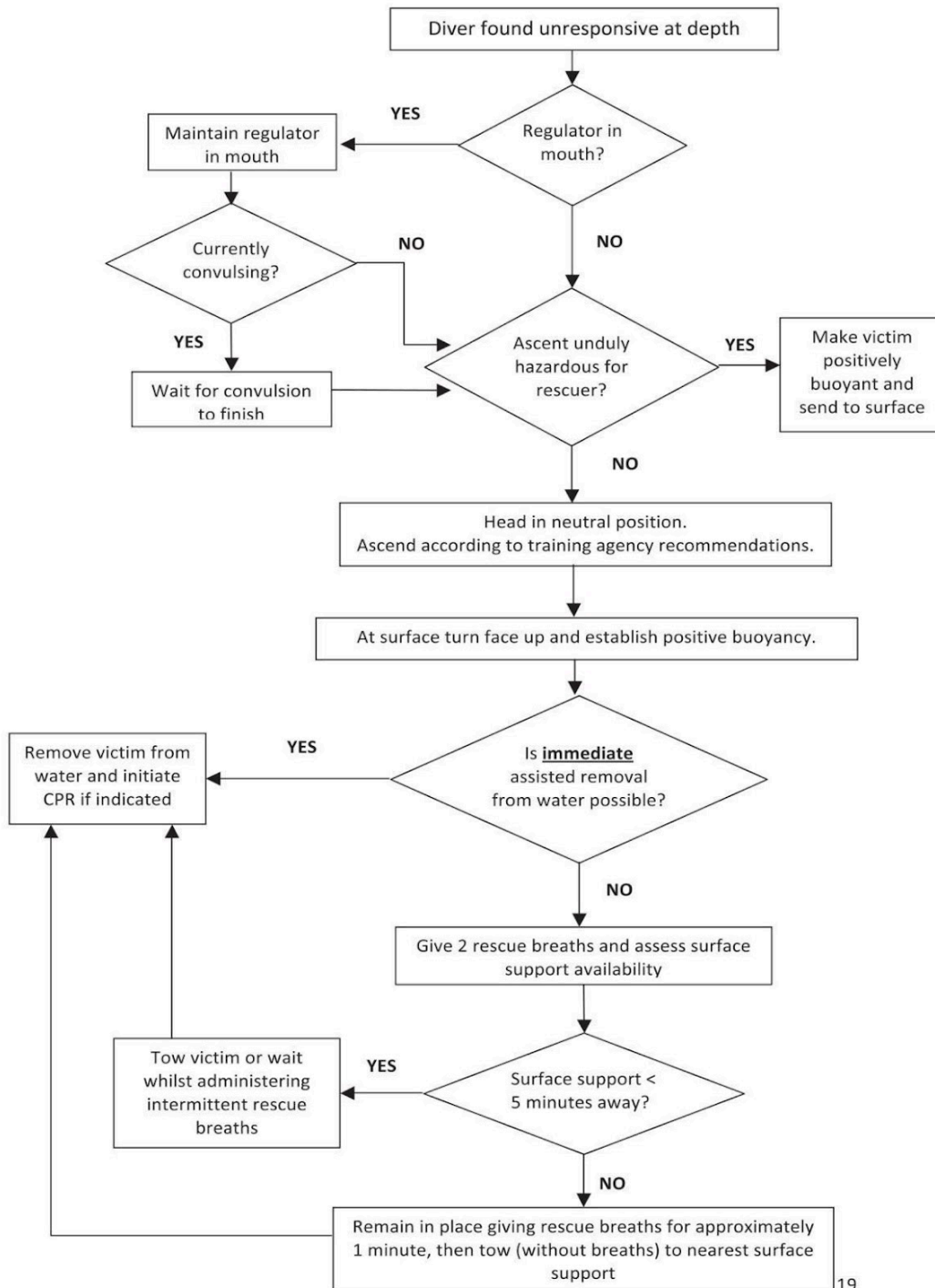
Incident Classification Rating Scale:

- Minor: Injuries That The Disl 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 Disl 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 Disl 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 9

### 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 10

### DISL Diver History And Application For Programmatic Participation

Use this checklist to track your progress in submitting application material for diver qualification.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

#### Application: (Appendix 10)

- \_\_\_\_\_ 1. Personal Data
- \_\_\_\_\_ 2. Training Data (include copy of C cards)
- \_\_\_\_\_ 3. Summary of Recent Experience (include log)
- \_\_\_\_\_ 4. Statement of Sponsorship
- \_\_\_\_\_ 5. Statement of Applicant (requires notarized signature)
- \_\_\_\_\_ 6. Waiver (requires notarized signature)
- \_\_\_\_\_ 7. Proof of Insurance (DAN)

#### Medical Exam & History

- \_\_\_\_\_ 8. Medical Evaluation Report (Appendix 2; must be signed by an MD or DO, not a PA)
- \_\_\_\_\_ 9. Diving Medical History Form (Appendix 3)

#### Physical Skills

- \_\_\_\_\_ 10. CPR (include copy of card)
- \_\_\_\_\_ 11. Ox Administration (include copy of card)
- \_\_\_\_\_ 12. First Aid (include copy of card)
- \_\_\_\_\_ 13. Field Neuro (include copy of card)
- \_\_\_\_\_ 14. Swim Test
- \_\_\_\_\_ 15. Pool Checkout
- \_\_\_\_\_ 16. Open Water Checkout

\_\_\_\_\_ Completed 100 hr course

\_\_\_\_\_ Gear Serviced

\_\_\_\_\_ Written Exam

\_\_\_\_\_ Diving Control Board Approval

**A. PERSONAL DATA**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Age: \_\_\_\_\_ Date of Birth: \_\_\_\_\_

Email \_\_\_\_\_

Phone: \_\_\_\_\_

In Emergency Notify: \_\_\_\_\_

Relationship: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Best Phone No.: \_\_\_\_\_

Alternate No.: \_\_\_\_\_

**B. TRAINING DATA**

Certifying Agency \_\_\_\_\_

Month/Year \_\_\_\_\_

Your Registry No. \_\_\_\_\_

Place Course Completed \_\_\_\_\_

Hours in Formal Course \_\_\_\_\_

Instructor \_\_\_\_\_

Course  Did,  Did not include open water ocean training. Please check one.

Please submit a copy of certification card.

**C. SUMMARY OF RECENT EXPERIENCE**

List the number of dives during the last two calendar years inclusive by depth range and general locality:

Last Year 20\_\_

Year Before Last 20\_\_

| Range  | # of Dives | Locality | Range  | # of Dives | Locality |
|--------|------------|----------|--------|------------|----------|
| 0-30   |            |          | 0-30   |            |          |
| 31-60  |            |          | 31-60  |            |          |
| 61-100 |            |          | 61-100 |            |          |
| 101+   |            |          | 101+   |            |          |



**D. STATEMENT OF SPONSORSHIP**

The above named applicant has my endorsement and support. I stipulate herein that the applicant has a requirement for programmatic participation in support of: a) Research or b) Service at the Dauphin Island Sea Lab.

I further understand that I may be asked to defray certain reasonable costs as a result of this applicant's participation in diving activities at the Dauphin Island Sea Lab.

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

**E. STATEMENT OF APPLICANT**

I, \_\_\_\_\_, hereby provide the foregoing information, which is true and complete to the best of my knowledge. I understand that my activities will be limited to those authorized by the policies and procedures published by the Dauphin Island Sea Lab. With this understanding, I apply for participation in the DISL Diving Program.

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Sworn and subscribed before me on this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

Notary Public: \_\_\_\_\_ (Seal)

My Commission Expires: \_\_\_\_\_

## **F. Waiver And Release Of Liability, Assumption Of Risk And Indemnity Agreement**

### **Marine Environmental Sciences Consortium – Dauphin Island Sea Lab**

I acknowledge that I am a student diver under the supervision and control of a certified dive professional and I am voluntarily asking permission to engage in compressed air diving (including SCUBA and Hookah) as a scientific diver or student diver under the standards for *Scientific Diving Certification and Operation of Scientific Diving Programs* of the American Academy of Underwater Sciences (AAUS). I agree that the diving activities I conduct based on the certification and/or training provided to me by the Marine Environmental Sciences Consortium – Dauphin Island Sea Lab be conducted in accordance with the above-referenced AAUS standards and all applicable rules of the Diving Control Board of the Marine Environmental Sciences Consortium – Dauphin Island Sea Lab.

I acknowledge that in the event such certification and/or training is provided, it will be granted to me as a voluntary diver. I further acknowledge and affirm that I am not required to participate in any specific diving activity; nevertheless, mindful of the risks inherent with diving, I hereby affirm my desire to participate in such diving activities and assume all of the risks incidental thereto in order to secure valuable training and other benefits of scientific diving. I further agree that it is my sole responsibility to determine whether I am sufficiently healthy to participate in SCUBA diving or other diving-related activities.

I understand that diving with compressed air, oxygen-enriched air (Nitrox) and Trimix supplied by standard open circuit SCUBA or with semi-closed circuit or closed circuit rebreathers, involves certain inherent risks including, but not limited to air expansion injuries, drowning, decompression sickness, embolism, oxygen toxicity, inert gas narcosis, hypoxia, hypercapnia or other barotrauma or hyperbaric injuries, and marine life injuries. Such injuries can occur that require treatment in a recompression chamber or medical facility. I further understand that the area chosen for these diving activities may be remote and isolated by time and distance from any recompression chamber or any medical facility. I choose to proceed with such dives in spite of the absence of a recompression chamber or any medical facility in proximity to the dive site. I also acknowledge the existence of hazards of SCUBA diving to include those hazards occurring during boat travel to and from the dive site including, but not limited to slipping or falling while on board, being cut or struck by a boat while in the water, injuries occurring while getting on or off the boat or other vessel, and other perils of the sea.

I understand and acknowledge that SCUBA diving and related activities are inherently dangerous and may include extreme tests of physical and mental limits. I understand that participation includes risks and dangers which include, without limitation, the potential for serious bodily injury, permanent disability, paralysis and death; loss or damage to property; exposure to extreme conditions and circumstances; accidents, illness, dangers arising from adverse weather conditions; equipment failure; inadequate safety measures, participants of varying skill levels; situations beyond the immediate control of the organizers or sponsors; other undefined harm or damage which may not be readily foreseeable; and other presently unknown risks and dangers (hereinafter “risks”). I understand that these risks may be caused in whole or in part by my own actions or inactions, the actions or inactions of other participants, or the acts, inactions or negligence of the Released Parties defined below, and I hereby expressly assume all such risks and responsibility for any damages, liabilities, losses or expenses which I incur as a result of my participation. I am aware that these activities are hazardous activities and that I could be

seriously injured or even killed. I am voluntarily participating in these activities with knowledge of the danger involved, and agree to assume any and all possibility of bodily injury, death or property damage, due to the risks whether the risks are known or unknown.

I understand that SCUBA diving activities may place me deeper underwater than I am able to safely execute a free ascent to the surface without breathing gas. I understand that diving activities are physically and mentally strenuous and that I will be exerting myself during this activity and that if I am injured as a result of heart attack, panic, hyperventilation, oxygen toxicity, inert gas narcosis, drowning, etc. that I expressly assume the risk of said injuries and will not hold the Marine Environmental Sciences Consortium – Dauphin Island Sea Lab or any of its consortium members, trustees, agents, officers or employees responsible for the same, and I agree to defend, indemnify, and hold harmless those parties for any such injuries incurred by me.

I hereby authorize any licensed physician, emergency medical technician, nurse, first aid provider, hospital or other medical or healthcare facility (hereafter “Medical Provider”) to treat any injuries I receive as a result of or relating to SCUBA diving or other diving-related activities. I authorize such Medical Provider to perform all procedures deemed advisable by the Medical Provider in attempting to treat any such injuries. I realize that there is a possibility of complications of anesthesia, hyperbaric medicine, and other medical procedures deemed advisable by the Medical Provider during such treatment and I assume any such risk for and on behalf of myself. I acknowledge that no warranty is being made as to the results of any medical treatment and that I will be responsible for the payment of all fees, charges and other monetary items related to such treatment and/or care. I further acknowledge that the Released Parties herein are not responsible for my medical needs and that the Released Parties have no responsibility for payment of any medical expenses incurred on my behalf.

**IN CONSIDERATION OF THE CERTIFICATION AND/OR TRAINING PROVIDED THROUGH THE DIVING CONTROL BOARD OF THE MARINE ENVIRONMENTAL SCIENCES CONSORTIUM – DAUPHIN ISLAND SEA LAB, I HEREBY COVENANT AND AGREE, FOR AND ON BEHALF OF MYSELF, MY HEIRS AND PERSONAL REPRESENTATIVES, THAT I DO HEREBY RELEASE, WAIVE AND COVENANT NOT TO SUE AND FURTHER AGREE TO INDEMNIFY, DEFEND AND HOLD HARMLESS THE MARINE ENVIRONMENTAL SCIENCES CONSORTIUM – DAUPHIN ISLAND SEA LAB, AND ALL OF ITS MEMBERS, TRUSTEES, AGENTS, OFFICERS, DIRECTORS, EMPLOYEES, CONTRACTORS, AND VOLUNTEERS (HEREAFTER “RELEASED PARTIES”) WITH RESPECT TO ANY LIABILITY, INJURIES (INCLUDING DEATH), ACTIONS, CAUSES OF ACTION, CLAIMS, DAMAGES, DEMANDS, SUITS, COSTS, LOSS OR EXPENSE (INCLUDING COURT COSTS AND ATTORNEY FEES) OF ANY KIND AND NATURE WHATSOEVER THAT MAY ARISE OUT OF, RESULT FROM OR RELATE TO SCUBA DIVING AND DIVING-RELATED ACTIVITIES, SPECIFICALLY INCLUDING ANY CLAIMS FOR LIABILITY CAUSED IN WHOLE OR IN PART BY THE ALLEGED NEGLIGENCE OF THE RELEASED PARTIES. THIS AGREEMENT EXTENDS TO ALL ACTS OF NEGLIGENCE AND OTHER TORTIOUS ACTS OR OMISSIONS OF THE RELEASED PARTIES, WITH THE EXCEPTION OF INTENTIONAL TORTS, AND IS INTENDED TO BE INTERPRETED AS BROAD AND PROTECTIVE OF THE RELEASED PARTIES AS IS PERMITTED BY THE LAWS OF THE STATE OF ALABAMA. THIS AGREEMENT IS INTENDED TO BE A COMPLETE AND UNCONDITIONAL RELEASE OF ALL LIABILITY OF THE RELEASED PARTIES TO THE GREATEST EXTENT ALLOWED BY LAW.**

I understand and agree that this agreement shall be governed by and construed in accordance with the laws of the State of Alabama. I hereby further consent and agree to the personal jurisdiction of all Courts in the State of Alabama and agree that any dispute or lawsuit arising out of this agreement or in any way related to the diving activities contemplated by this agreement, shall be filed and litigated in state or federal court in Mobile County, Alabama.

This agreement represents the complete understanding between myself and the released parties regarding these issues and no oral representations, statements or inducements have been made apart from this agreement. If any provision of this agreement is held to be unlawful, void or for any reason unenforceable, then that provision shall be deemed severable from this agreement and shall not affect the validity and enforceability of any of the remaining provisions contained herein.

I hereby confirm that I have read this agreement or have had someone read it to me; I understand the terms and conditions of this agreement, that no one has made any representations to me except as may be stated herein, and that I execute this document as my own free act and deed.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Full Name

Affirmed and subscribed before me this the \_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Notary Public: \_\_\_\_\_

(Seal)

Date Commission Expires: \_\_\_\_\_

**Appendix 11**  
**DISL Scientific Diving Plan**

*– Jan. 2025 –*  
*Contact Diving Safety Officer for*  
*Dive Plan Template and Procedures*