Special Publication No. 12-16

Dive Safety Manual

Approved by

Kyle Hebert—ADF&G Statewide Dive Safety Officer

November 2012

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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ALASKA DEPARTMENT OF FISH AND GAME

DIVE SAFETY MANUAL

November 2012

Approved on behalf of the Dive Safety Board by:

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Kyle Hebert
ADF&G Dive Safety Officer

November 1, 2012

Effective Date

FOREWORD

This is the fifth edition of the Alaska Department of Fish and Game's (ADF&G) Dive Safety Manual. The first edition was written by ADF&G staff Dave Barto and Gary Liepitz and was adopted in January of 1992. The second edition (effective April 1997) was written to resolve many outstanding issues regarding training, equipment, reciprocity and safe dive practices that had been identified by ADF&G staff over the previous several years. The April 1997 edition, as well as revised editions published in 2002 and 2006, and this current edition, draw heavily upon three sources: the American Academy of Underwater Science (AAUS) Standards for Scientific Diving Certification and Operation of Scientific Diving Program, the Manual for Diving Safety of the University of California, San Diego, and the first edition of the Alaska Department of Fish and Game Dive Safety Manual. The ADF&G Dive Safety Board adopted this manual by consensus on December 8, 2011, following a process of review, discussion, and editing during its annual meeting.

This manual is divided into two main chapters, each specific to the Department's diving missions and subsequent governing regulations as defined by the federal Occupational Safety and Health Administration (OSHA) regulations 29 CFR Ch. CVII.

Chapter I: Scientific Diving Standards (OSHA scientific exemption)

Chapter II: Non-Scientific Diving Standards (Non-exempt OSHA regulations)

DEFINING ADF&G AUSPICES

For the purposes of the following standards, the auspices of the ADF&G includes all diving operations in which the department is connected, as a result of ownership of any equipment used, locations selected, or relationship with the individual(s) concerned, unless diving with reciprocity under a host organization as per Appendix H. This is not limited to scientific operations, and will include any non-scientific, proficiency or personal diving activities that are associated with department business. It does include all cases involving the operations of employees of the ADF&G or employees of auxiliary organizations, as follows: such employees are acting within the scope of their employment; the operations of other persons are engaged in scientific diving for ADF&G; or, are diving as members of an organization recognized by ADF&G. The Commissioner of the Alaska Department of Fish and Game has the ultimate authority and responsibility for the conduct of the department's diving program. The Dive Safety Board (DSB) is responsible for monitoring of the diving program, interpreting policy, and developing additional policies or rules as needed to assure compliance with all applicable statutes and regulations. The administration of the diving program will reside with the ADF&G Dive Safety Board.

ABSTRACT

The Alaska Department of Fish and Game conducts several dive projects throughout the state that require the use of scuba. Dive projects may involve work in marine and freshwater environments and may require scientific or non-scientific diving. Scientific dive projects usually consist of observation or collecting biological and habitat data for commercially important fish or invertebrate populations. This type of diving often requires only the use of measuring tools, collection bags, and means to write or record data underwater. The department's scientific diving program qualifies for a scientific exemption of commercial diving regulations administered under the federal Occupational Safety and Health Administration. The department also conducts non-scientific dive projects that do not qualify for scientific exemption. These projects may include installation and maintenance of fish weirs that cross streams and rivers. Although fish weirs are designed to allow collection of biological data for salmon and other freshwater and anadromous fish, the installation and maintenance of these structures requires underwater work that goes beyond the definition of scientific diving. Another non-scientific diving category the department recognizes is ship husbandry, or diving beneath and around department vessels to observe and inspect hulls and equipment not visible from above the water surface. All dive projects conducted by the department fall under the authority of the Dive Safety Board, which is the governing body that maintains this document, establishes the department's dive safety policy, reviews all dive projects for safety considerations, and approves all dive-related training and equipment.

Key words: diving, standards, biological data, Dive Safety Board, scientific exemption, fish, weir, scuba

CHAPTER I: SCIENTIFIC DIVING STANDARDS (OSHA SCIENTIFIC EXEMPTION)

SECTION 1— GENERAL POLICY AND SCIENTIFIC DIVING STANDARDS

1.10 PURPOSE

The purpose of these Scientific Diving Standards is to ensure that all scientific diving under Alaska Department of Fish and Game (ADF&G) auspices is conducted in a manner that will maximize protection of scientific divers from accidental injury and/or illness, and to set forth standards for training and certification which will allow a working reciprocity between other agencies or academic institutions engaged in scientific research. Fulfillment of the purposes shall be consistent with the furtherance of research and safety. All ADF&G divers should submit any comments and suggestions concerning the ADF&G diving program through their Local Dive Safety Officer (LDSO), to the ADF&G Dive Safety Board, for consideration during the annual Dive Safety Board meeting. The regulations herein shall be observed at all locations where scientific diving is conducted.

1.11 Scientific Diving Definition

Scientific diving is defined (29 CFR 1910.402) 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.

1.12 Scientific Diving Exemption

OSHA has granted an exemption for scientific diving from commercial diving regulations under the guidelines (29 CFR, Appendix B to Subpart T) listed below.

1.12.1 The Dive Safety Board consists of a majority of active scientific divers and has autonomous and absolute authority over the scientific diving program's operation.

1.12.2 The purpose of the project using scientific diving is the advancement of science; therefore, information and data resulting from the project are non-proprietary.

1.12.3 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.

1.12.4 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.

1.12.5 In addition, the scientific diving program shall contain at least the following elements:

1.12.5.1 Dive Safety Manual (DSM) which includes at a minimum: Procedures covering all diving operations specific to the program; including procedures for emergency care, recompression and evacuation; and the criteria for diver training and certification.

1.12.5.2 Dive Safety Board, with the majority of its members being active scientific divers, which shall at a minimum have the authority to: approve and monitor diving projects, review and revise the dive safety manual, assure compliance with the manual (Section 1.30), 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.

1.13 Review of Standards

An annual review of ADF&G diving activities shall be completed by the Dive Safety Board. Any recommendations for modifications of the standards shall be submitted to the Dive Safety Board for consideration through an LDSO.

1.20 OPERATIONAL CONTROL

1.21 ADF&G Scientific Diving Standards and Dive Safety Manual

ADF&G shall develop and maintain a scientific Dive Safety Manual (DSM), which provides for the development and implementation of policies and procedures that will enable the department to meet requirements of local environments and conditions as well as to comply with the American Academy of Underwater Science (AAUS) scientific diving standards. ADF&G scientific diving standards shall include, but are not be limited to:

1.21.1 The AAUS Standards are used as a set of minimal guidelines for the development of the scientific sections of the ADF&G Dive Safety Manual.

1.21.2 Emergency evacuation and medical treatment procedures.

1.21.3 The criteria for diver training and certification.

1.21.4 Standards written or adopted by reference for each diving mode utilized which include the following:

1.21.4.1 Safety procedures for the diving operation.

1.21.4.2 Responsibilities of the dive team members.

1.21.4.3 Equipment use and maintenance procedures.

1.21.4.4 Emergency procedures.

Many of the relevant forms, guidelines, and resources used by department divers and the Dive Safety Board are listed in Appendices A through S.

1.22 The Dive Safety Officer

The Dive Safety Officer (DSO) serves as a member of the Dive Safety Board. This person should have broad technical and scientific expertise in research related diving.

1.22.1 Qualifications

1.22.1.1 The DSO shall be appointed by the Commissioner with the advice and counsel of the Dive Safety Board.

1.22.1.2 Shall be a qualified scientific diver.

1.22.1.3 Shall be certified as a scuba diving instructor, a certified Dive Master, or have equivalent diving supervisory experience.

1.22.2 Duties and Responsibilities

1.22.2.1 The DSO is responsible, through the Dive Safety Board, to the Commissioner or his or her designee, for the conduct of all scientific diving under department

auspices. The routine operational authority for this program, including the conduct of training and certification, approval of dive plans, maintenance of dive records, ensuring compliance with this Manual, and all relevant regulations of the State, rests with the DSO.

1.22.2.2 May delegate portions of this program to a LDSO or Dive Safety Board member, although the DSO may not delegate responsibility for the safe conduct of ADF&G's dive program.

1.22.2.3 The DSO shall be guided in the performance of the required duties by the advice of the Dive Safety Board, but the DSO will retain operational responsibility for the conduct of the scientific diving program.

1.22.2.4 The DSO shall suspend any diving activity that in his or her judgment is unsafe or unwise. The DSO must also immediately notify the LDSO, Dive Safety Board and responsible department regional supervisor of such action. The Dive Safety Board may recommend resumption of such action by majority vote. Such actions shall be thoroughly documented.

1.23 The Dive Safety Board

1.23.1 ADF&G shall establish and maintain a Dive Safety Board. The Dive Safety Board shall consist of a majority of active scientific divers. Voting members shall include the Dive Safety Officer who shall serve as the Commissioner's designee and chair of the Dive Safety Board. The Dive Safety Board will be composed of representatives of the diving program such as qualified department scientific divers who meet the standards set forth in this Manual, and those scientific divers who are assigned the duty of LDSO by their respective Division Directors.

The Dive Safety Board,

1.23.2 Has autonomous and absolute authority over the operation of scientific and non-scientific diving programs.

1.23.3 Shall approve and monitor diving projects annually.

1.23.4 Shall review and revise the Dive Safety Manual.

1.23.5 Shall assure compliance with the Dive Safety Manual.

1.23.6 Shall certify the depths to which a diver has been trained and authorized to dive.

1.23.7 Shall take disciplinary action for unsafe practices.

1.23.8 Shall assure adherence to the buddy system for scuba diving.

1.23.9 Is responsible to the Commissioner through the DSO. The Dive Safety Board shall act as an ADF&G representative in matters concerning ADF&G's dive program.

1.23.10 Shall act as a board of appeal to consider diver-related problems.

1.23.11 Shall issue, reissue, or revoke diving certifications.

1.23.12 Shall issue changes in policy and amendments to ADF&G's Dive Safety Manual, as needed.

1.23.13 Shall establish and/or approve training programs through which the applicants for certification can satisfy the requirements of this Manual.

1.23.14 Shall suspend diving programs which it considers to be unsafe or unwise and immediately notify the appropriate regional supervisor.

1.23.15 Shall establish criteria for equipment selection and use.

1.23.16 Shall consult with Local Dive Safety Officers regarding new equipment or techniques.

1.23.17 Shall establish and/or approve facilities for the inspection and maintenance of diving and associated equipment.

1.23.18 Shall ensure that air station(s) used by ADF&G meet air quality standards as described in Sec. 3.60 of this manual.

1.23.19 Shall periodically review the Dive Safety Officer's performance and program.

1.23.20 Shall sit as a board of investigation to inquire into the nature and cause of diving accidents or violations of ADF&G's diving manual.

1.24 Local Dive Safety Officer(s)

ADF&G operates a very diverse scientific program over an extremely large geographic area. To effectively implement ADF&G's mission, it is organized by Division (Commercial Fisheries, Sport Fisheries, Habitat and Restoration and Wildlife Conservation) and then by Region (three or four depending upon division). To assure effective implementation of this dive safety manual, a Local Dive Safety Officer (LDSO) shall be appointed at either the Division or Regional level, depending upon the scope of diving programs in the respective Divisions, with the advice and counsel of the DSO. Each Division that undertakes diving shall have an LDSO unless specific arrangements are made for another division, region or the DSO, to assume the responsibility for an LDSO for a specific organizational unit of ADF&G. Divisions may be charged through a reimbursable services agreement (RSA) for the services of a LDSO or DSO.

1.24.1 LDSOs shall be authorized department divers, and either an underwater instructor from a nationally recognized certifying organization, a certified Dive Master (see Sec. 1.27), or have other dive supervisory experience as approved by the DSB.

1.24.2 Under the supervision of the Dive Safety Board, the LDSO is responsible for the following activities in a Division or region:

1.24.2.1 Certify when candidate divers have met the requirements of certification set out in this Manual.

1.24.2.2 Review and recommend approval or disapproval of dive plans submitted to the Dive Safety Board.

1.24.2.3 Supervise the maintenance of records necessary to ensure compliance with this Manual.

1.24.2.4 Suspend any diving activity that in his or her judgment is unsafe or unwise. He or she must immediately notify the DSO, and responsible department regional supervisor or divisional director, of such action.

1.24.2.5 Develop training requirements for review and approval of the Dive Safety Board to tailor or supplement ADF&G's Diver Certification requirements that fulfill needs particular to the activities in a division or region.

1.25 Instructional Personnel

1.25.1 Qualifications

All personnel involved in diving instruction under department auspices shall be qualified for the type of instruction being given.

1.25.2 Selection

The DSO or LDSO, who may solicit the advice of the Dive Safety Board, will select instructional personnel. The Dive Safety Board will accept as proof of qualification a current certification to teach that subject from a nationally recognized training organization. The Dive Safety Board may allow training by other individuals who can demonstrate competence and experience in a particular subject area.

1.26 Dive Master or Lead Diver

All dive operations under department auspices will be under the control of a dive master, or if allowed by the Dive Safety Board, a lead diver. The dive master or lead diver is responsible at that location and time for coordinating, briefing and planning as outlined in this section unless exempted by the Dive Safety Board. The Dive Master or Lead Diver shall be responsible for,

1.26.1 Coordination with other known activities in the vicinity that are likely to interfere with diving operations.

1.26.2 Ensuring all dive team members possess current certification, and are qualified for the type of diving operation.

1.26.3 Planning dives in accordance with Section 2.21.

1.26.4 Ensuring safety and emergency equipment is in working order and at the dive site.

1.26.5 Briefing the dive team members on:

1.26.5.1 Dive objectives.

1.26.5.2 Unusual hazards or environmental conditions likely to affect the safety of the diving operation.

1.26.5.3 Modifications to diving or emergency procedures necessitated by the specific diving operation.

1.26.6 Suspending diving operations if in his or her opinion, conditions are not safe.

1.26.7 Reporting to the LDSO, DSO and Dive Safety Board any physical problems or adverse physiological effects including symptoms of pressure-related injuries.

1.26.8 Shall be qualified to assist, as required, in the training of department employees participating in their field practicum (Sec. 5.33) necessary to gain certification as a scientific diver.

1.27 Reciprocity and Visiting Scientific Diver

1.27.1 Two or more organizations engaged jointly in diving activities, or engaged jointly in the use of diving resources, shall designate one of the participating Diving Control Boards (or Dive Safety Boards) to govern the joint dive project.

1.27.2 A scientific diver from one organization shall apply for permission to dive under the auspices of another organization by submitting to the Dive Safety Officer of the host organization a document containing all the information described in Appendix H (letter of reciprocity) signed by the Dive Safety Officer or Chairperson of the home Dive Safety Board.

1.27.3 A visiting scientific diver may be asked to demonstrate his or her knowledge and skills for the planned diving. An example of items to be demonstrated is presented in Appendix I (checkout dive).

1.27.4 If a host organization denies a visiting scientific diver permission to dive, the host Dive Safety Board shall notify the visiting scientific diver and his or her Dive Safety Board with an explanation of all reasons for the denial.

1.27.5 The Dive Safety Board may develop reciprocity agreements with organizations after review of that organization's Dive Safety Manual, appropriate Standard Operating Procedures, or Diving Rules.

1.27.6 The Dive Safety Board may grant a waiver for specific requirements of training, examinations, depth certification, and minimum activity to maintain certification.

1.30 Consequences Of Violation Of Regulations By Divers

Failure to comply with the provisions of this manual may be cause for revocation or restriction of a diver's certificate by the Dive Safety Board, DSO, LDSO, Regional Supervisor or Director, and may result in disciplinary action by the employee's supervisor.

1.40 Consequences Of Violation Of Regulations By ADF&G

ADF&G shall maintain compliance with OSHA scientific diving standards. Failure to comply with ADF&G regulations and standards may be cause for the revocation or restriction of ADF&G's scientific diving status.

1.50 Record Maintenance

The DSO and LDSO shall maintain a permanent record for each department diver. The file shall include evidence of certification level, log sheets, results of physical examinations, any waivers that may have been granted, reports of disciplinary actions by the Dive Safety Board for failure to comply with provision of this Manual, accident or injury reports related to diving, evidence of all dive training attempted or accomplished by the diver, and other pertinent information deemed necessary.

1.50.1 Availability of Records:

1.50.1.1 All medical records retained by ADF&G for a current or former divers shall be made available to an attending physician if the diver has granted her/his consent in writing. It is department policy to encourage all employees to grant such consent at the time of certification.

1.50.1.2 Records and documents required by this standard shall be retained by ADF&G for the following period:

1.50.1.2.1 All records shall be retained for the duration of an individual's employment with ADF&G and for a minimum of five years following termination of employment.

1.50.1.2.2 Dive Safety Manual - current document only.

1.50.1.2.3 Equipment inspection and testing records are to be retained by each project leaders until equipment is withdrawn from service.

1.50.1.3 The DSO and members of the Dive Safety Board shall have access to the files of each diver. The employee, the employee's supervisor and others in the employee's chain of command shall be allowed access to the employee's file.

SECTION 2—DIVING REGULATIONS FOR SCUBA (OPEN CIRCUIT, COMPRESSED AIR)

2.10 INTRODUCTION

No person shall engage in scientific diving operations under ADF&G auspices unless he or she holds a current certification issued pursuant to the provisions of this manual.

2.20 PRE-DIVE PROCEDURES

2.21 Dive Plans

All diving under department auspices shall be in accordance with a dive plan that has been approved by the Dive Safety Board. Dives will be planned around the competency of the least experienced diver. Dive plans shall consider and include the following information:

2.21.1 Divers' qualifications, and the type of certificate or certification held by each diver;

2.21.2 Emergency plan (see Appendix K) with,

2.21.2.1 Name, telephone number, and relationship of person to be contacted for each diver in the event of an emergency,

2.21.2.2 Nearest operational recompression chamber,

2.21.2.3 Nearest accessible hospital,

2.21.2.4 Available means of transport;

2.21.3 Approximate number of proposed dives;

2.21.4 Location(s) of proposed dives;

2.21.5 Estimated depth(s) and bottom time(s) anticipated;

2.21.6 Decompression status and repetitive dive plans, if required;

2.21.7 Proposed work, equipment, and boats to be employed;

2.21.8 Any hazardous conditions anticipated.

2.22 Pre-dive Safety Checks

2.22.1 Diver's Responsibilities

2.22.1.1 Each scientific diver shall conduct a functional check of his or her diving equipment in the presence of the diving buddy or tender.

2.22.1.2 It is the diver's responsibility and duty to refuse to dive if, in the diver's judgment, conditions are unfavorable, or if he or she would be violating the precepts of this manual, or of his or her training.

2.22.1.3 No dive team member shall be required to be exposed to hyperbaric conditions against his or her will, except when necessary to prevent or treat a pressure-related injury.

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

2.22.2 Equipment Evaluations

2.22.2.1 Each diver shall insure that his or her equipment is in proper working order and that the equipment is suitable for the type of diving operation.

2.22.2.2 Each diver shall wear a device for maintaining positive buoyancy and check it regularly (variable volume dry suits do not qualify as such a device).

2.22.3 Site Evaluation

The environmental conditions at the site will be evaluated.

2.30 DIVING PROCEDURES

2.31 Solo Diving Prohibition

All scientific diving activities shall assure adherence to the buddy system (two comparably equipped scuba divers in the water in constant communication) for scuba diving. This buddy system is based upon mutual assistance, especially in the case of an emergency. If effective communication is lost, all divers shall surface and remain there until contact is reestablished. Solo scientific diving is prohibited under the OSHA scientific exemption.

2.32 Refusal to Dive

2.32.1 The decision to dive is that of the diver. A diver may refuse to dive, without fear of penalty, whenever he or she feels it is unsafe for them to make the dive (see Sec. 2.22.1.2). Other dive team members shall support a decision not to dive made by a member of their team.

2.32.2 Safety—The ultimate responsibility for safety rests with the individual diver. It is the diver's responsibility and duty to refuse to dive if, in the diver’s judgment, conditions are unsafe or unfavorable, or if he or she would be violating the precepts of his or her training, or the regulations documented in this manual.

2.33 Termination of the Dive

2.33.1 It is the responsibility of the diver to terminate the dive, without fear of penalty, whenever he or she feels it is unsafe to continue the dive, unless such a decision compromises the safety of another diver already in the water (see Sec. 2.22.1.2).

2.33.2 The dive shall 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; within a buddy group, the lowest amount of tank pressure remaining in any individual tank is a minimum of 500 psig.

2.34 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 which is likely to cause death, serious physical harm, or major environmental damage. A written report of such actions must be submitted to the Dive Safety Board explaining the circumstances and justifications.

2.40 POST-DIVE PROCEDURES

2.41 Post-Dive Safety Checks

2.41.1 After the completion of a dive, each diver shall report any physical problems, symptoms of decompression sickness, or equipment malfunctions to the diver in charge of operations.

2.41.2 Divers shall remain awake for at least one hour after diving, and remain in the company of a dive team member, who is prepared to transport the diver in question to a hyperbaric chamber, if necessary.

2.50 EMERGENCY PROCEDURES

ADF&G will develop emergency procedures and must include procedures for emergency care, recompression and evacuation for each dive location (See Appendix K). Application and implementation of these emergency procedures shall be addressed with each dive plan.

2.60 FLYING AFTER DIVING AND ALTITUDE DIVING

2.61 Flying After Diving

Divers shall spend a minimum surface interval of 12 hours (24 hours recommended) before ascending to 8,000 or more feet in altitude (i.e. commercial airline); below this altitude, a diver shall under no circumstances exceed NOAA regulations, as described in NOAA Diving Manual 2001, Fourth Edition. See Appendix S for additional information.

2.62 Altitude Diving

Any dive conducted at greater than 1,000 feet above sea level must be in compliance with procedures described in Section 4.5 of the NOAA Dive Manual 2001, Fourth Edition.

2.70 RECORD KEEPING AND REQUIREMENTS

2.71 Personal Diving Log

Each certified scientific diver shall maintain a log of every dive made under department auspices, and is encouraged to log all other dives. An individual's dive log synopsis must be submitted annually to the LDSO. Dive logs shall be based on a calendar year. Access to the logbook data is authorized for the DSO, LDSO(s), and other department employees who have a legitimate need to review these records. These records represent the official department copy of dive logs and are part of each diver's permanent record. Minimum information required in the individual's submitted diving log shall include at least the following:

2.71.1 Name of diver;

2.71.2 Total time (in minutes) and total number of dives per project;

2.71.3 Purpose and general nature of diving activities (e.g. what project are you working on, herring, sea cucumber, sea urchins, sea lion capture, weir installation and maintenance);

2.71.4 Detailed report of any near or actual incidents;

2.71.5 Summary diving statistics shall be forwarded from each LDSO, to the DSO, for inclusion into each diver's permanent file.

2.72 Required Incident Reporting

All diving incidents requiring recompression treatment, or resulting in moderate or serious injury, or death shall be reported to the employee's supervisor, the DSO, and the LDSO. The DSO or LDSO and the employee's supervisor shall investigate and document such an incident. The report will specify the circumstances of the incident and the extent of any injuries or illnesses. Additional information must meet the following reporting requirements.

2.72.1 Such a report will include a current State of Alaska Accident/ Injury Report form, a description of symptoms (including log book data and time of onset), and results of any treatment. The report shall be filed in the permanent records of the DSO and a copy forwarded to other appropriate state agencies. A copy will be filed in accordance with standard State of Alaska accident/injury reporting required by the Department of Labor.

2.72.2 If pressure-related injuries are suspected, or if symptoms are evident, the following additional information shall be recorded and retained by ADF&G, with the record of the dive:

2.72.2.1 Complete Incident Report Form (Appendix L).

2.72.2.2 Written descriptive report to include the following:

2.72.2.2.1 Name, address, phone numbers of the principal parties involved;

2.72.2.2.2 Summary of experience of divers involved;

2.72.2.2.3 Location, description of dive site and description of conditions that led up to incident;

2.72.2.2.4 Description of symptoms, including depth and time of onset;

2.72.2.2.5 Description and results of treatment;

2.72.2.2.6 Disposition of case;

2.72.2.2.7 Recommendations to avoid repetition of incident.

2.72.3 The Dive Safety Board shall investigate and document any incident of significant dive related injury.

SECTION 3—DIVING EQUIPMENT

3.10 GENERAL POLICY

3.10.1 Only department certified divers, divers in training, or divers defined under Section 1.27, shall be issued, or use ADF&G owned equipment. All equipment shall meet standards as determined by the DSO and the Dive Safety Board. Equipment that is subjected to extreme usage under adverse conditions should require more frequent testing and maintenance.

3.10.2 All equipment shall be regularly examined by the person using them.

3.10.3 Considering that many department dive operations are on-going in nature, and that many department employees often rotate through the duty for such operations within a region or division, and considering that the margin of safety is increased when divers are fully familiar with the specific equipment used by their diver buddy, it is a goal for each project diver to be similarly equipped. Each LDSO shall have responsibility for reviewing and approving dive equipment for dive projects under their oversight.

3.20 EQUIPMENT

3.21 Regulators

3.21.1 Approval.

Only those makes and models approved by the LDSO, in consultation with the Dive Safety Board shall be used.

3.21.2 Inspection and testing.

Scuba regulators shall be inspected and tested prior to first use and a minimum of every twelve months thereafter by a factory authorized technician.

3.21.3 Regulators will consist of a primary second stage and an alternate air source (such as an octopus second stage, BC mounted second stage, or redundant air supply).

3.22 Breathing Masks and Helmets

Breathing masks and helmets shall have the following:

3.22.1 A non-return valve at the attachment point between helmet or mask hose, which shall close readily and positively;

3.22.2 An exhaust valve;

3.22.3 A minimum ventilation rate capable of maintaining the diver at the depth to which he or she is diving.

3.23 Scuba Cylinders

3.23.1 Scuba cylinders shall be designed, constructed, and maintained in accordance with the applicable provisions of the Unfired Pressure Vessel Safety Orders.

3.23.2 Scuba cylinders must be hydrostatically tested in accordance with DOT standards.

3.23.3 Scuba cylinders must have an internal inspection at intervals not to exceed twelve months and must have a verifying, dated sticker attached to each tank.

3.23.4 Scuba cylinder valves shall be functionally tested at intervals not to exceed twelve months.

3.24.1 All backpacks without integrated floatation devices and weight systems shall have a quick release device designed to permit jettisoning with a single motion from either hand.

3.25 Gauges

3.25.1 Gauges shall be inspected and tested before first use and every twelve months thereafter. Inaccurate gauges shall not be used. A record of inspections, tests, and repairs shall be maintained.

3.26 Flotation Devices

3.26.1 Each diver shall have the capability of achieving and maintaining positive buoyancy. The device must be capable of oral inflation as well as inflation from the divers air supply. Such a device is required in addition to a dry suit.

3.26.2 Personal flotation systems, buoyancy compensators, dry suits, or other variable volume buoyancy compensation devices shall be equipped with an exhaust valve.

3.26.3 These devices shall be functionally inspected and tested at intervals not to exceed twelve months.

3.27 Timing Devices, Depth and Pressure Gauges

Both members of the diving pair must have an underwater timing device, a depth indicator, and a submersible pressure gauge. A dive computer that combines the functions of these devices may be substituted. Weir divers are exempt from this requirement when diving in water that is less than 10 feet deep.

3.28 Determination of Decompression Status: Dive Tables, Dive Computers

3.28.1 A set of diving tables, approved by the LDSO, must be available at the dive location.

3.28.2 Dive computers or diving tables will be utilized.

3.28.3 See Appendix M for recommendations on dive computer use.

3.30 AUXILIARY EQUIPMENT

All auxiliary equipment shall be of a type approved by the DSO, LDSO and/or the Dive Safety Board.

3.31 Hand held underwater power tools.

Power tools and equipment used underwater shall be specifically approved for underwater use. Power tools and equipment supplied with power from the surface shall be de-energized before being placed into or retrieved from the water. Hand held power tools shall not be supplied with power from the dive location until requested by the diver.

3.40 SUPPORT EQUIPMENT

3.41 First aid supplies.

A first aid kit and emergency oxygen administration equipment shall be available at the dive location.

3.42 Diver's Flag

A diver's flag shall be displayed prominently whenever diving is conducted under circumstances where required or where water or amphibious aircraft traffic is probable.

3.43 Compressor Systems - Department Controlled

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

3.43.1 Low pressure compressors used to supply air to the diver if equipped with a volume tank shall have a check valve on the inlet side, a relief valve, and a drain valve;

3.43.2 Compressed air systems over 500 psig shall have slow-opening shut-off valves;

3.43.3 All air compressor intakes shall be located away from areas containing exhaust or other contaminants.

3.44 Oxygen Systems

3.44.1 Equipment used with oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be designed and maintained for oxygen service.

3.44.2 Components exposed to oxygen or mixtures containing over forty percent (40%) by volume oxygen shall be cleaned of flammable materials before being placed into service.

3.44.3 Oxygen systems over 125 psig shall have slow-opening shut-off valves.

3.50 EQUIPMENT MAINTENANCE

3.51 Record Keeping

Each project leader or designee shall be responsible for providing the LDSO with an inventory and a maintenance schedule for all equipment under their control. Each equipment modification, repair, test, calibration, or maintenance service shall be logged, including the date and nature of work performed, serial number of the item, and the name of the person performing the work for the following equipment:

3.51.1 Regulators,

3.51.2 Submersible pressure gauges,

3.51.3 Depth gauges,

3.51.4 Scuba cylinders,

3.51.5 Cylinder valves,

3.51.6 Diving helmets,

3.51.7 Submersible breathing masks,

3.51.8 Compressors,

3.51.9 Gas control panels,

3.51.10 Air storage cylinders,

3.51.11 Air filtration systems,

3.51.12 Analytical instruments,

3.51.13 Buoyancy control devices,

3.51.14 Dry suits.

3.52 Compressor Operation and Air Test Records

3.52.1 Gas analyses and air tests shall be performed on each department breathing air compressor at regular intervals of no more than 100 hours of operation or six months, whichever occurs first, or when the compressor is returned to service from storage. The results of these tests shall be entered in a formal log and be maintained.

3.52.2 A log shall be maintained with the compressor showing operation, repair, overhaul, filter maintenance, and temperature adjustment for each compressor.

3.60 AIR QUALITY STANDARDS

Breathing air for scuba shall meet the following specifications (listed in Table 1), as set forth by the Compressed Gas Association (CGA Pamphlet G-7.1) and referenced in OSHA 29 CFR 1910.134.

Table 1.–List of air quality standards, as set forth by the Compressed Gas Association.

CGA Grade E Component	Maximum Value
Oxygen	20 to 22% by volume
Carbon monoxide	10 PPM by volume
Carbon dioxide	500 PPM by volume
Condensed hydrocarbons	5 mg per cubic meter
Water vapor	NS
Objectionable odors	None

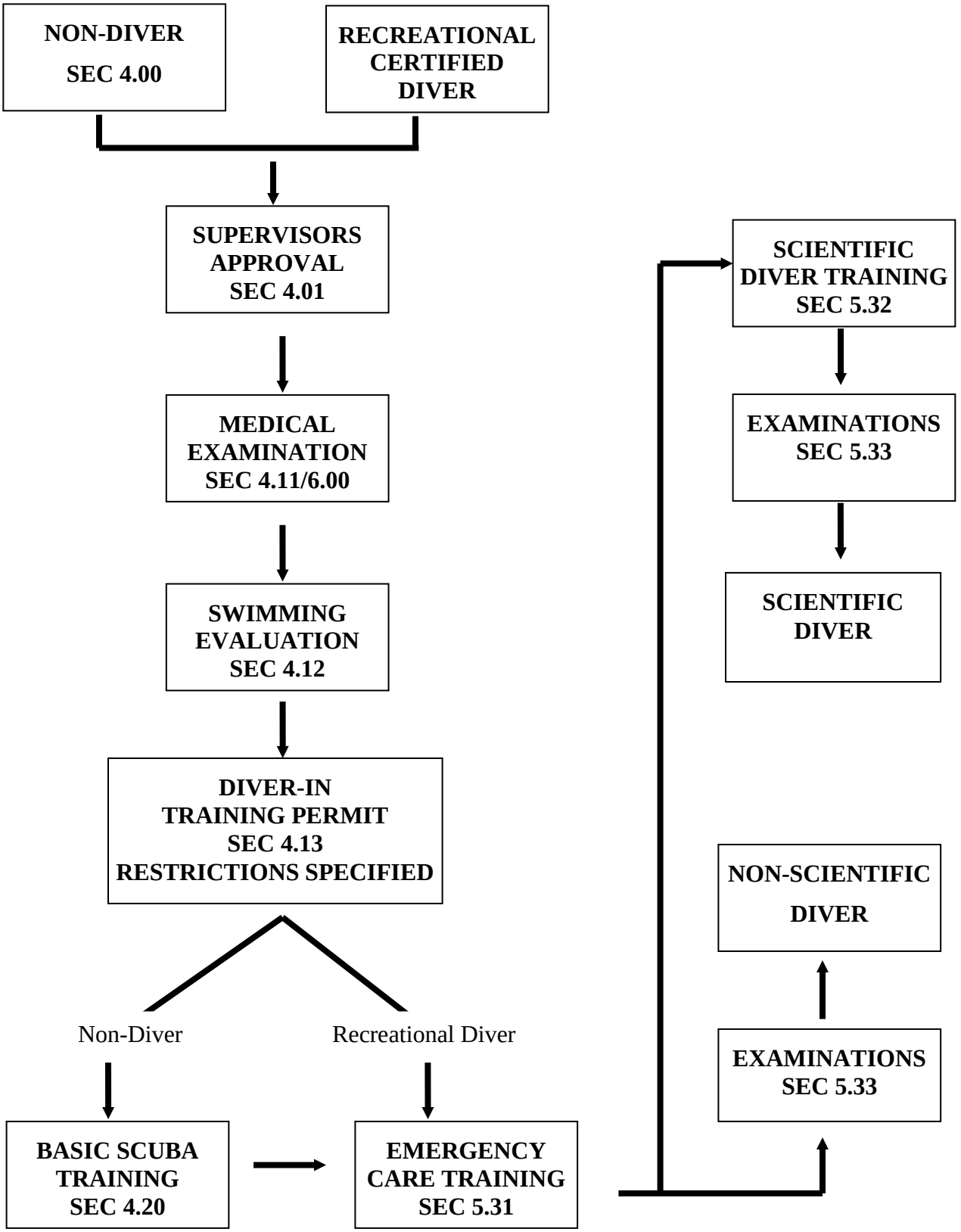
SECTION 4—ENTRY-LEVEL TRAINING REQUIREMENTS

This section describes training for the department diver applicant, previously not certified for department diving. The flowchart in Figure 1 illustrates the general steps necessary to become a authorized department diver.

4.10 SUPERVISORY APPROVAL

A letter requesting your participation in the ADF&G diving program (Appendix O) must be obtained from either your Divisional Director or Regional Supervisor and submitted to the DSO through your LDSO, prior to participating in the diving program.

Figure 1.–Flowchart of Alaska Department of Fish and Game diver training.



4.20 EVALUATION

4.21 Medical Examination

The applicant for training shall be certified by a licensed medical doctor, or a licensed physician's assistant under the direction of a licensed medical doctor, preferably with hyperbaric medical training, to be medically qualified for diving before proceeding with the training as designated in Sec. 4.20 (see Section 6.00 and Appendices A through F).

4.22 Swimming Evaluation

The applicant for training shall successfully perform the following tests, or their equivalent, in the presence of the DSO, or an examiner approved by the DSO. Candidates for certification who do not possess a training certificate from a nationally recognized training organization should arrange for this test to be included as part of their basic scuba training. If in the judgment of the DSO or LDSO a candidate has not demonstrated these or equivalent skills, the DSO or LDSO shall require a candidate to demonstrate the required swimming skills in the presence of, or an examiner approved by, the DSO or LDSO (listed below).

4.22.1 Swim underwater without swim aids for a distance of 25 yards without surfacing.

4.22.2 Swim 400 yards in less than 12 minutes without swim aids.

4.22.3 Tread water for 10 minutes, or 2 minutes without the use of hands, without swim aids.

4.22.4 Without the use of swim aids, transport another person of equal size a distance of 25 yards in the water.

4.23 Diver-In-Training certification

The LDSO shall specify restrictions (Appendix Q) through a diver in training certification which allows an individual to participate in an approved training program, commensurate with the standards of this manual.

4.30 SCUBA TRAINING

ADF&G divers must have completed an entry level scuba course from a training organization approved by the Dive Safety Board. Such a course generally includes about 40 hours of instruction and several open-water dives. ADF&G shall not teach an entry level scuba course. It is the responsibility of the individual diver to provide evidence that a course meets entry-level requirements. A LDSO or the DSO may require a candidate to demonstrate proficiency in the skills listed and/or knowledge of the subject areas, including taking a refresher course, if a candidate has not been actively engaged in scuba diving for a period longer than one year.

4.31 Practical Training

At the completion of basic training, the trainee must satisfy the DSO, the LDSO, or the instructor of the trainee’s ability to perform the following, as a minimum, in a pool or in sheltered water:

4.31.1 Enter water with full equipment;

4.31.2 Clear face mask;

4.31.3 Demonstrate air sharing, including both buddy breathing and the use of alternate air source, as both donor and recipient, with and without a face mask;

4.31.4 Demonstrate ability to alternate between snorkel and scuba while kicking;

4.31.5 Demonstrate understanding of underwater signs and signals;

4.31.6 Demonstrate simulated in-water mouth-to-mouth resuscitation;

4.31.7 Rescue and transport, as a diver, a passive simulated victim of an accident;

4.31.8 Demonstrate ability to remove and replace equipment while submerged;

4.31.9 Demonstrate watermanship ability which is acceptable to the instructor.

4.32 Written Examination

Before completing training, the trainee must pass a written examination that demonstrates knowledge of at least the following:

4.32.1 Function, care, use, and maintenance of diving equipment;

4.32.2 Physics and physiology of diving;

4.32.3 Diving regulations and precautions;

4.32.4 Near-shore currents and waves;

4.32.5 Dangerous marine animals;

4.32.6 Emergency procedures, including buoyant ascent and ascent by air sharing;

4.32.7 Currently accepted decompression procedures;

4.32.8 Proper use of dive tables;

4.32.9 Underwater communications;

4.32.10 Aspects of freshwater and altitude diving;

4.32.11 Hazards of breath-hold diving and ascents;

4.32.12 Planning and supervision of diving operations;

4.32.13 Diving hazards;

4.32.14 Cause, symptoms, treatment, and prevention of the following: near drowning, air embolism, carbon dioxide excess, squeezes, oxygen poisoning, nitrogen narcosis, exhaustion and panic, respiratory fatigue, motion sickness, decompression sickness, hypothermia, and hypoxia/anoxia.

4.33 Open Water Evaluation

The trainee must satisfy an instructor, approved by the DSO, or the LDSO, of the trainee's ability to perform at least the following in open water:

4.33.1 Surface dive to a depth of 10 feet in open water without scuba;

4.33.2 Demonstrate proficiency in air sharing, including both buddy breathing and the use of alternate air source, as both donor and receiver;

4.33.3 Enter and leave open water or surf, or leave and board a diving vessel, while wearing scuba gear;

4.33.4 Kick on the surface 400 yards while wearing scuba gear, but not breathing from the scuba unit;

4.33.5 Demonstrate judgment adequate for safe diving;

4.33.6 Demonstrate, where appropriate, the ability to maneuver efficiently in the environment, at and below the surface;

4.33.7 Complete a simulated emergency swimming ascent;

4.33.8 Demonstrate clearing of mask and regulator while submerged;

4.33.9 Demonstrate ability to achieve and maintain neutral buoyancy while submerged;

4.33.10 Demonstrate techniques of self-rescue and buddy rescue;

4.33.11 Navigate underwater;

4.33.12 Plan and execute a series of dives;
Successfully complete 5 open water dives for a minimum total time of 3 hours, of which 1 and 1/2 hours cumulative bottom time must be on scuba. No more than 3 training dives shall be made in any one day.
4.33.13 Demonstrate judgment adequate for safe diving.

4.40 SKIFF OPERATORS AND DIVE TENDERS

4.41 Requirements for Dive Tenders

Operators of skiffs and other dive tendering platforms must be adequately trained to deliver emergency rescue assistance to divers. Dive tenders must hold current certifications for First Aid and CPR. Certification for oxygen administration and Automated External Defibrillator (AED) use is highly recommended. Additionally, dive tenders must be able to demonstrate proficiency operating and handling skiffs, particularly during deployment and retrieval of divers.

SECTION 5— SCIENTIFIC DIVER CERTIFICATION

5.10 CERTIFICATION TYPES

5.11 Scientific Diver Certification.

This is a permit to dive, usable only while it is current and for the purpose intended.

5.12 Temporary Diver Permit.

This permit constitutes a waiver of the requirements of Sec. 5.00 and is issued only following a demonstration of the required proficiency in diving. It is valid only for a limited time, as determined by the DSO. This permit is not to be construed as a mechanism to circumvent existing standards set forth in this manual.

The DSO may waive requirements of Sections 5.30, 5.31 and 5.32 if the person in question has demonstrated proficiency in diving and can contribute measurably to a planned dive. A statement of the temporary diver's qualifications shall be submitted to the DSO as a part of the dive plan. Temporary permits shall be restricted to the planned diving operation and shall comply with all other policies, regulations, and standards of this manual, including medical requirements.

5.20 GENERAL POLICY

ADF&G requires that no person shall engage in scientific diving unless that person is authorized by the department, pursuant to the provisions of this manual. The following are considered minimal standards for a scientific diver certification:

5.21 Eligibility

Only persons diving under ADF&G auspices are eligible to obtain certification.

5.22 Prerequisites

5.22.1 Diver-In-Training Permit

This permit authorizes an individual to participate in an approved training program commensurate with the standards of this manual.

5.23 Application for Certification

Applications for certification shall be made to the DSO or LDSO.

5.24 Medical Examination

Each applicant for diver certification shall submit a statement from a licensed physician, based on an approved medical examination, attesting to the applicant's fitness for diving, prior to initiating training or for certification (see Sec. 6.00 and Appendices A to F).

5.30 REQUIREMENTS FOR SCIENTIFIC DIVER CERTIFICATION

Submission of documents and participation in aptitude examinations does not automatically result in certification. The applicant must convince the DSO or LDSO and members of the Dive Safety Board, as appropriate, that he or she is sufficiently skilled and proficient to be certified. The signature of the DSO or LDSO will acknowledge this skill. Any applicant who does not possess the necessary judgment, under diving conditions, for the safety of the diver and his or her partner, will be denied departmental scientific diving privileges. The DSO or LDSO may require additional training, or experience following completion of the minimum field practicum and

training as he or she deems necessary, prior to certifying a candidate as having successfully demonstrated the skills, knowledge and judgment necessary to safely participate in department dive operations. Minimum documentation and examinations required are as follows.

5.31 Documents

5.31.1 Application for certification

5.31.2 Medical approval

5.31.3 Proof of diver-in-training permit level or its equivalent

5.31.4 Emergency Care Training

The diver or diver-in-training must also provide proof of training in the following:

5.31.5 Cardiopulmonary resuscitation (CPR) (must be current);

5.31.6 Emergency oxygen administration (must be current);

5.31.7 First aid (must be current).

5.32 Advanced Training

The diver must complete additional theoretical aspects, and practical training beyond basic scuba training. To be certified as a Scientific Diver by ADF&G, an individual shall complete the NOAA working diver training or its equivalent prior to being certified. The following training may be substituted for the NOAA training, but it is the responsibility of the diver to convince the DSO, LDSO or Dive Safety Board that the training the diver has taken, or plans to take, will satisfy this requirement.

5.32.1 Safety: Complete instruction in CPR, First Aid and oxygen administration and possess current certificates of such training from recognized training agencies.

5.32.2 Dive Theory: Complete advanced dive and dive rescue courses offered by a recognized and certified dive agency, and pass a written or oral examination in dive theory on each of the following topics: physics, physiology, equipment, environment and decompression-recompression theory.

5.33 Field Practicum

Upon successful completion of formal advanced training, a diver in training shall complete a field practicum with, or under the supervision of, the DSO, or an LDSO, or qualified delegate, and shall be accompanied by someone certified as an ADF&G scientific diver, with experience in the type of diving planned, with the knowledge and permission of the DSO. The field practicum may be conducted as part of ongoing scientific dive operations conducted by ADF&G. As a minimum requirement, a diver in training shall complete at least 20 dives over a period of at least 10 days.

5.40 DEPTH CERTIFICATIONS

The Diving Certificate will authorize the holder to dive to the depth indicated on the certificate. Diving is not permitted beyond a depth of 130 feet.

5.41 Depth Certification Levels

5.41.1 Certification to 30 Foot Depth

This is the initial permit level, approved upon the successful completion of training outlined in Sec. 4.00.

5.41.2 Certification to 60 Foot Depth

A diver holding a certificate to 30 foot may be certified to a depth of 60 feet after successfully completing, under supervision, a minimum of 12 logged training dives to depths between 31 and 60 feet, for a minimum total time of 4 hours.

5.41.3 Certification to 100 Foot Depth

As policy, department scientific divers shall not normally dive, nor be certified to a depth, greater than 100 feet. A diver holding a 60 foot certificate may be certified to the 100 foot level after participating in an approved training program on deep diving, and after logging a minimum of 6 dives to between 90 and 100 feet of seawater (fsw). The signatures of two individuals who are certified to at least the same depth shall validate depth certification. A candidate for certification shall demonstrate proficiency in the planning of deep dives and the use of decompression tables.

5.41.4 Certification to 130 Foot Depth

A diver holding a 100 foot certificate may be certified to the 130 foot level. Logging a minimum of 6 dives to between 120 and 130 fsw may certify a diver. The signatures of two individuals who are certified to at least the same depth shall validate depth certification. A candidate for certification shall demonstrate proficiency in the planning and special problems of deep dives, and the use of decompression tables to the LDSO or DSO.

5.42 Progression to Next Depth Level

A certified diver diving under department auspices may exceed his or her depth certification only if accompanied by a diver certified to a greater depth. Under these circumstances the diver may exceed his or her depth limit by one step.

5.50 CONTINUATION OF CERTIFICATE

5.51 Minimum Dive Activity to Maintain Certification

During any 12 month period, each certified scientific diver must log a minimum of 12 dives. At least one dive must be logged near the maximum depth of the diver's certification during each 6-month period. Failure to meet these minimum requirements may be cause for revocation, or restriction of certification and is subject to a checkout dive by the LDSO or his designee. The checkout dive must occur prior to the start of any survey and Appendix I must be completed and submitted to the LDSO. Personal, recreational diving can be included in the minimum dive requirement, and is encouraged.

5.52 Re-qualification of Depth Certificate

Once the initial certification requirements of Subsections 5.31 to 5.34 are met, depth certification of divers whose certification has lapsed due to lack of activity may be reinstated, by demonstrating to the LDSO or DSO that the diver is competent to engage in diving to the planned depth.

5.53 Medical Examination

All certified scientific divers shall pass a medical examination at the intervals specified in Section 6.12. After each major illness or injury a certified scientific diver shall receive clearance to return to diving from a physician before resuming diving activities.

5.54 Periodic Training

5.54.1 As a minimum, all certified scientific divers shall remain current in cardiopulmonary resuscitation (CPR), emergency oxygen administration, and first aid for diving accidents.

5.54.2 Periodic scientific diver refresher training is required at a minimum of 5-year intervals.

5.60 REVOCATION OF CERTIFICATION

A diving certificate may be revoked, or restricted, for cause by the DSO, LDSO, Dive Safety Board or by the employee's supervisor. Violations of regulations set forth in this manual, or other applicable regulations of the State of Alaska not in conflict with this manual, may be considered cause for revoking a certificate. The DSO, LDSO, Dive Safety Board or the employee's supervisor shall inform the diver in writing of the reason(s) for revocation or restriction. The diver will be given the opportunity to present his or her case, in writing, to the Dive Safety Board for reconsideration and/or recertification. All such written statements and requests, as identified in this section, are formal documents which will become part of the diver's permanent file.

5.70 RECERTIFICATION

If a diver's ADF&G authorization expires or is revoked or restricted, the diver may be reauthorized after complying with such conditions as the DSO, LDSO or the Dive Safety Board may impose. The diver shall be given an opportunity to present his or her case to the Dive Safety Board before conditions for recertification are stipulated.

Recognizing that many department dive activities are seasonal in nature and that it is difficult for many divers to fulfill the requirement for diving as described in Section 5.51 above, the DSO or LDSO who serves each division or region may establish and conduct (within each region or division as appropriate) using qualified instructors, an annual refresher course in dive theory and techniques. Participation in such refresher courses may be required for recertification for individuals who have allowed their certification to lapse.

5.80 DIVE MASTER CERTIFICATION

Department employees who are certified Scientific Divers and who occupy a supervisory position, or whose job description requires a substantial amount of diving, shall be eligible for training as a department Dive Master. Training as a department Dive Master shall require the approval of the LDSO or DSO, and follow other required department training procedures.

Dive Masters occupy a position of *leadership* and *responsibility* in the department. Generally stated, that responsibility is to plan and conduct *efficient* and *safe* dive operations in support of the department's mission. In the event of an emergency, dive masters are responsible for *deciding* and *implementing* the appropriate emergency response.

To accomplish this mission, department Dive Masters should be,

1. Among the best trained and most competent in diving theories, equipment, and skills;
2. Prepared to identify and respond to emergency situations;
3. Experienced in, and show good judgment in, the field conditions they operate;
4. Committed to the conduct of safe and efficient dive operations;
5. Able to plan, monitor and execute a dive plan that is safe and efficient; and,
6. Mentors for staff new to diving and a resource for experienced staff.

The LDSO, in consultation with the DSO, shall approve specific courses and training prior to being certified as a department Dive Master; preferred training is the NOAA Dive Master course or its equivalent. It is the responsibility of the diver to convince the DSO, LDSO, or Dive Safety Board that the training the diver has taken, or plans to take, will satisfy this requirement.

5.90 INSTRUCTOR LEVEL AND OTHER CERTIFICATIONS

Recognizing the need for ongoing and continuous education, the cost savings gained when such training is conducted "in-house", and the value of having well-trained divers participating in department operations, the Dive Safety Board pre-approves training for qualified individuals in the fields listed below.

5.90.1 Scuba Instructor
5.90.2 Assistant Instructor
5.90.3 Visual Tank Inspection
5.90.4 Emergency Medical Technician
5.90.5 Oxygen Administration Instructor
5.90.6 Cardiopulmonary Resuscitation Instructor
5.90.7 First Aid Instructor
5.90.8 Regulator and Dry Suit Maintenance
5.90.9 Nitrox Instructor
5.90.10 Automated External Defibrillator (AED) Instructor

Department certification will be based on need. Individuals will be authorized to teach "in-house" courses only after successfully completing training from a recognized certifying organization, and complying with the provisions of this manual. Approval must be obtained, through your supervisor and from your local LDSO, prior to participating in instructor level courses.

5.91 Continuing Education

With approval through your supervisor, all ADF&G divers are strongly encouraged to participate in continuing education courses. Suggested classes pre-approved by the Dive Safety Board are listed below.

5.91.1 Dive Rescue
5.91.2 Emergency Medical Technician (all levels)
5.91.3 Life Guard Training
5.91.4 Visual Tank Inspection
5.91.5 Gear Servicing and Maintenance
5.91.6 Compressor Maintenance and Operation
5.91.7 Dive Master

5.91.8 Assistant Instructor
5.91.9 Altitude Diving
5.91.10 Underwater Photography
5.91.11 Enhanced Air (Nitrox) Diving
5.91.12 Closed and Semi-Closed Circuit Scuba (Rebreathers) (see Sec. 7.50)
5.91.13 Skiff operation and maintenance
5.91.14 Decompression Diving
5.91.15 Surface Supplied and Hookah Diving
5.91.16 Blue Water Diving (see Sec. 7.70)
5.91.17 Ice Diving (see Sec. 7.80)
5.91.18 Overhead Environments (see Sec. 7.90)
5.91.19 Photography
5.91.20 Trimix
5.91.21 Automated External Defibrillator (AED)
5.91.22 Diving Medical Technician (DMT)
5.91.23 NOAA working diver refresher training, or its equivalent

SECTION 6—MEDICAL STANDARDS

6.10 MEDICAL REQUIREMENTS

6.11 General

6.11.1 Department dive team members shall have passed a current diving physical examination and have been declared by the examining physician to be fit to engage in diving activities as may be limited or restricted in the medical evaluation report.

6.11.2 All medical evaluations required by this standard shall be performed by, or under the direction of, a licensed medical doctor of the applicant diver's choice. ADF&G encourages divers to seek medical evaluations from physicians trained in, and familiar with, the special problems of hyperbaric conditions and diving.

6.11.3 The diver should be free of any chronic disabling disease and be free of any conditions contained in the list of conditions for which restrictions from diving are generally recommended (Appendix A).

6.12 Frequency of Medical Evaluations

A medical evaluation shall be completed,

6.12.1 Before a diver may begin diving, the LDSO must be provided with a completed copy of the Medical Evaluation of Fitness for Scuba Diving Report (Appendix B). That report must be reviewed and found satisfactory by the LDSO prior to authorization to dive.

6.12.2 After a diver receives authorization to dive, a medical evaluation will be performed at a minimum of,

6.12.2.1 Three-year intervals up to age 40 (up to last day at age 39),

6.12.2.2 Two-year intervals at age 40 (first day at 40) and up to age 50 (up to last day at age 49),

6.12.2.3 One-year intervals at or after age 50.

6.12.2.4 When transitioning between age brackets, the new medical evaluation interval will begin after the previous interval has been completed.

6.12.3 After any major injury or illness, or any condition requiring hospitalization, requires that the diver undergo a physical examination and obtains clearance to return to diving from a physician. If the injury or illness is pressure related then the clearance to return to diving must come from a physician trained in diving or hyperbaric medicine.

6.13 Information Provided Examining Physician

ADF&G shall provide a copy of the medical evaluation requirements of this standard to the examining physician. (Appendices A, B, and C).

6.14 Content of Medical Evaluations

Medical examinations conducted initially and at the intervals specified in Section 6.12 shall consist of the following:

6.14.1 Applicant agreement for release of medical information to the DSO, LDSO, and the Dive Safety Board (See Appendix B);

6.14.2 Medical history (See Appendix C);

6.14.3 Diving physical examination (Section 6.15 and Appendix B).

6.14.4 Any additional tests the physician may consider necessary.

6.15 Conditions for which Restriction from Diving is Recommended

See Appendix A (Adapted from Davis, 1986).

6.16 Laboratory Requirements for Diving Medical Examination:

The initial diving medical examination and those done at 5-year intervals thereafter shall include the procedures listed below.

6.16.1 Medical History

6.16.2 Chest X-ray

6.16.3 Resting EKG

6.16.4 Pulmonary function

6.16.5 Audiogram

6.16.6 Visual acuity

6.16.7 Complete blood count (CBC)

6.16.8 Blood chemistry

6.16.9 Urinalysis

6.16.10 Any further tests deemed necessary by the physician to qualify the patient for scuba diving.

6.16.11 The following procedures are required during periodic re-examination (every 3 years up to age 40, every 2 years after age 40 up to age 50, and every year after age 50:

6.16.11.1 Medical History;

6.16.11.2 Complete blood count (CBC);

6.16.11.3 Blood chemistry;

6.16.11.4 Urinalysis;

6.16.11.5 Any further tests deemed necessary by the physician to qualify the patient for scuba diving.

6.17 Physician's Written Report

6.17.1 After any medical examination relating to the individual's fitness to dive, ADF&G shall obtain a written report prepared by the examining physician, which shall contain the examining physician's opinion of the individual's fitness to dive, including any recommended restrictions or limitations. This may be reviewed by the Dive Safety Board.

6.17.2 ADF&G shall make a copy of the physician's written report available to the individual.

SECTION 7—OTHER DIVING TECHNOLOGY

Certain types of diving, some of which are listed below, require equipment or procedures which necessitate additional training because of their complexity or increased risk. It is the responsibility of the individual diver to provide evidence that such a course meets the Dive Safety Board requirements. Specific skill requirements, academic topics, and training may be determined necessary by the Dive Safety Board on a case-by-case basis, depending on a departmental program mission. Divers shall comply with all scuba diving procedures in this manual and any additional procedures specified by the Dive Safety Board.

7.10 STAGED DECOMPRESSION DIVING

No diver shall plan or conduct staged decompression dives without prior approval of the Dive Safety Board. Prior to engaging in staged decompression diving, all divers and tenders shall complete a training program approved by the Dive Safety Board in the use and special considerations of staged decompression diving.

7.20 SATURATION DIVING

Saturation diving is not allowed.

7.30 HOOKAH

7.30.1 Divers using the hookah mode shall be equipped with a diver-carried independent reserve breathing gas supply.

7.30.2 Each hookah diver shall be hose-tended by a separate dive team member while in the water.

7.30.3 The hookah breathing gas supply shall be sufficient to support all hookah divers in the water for the duration of the planned dive, including decompression.

7.30.4 Prior to engaging in diving with hookah gear, all divers and tenders shall complete a training program approved by the Dive Safety Board in the use and special considerations of hookah gear.

7.40 SURFACE SUPPLIED DIVING

Surface supplied divers shall comply with all scuba diving procedures in this manual (except section 2.31).

7.40.1 Divers using the surface supplied mode shall be equipped with a diver-carried independent reserve breathing gas supply.

7.40.2 Each surface supplied diver shall be hose-tended by a separate dive team member while in the water.

7.40.3 Divers using the surface supplied mode shall maintain voice communication with the surface tender.

7.40.4 The surface supplied breathing gas supply shall be sufficient to support all surface supplied divers in the water for the duration of the planned dive, including decompression.

7.40.5 During surface supplied diving operations when only one diver is in the water, there must be a standby diver in attendance at the dive location and capable of rendering immediate assistance.

7.40.6 Surface supplied diving will adhere to the depth limits outlined in sections 5.40 to 5.42.

7.40.7 Prior to engaging in surface-supplied-air diving, all divers and tenders shall complete a training program, approved by the Dive Safety Board, in the use and special considerations of the specific equipment used in the dive operation.

7.50 CLOSED AND SEMI-CLOSED CIRCUIT SCUBA (REBREATHERS)

Prior to using rebreathers, the regional supervisor or division director, or a proper designee, must certify that such diving is essential to ADF&G's mission. Only after consulting with the DSO or LDSO to determine whether reasonable alternatives exist (other than using department divers), and after completing a Dive Safety Board-approved training program in the use and special considerations of rebreathers, may department divers perform rebreather diving.

Closed and semi-closed circuit scuba (rebreathers) shall meet the requirements listed below.

7.50.1 Oxygen partial pressure in the breathing gas shall not exceed values approved by ADF&G's Dive Safety Board. The generally accepted maximum value is 1.4 atmospheres ppo_2 at depths greater than 25 fsw (7.6 meters of seawater or msw).

7.50.2 Chemicals used for the absorption of carbon dioxide shall be kept in a cool, dry location in a sealed container until required for use.

7.50.3 The designated person-in-charge shall determine that the carbon dioxide absorption canister is used in accordance with the manufacturer's instructions.

7.50.4 Closed and semi-closed diving equipment will not be used at a depth greater than that recommended by the manufacturer of the equipment.

7.60 MIXED GAS DIVING

7.61 Nitrox Diving

Divers planning to use enriched air (nitrox) scuba diving must use the guidelines listed in American Academy of Underwater Science's *Guidelines for scientific nitrox diving and nitrox diver certification* (American Academy of Underwater Sciences 1991). All divers shall complete a training program, approved by the Dive Safety Board, in the use and special considerations of nitrox diving, prior to engaging in nitrox diving.

7.70 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 Publication. No. T-csgcp-014). Prior to blue water diving, the regional supervisor or division director, or one of their designees, must certify that such diving is essential to ADF&G's mission. Only after consulting with the DSO or LDSO to determine if reasonable alternatives exist (other than using department divers), may blue water diving be performed.

7.80 ICE DIVING

Divers planning to dive under ice should use the following: "guidelines for conduct of research diving", national science foundation, division of polar programs, 1990. Prior to ice diving, the regional supervisor or division director, or one of their designees, must certify that such diving is essential to ADF&G's mission. Department divers may perform ice diving, only after consulting with the DSO or LDSO, to determine if reasonable alternatives exist (other than using department divers).

7.90 OVERHEAD ENVIRONMENTS

Divers shall not enter enclosed or confined spaces that are too small for at least two divers, unless the mission cannot be successfully completed. Prior to entering enclosed or confined spaces, the regional supervisor or division director, or one of their designees, must certify that such diving is essential to ADF&G's mission. Only after consulting with the DSO or LDSO to determine if reasonable alternatives exist (other than using department divers), may department divers enter enclosed or defined spaces. Also, prior to diving in an overhead environment, all divers and tenders shall complete a training program, in the special considerations of overhead environments, that has been approved by the Dive Safety Board. When it is necessary to enter such spaces, a diver shall be stationed at the underwater entry point, and an orientation line shall be used.

CHAPTER II—NON-SCIENTIFIC DIVING (NON-EXEMPT OSHA REGULATIONS)

This chapter of the manual was written in recognition of several department dive projects that fall outside of the definition of scientific diving and OSHA's exemption for scientific diving. Such diving, which includes, for example, assembling and maintaining stream weirs and ship husbandry, may be conducted under ADF&G auspices so long as it is approved by the Dive Safety Board and done within OSHA's rules for commercial diving (29 CFR, subpart T, section 1910.401 to 1910.440). Additionally, non-scientific department diving will fall under the authority and oversight of the ADF&G Dive Safety Board and Dive Safety Officer.

SECTION 1 – GENERAL POLICY

1.10 MEDICAL STANDARDS

All department divers participating in non-scientific (non-OSHA exempt) diving shall be current on all medical examinations and criteria identified in Chapter I, Section 6 (Medical Standards), prior to diving.

1.20 RECIPROCITY AND VISITING NON-SCIENTIFIC DIVER

A visiting non-scientific diver shall be certified at a minimum as an open water diver, hold current First Aid/CPR/Oxygen Administration certification, and have a current medical exam as outlined in Section 6.00. Additionally, visiting non-scientific divers should be prepared to demonstrate dive proficiency, provide proof of experience and are subject to checkout dives by the LDSO or designee. Experience with dry suits is recommended.

1.30 SOLO DIVE PROHIBITION

All non-scientific diving activities shall assure adherence to the buddy system (two comparably equipped scuba divers in the water in constant communication) for scuba diving. This buddy system is based upon mutual assistance, especially in the case of an emergency. If effective communication is lost, all divers shall surface and remain there until contact is reestablished.

1.31 Weir Solo Diving Exemption

The only exemption to the solo diving prohibition for diving under ADF&G auspices shall be granted for weir diving, so long as diving is conducted in accordance with OSHA regulations and ADF&G Dive Safety Manual Chapter II, Sub-section 2.21 below.

SECTION 2—WEIR DIVING

2.10 WEIR DIVING DEFINITION

The ADF&G Dive Safety Board has concluded that weir construction, disassembly, and maintenance do not qualify for the federal OSHA Scientific Exemption. Weir diving standards will comply with the OSHA rules for commercial diving (29 CFR, subpart T, section 1910.401 - 1910.440). Where contradictions occur between the DSM and OSHA regulations (29 CFR Ch. XVII), OSHA regulations for commercial diving operations will be followed.

Weir diving is done to construct, maintain, or remove all structures, devices, and materials associated with a weir. The primary purpose is not to conduct scientific observations or record data; therefore specialized scientific training is not necessary to complete the task (as opposed to Scientific Diving, Chapter I, Section 1.12). It differs from underwater construction in its simplicity and small scale. Materials are pre-fabricated and only assembly with simple fasteners is required. Parts are easily manipulated by hand, using one to four individuals. No underwater welding, underwater power tools, or other underwater power equipment are used by the divers or in their vicinity.

Weir diving is project-specific, unique, and very atypical to ocean dives. Due to the current, shallow water depth, and the weir structure, the diver is virtually never in a free-swimming state. Instead, the diver finds support against the current by lying on the weir panels, standing on the weir panels, or standing on the river bottom. The diver often must physically grab hold of the

weir to pull himself below the water's surface. The effect of the current on the diver against the angle of the weir is usually to force the diver to the surface; the diver can often only remain submerged by maintaining an effort to do so. Buoyancy control is very basic, usually either very positive to remain on the surface or very negative to stay in contact with the structures. While in the water divers typically spend more time above the surface than they do below; interchanging between the two positions. Realistically, accurate 'bottom times' are difficult to calculate and maximum depth is usually less than 15 feet of fresh water (ffw).

2.20 LINE TENDERING

2.21 OSHA section 1910.424

Scuba diving shall not be conducted against currents exceeding one knot, unless line tended. When solo diving, a standby diver shall be available while a diver is in the water. That diver shall be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operations. A manual reserve or J-valve with handle is required on all cylinders; the only acceptable substitute is an independent reserve cylinder with a separate regulator.

2.30 BUOYANCY COMPENSATORS

Buoyancy compensation devices (BCD's) are optional for weir divers, because BCD's increase resistance to the current, thereby hindering the performance of the diver and unnecessarily contributing to diver fatigue. An inflatable vest capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, plus an oral inflation device, and an exhaust valve shall be worn (1910.430) whenever a buoyancy compensator device is not. ADF&G's Dive Safety Board also mandates the use of a pressure gauge for all scuba tanks when in use, and that divers have surfaced once tank pressure falls below 500 psi, (this generally is the pressure that a J valve in the up position will need to be pulled down).

2.40 DIVE FLAGS

Diver's flag(s) shall be displayed prominently whenever diving is conducted. One life ring will be on hand at the weir, in the boat that assists the divers. Medical grade oxygen and respirator, in a ready-to -use configuration, will be on site during each scuba dive and all divers and dive tenders must be trained in its use. A copy of this plan with emergency phone numbers and first aid information will be near the phone in the field camps.

2.50 DIVING RESTRICTED TO WEIR AND IMMEDIATE ENVIRONS

ADF&G's Dive Safety Board restricts all ADF&G divers that are authorized exclusively as weir divers to dive only at the weirs and immediate environs. Since weir divers do not qualify as scientific divers (which requires additional training) no ocean, lake or other diving, except at the weir will be allowed. This also restricts the use of any ADF&G dive gear, skiff, or boat, to be used on any other non-weir activity.

2.60 AUTHORIZATION TO DIVE

Authorization to weir dive will be granted only if all required items on "Department Diver Authorization Checklist" (Appendix P) are completed. This form must be submitted to the LDSO prior to any diving activities.

2.70 MINIMUM DIVE ACTIVITY TO MAINTAIN CERTIFICATION

If a weir diver is unable to complete the minimum of 6 total scuba dives within the year prior to returning to the weir, then that person(s) shall do a checkout dive at the weir (Appendix J).

2.80 WEIR DIVING SAFETY

In addition to standard safety considerations associated with scuba diving, the following items should be considered as particularly hazardous when weir diving.

2.81 Boat Traffic

Local residents routinely operate skiffs in the vicinity of weirs. A dive flag will be posted near the boat gate opening on the weir whenever a diver is in the water. When diving within 20 feet of the boat gate, a skiff bearing a dive flag and a dive tender will be posted at the boat gate to alert and delay traffic. Any time boat traffic is present the dive tenders shall notify the divers, who must immediately surface and observe the traffic until the traffic departs.

2.82 Hypothermia

This is a primary danger during weir installation. During installation, there are frequent times of low diver activity levels, as divers must wait for panels or sandbags to be installed. Also, the divers may be in the water much longer than in normal open water ocean dives. The combination of these factors can lead to hypothermic conditions. Each diver must be aware of and operate only within his or her own individual limits. Dive tenders must beware that hypothermia can affect a divers' behavior and must look for altered speech or action patterns.

2.83 High Water

In the spring or times of flood, the force of the current can increase considerably. While diving near open panel sections, the diver must expend additional effort to avoid being swept downstream past the weir. The diver must evaluate and consider the possibility of a washout. If this possibility is thought to exist, then extra caution should be practiced.

2.84 Entanglement

Ropes may be used when moving weir parts and cables are used in some parts of weir fastening and operation. The weir panels have some sharp edges that could snag a diver's dry suit or gear. It is recommended that a dive knife be worn at all times by a diver.

2.85 First Aid

Per OSHA regulations, a bag-type manual resuscitator shall be at the dive site in addition to the items listed in Chapter I.

SECTION 3—SHIP HUSBANDRY DIVING

3.10 SHIP HUSBANDRY DIVING DEFINITION AND LIMITATIONS

This section addresses diving for maintenance and inspection of vessels owned or used by the department. Ship husbandry that requires diving should be conducted by professional commercial divers for most situations. However, the Dive Safety Board recognizes that at times situations may occur where: 1) it may be difficult to obtain a professional diver within an

acceptable time and cost, or 2) where a routine, simple underwater task must be performed that is well within the limits of properly trained department divers.

Diving under scenario 1 is intended for unplanned situations where diving under or around a vessel must occur to prevent injury or significant damage to a vessel engaged in department work. In this case, consultation with the LDSO should be considered prior to diving, unless an emergency exists. If contact is not feasible or possible prior to diving, a description of the situation and all dive operations shall be documented in a written report submitted to the LDSO within two weeks of the activity. During routine maintenance and planned inspections (scenario 2 above), diving shall be limited to department-owned vessels. This type of diving will be limited to observation, documentation, and use of light-duty tools. Diving may not be conducted unless main engines are shut down and the vessel is at anchor or at dock.

3.20 AUTHORIZATION TO DIVE

Authorization to dive for ship husbandry purposes will be granted only to an ADF&G diver that has been issued a current Authorization to Dive (Appendix Q) with a ship husbandry endorsement. Ship husbandry endorsement may be obtained by completing a specialty course in ship husbandry diving authorized by the LDSO.

3.21 Minimum Dive Activity to Maintain Certification

If a diver anticipating conducting ship husbandry dives is unable to complete the minimum of 6 total scuba dives per year, then that person(s) shall do a checkout dive with the LDSO. The checkout dive will follow the Scientific Diver Checkout Dive procedure found in Appendix I of the manual.

SECTION 4—OTHER NON-SCIENTIFIC DIVING

Non-scientific diving operations that are not included under Sections 2 or 3 may not be conducted without prior approval by the Dive Safety Officer and the Dive Safety Board. Before dive operations may commence, a written proposal must be submitted to the Dive Safety Officer for review. The DSO may consult with the Dive Safety Board to consider the overall safety aspects of the proposed dive project and determine if modifications or limitations are warranted. Proposals must be submitted to the DSO at least three months in advance of planned dive operations.

REFERENCES CITED

NOAA Diving Manual: Diving for Science and Technology, Fourth Edition. 2001. Best Publishing Company, Flagstaff, AZ.

Occupational Safety and Health Administration (OSHA) regulation concerning scientific diving exemption of 29 CFR Part 1910, Subpart T (Commercial Diving Operations).

APPENDIX A

DIVING MEDICAL EXAM OVERVIEW FOR THE EXAMINING PHYSICIAN

Appendix A–Diving medical exam overview for the examining physician.

TO THE EXAMINING PHYSICIAN:

This person, _____, requires a medical examination to assess his or her fitness for certification as a Scientific Diver for the Alaska Department of Fish and Game. The candidate's answers on the (attached) Diving Medical History Form 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. Please contact the undersigned Dive Safety Officer if you have any questions or concerns about diving medicine or ADF&G's standards. Thank you for your assistance.

_____ _____

Dive Safety Officer Date

_____ _____

Printed Name Phone Number

Scuba and other modes of compressed-gas diving can be strenuous and hazardous. A special risk is present if the middle ear, sinuses or lung segments do not readily equalize air pressure changes. The most common cause of distress is Eustachian insufficiency. Most fatalities involve deficiencies in prudence, judgement, emotional stability or physical fitness. Please consult the following list of conditions which usually restrict candidates from diving.

(Adapted from Davis 1986:47-50, bracketed numbers are pages in Davis)

1. Tympanic membrane perforation or aeration tube [7]
2. Inability to auto-inflate the middle ears [6,7,8]
3. External ear exostoses or osteomas adequate to prevent external ear canal pressure equilibration [4]
4. Meniere's Disease or other chronic vertiginous conditions, status post-surgery, such as subarachnoid endolymphatic shunt for Meniere's Disease [11]
5. Stapedectomy and middle ear prosthesis [9]
6. Chronic mastoiditis or mastoid fistula [5]
7. Any oral or maxillofacial deformity that interferes with the retention of the regulator mouthpiece [43]
8. Corrected near visual acuity not adequate to see tank pressure gauge, watch, decompression tables, and compass underwater. Uncorrected visual acuity not adequate to see the diving buddy or locate the boat in case corrective lenses are lost underwater [13]
9. Radial keratotomy or other recent ocular surgery [14]
10. Claustrophobia of a degree to predispose to panic [15,16]
11. Suicidal ideation [16]
12. Significant anxiety states [16]
13. Psychosis [18]
14. evere depression [16]
15. Manic states [16]
16. Alcoholism [19,20]
17. Mood-altering drug use [19,20]
18. Improper motivation for diving [16,17,18]
19. Episodic loss of consciousness [1,22]
20. History of seizure. History of seizure in early childhood must be evaluated individually [21]

–continued–

21. Migraine [20]
22. History of cerebrovascular accident or transient ischemic attack [23]
23. History of spinal cord trauma with neurologic deficit - whether fully recovered or not. [23]
24. Any degenerative or demyelinating CNS process [25]
25. Brain tumor with or without surgery [24]
26. Intracranial aneurysm or other vascular malformation [24]
27. History of neurological decompression sickness with residual deficit [23,24]
28. Head injury with sequelae [21]
29. History of intracranial surgery [24]
30. Sickle cell disease [34]
31. Polycythemia or leukemia [34]
32. Unexplained anemia [34]
33. History of myocardial infarction [28,29,20]
34. Angina or other evidence of coronary artery disease [29]
35. Unrepaired cardiac septal defects [32]
36. Aortic stenosis or mitral stenosis [32]
37. Complete heart block [31]
38. Fixed second-degree heart block [31]
39. Exercised-induced tachyarrhythmias [31,32]
40. Wolf-Parkinson-White (WPW) Syndrome with paroxysmal atrial tachycardia or syncope [31]
41. Fixed-rate pacemakers [33]
42. Any drugs which inhibit the normal cardiovascular response to exercise tolerance [31]
43. Peripheral vascular disease, arterial or venous, severe enough to limit exercise tolerance [33,41]
44. Hypertension with end-organ finding - retinal, cardiac, renal or vascular [30]
45. History of spontaneous pneumothorax [36]
46. Bronchial asthma. History of childhood asthma requires special studies [7,35]
47. Exercise or cold air-induced asthma [36,37]
48. X-ray evidence of pulmonary blebs, bullae, or cysts [36,37]
49. Chronic obstructive pulmonary disease [37]
50. Insulin-dependent diabetes mellitus. Diet or oral medication-controlled diabetes mellitus if there is a history of hypoglycemic episodes [38]
51. Any abdominal wall hernia with potential for gas-trapping until surgically corrected [41]
52. Paraesophageal or incarcerated sliding hiatal hernia [39]
53. Sliding hiatus hernia if symptomatic due to reflux esophagitis [39]
54. Pregnancy [1,45]
55. Osteonecrosis. A history consistent with a high risk of dysbaric osteonecrosis
56. Any condition requiring ingestion of the following medication: antihistamines, bronchodilators, steroids, barbiturates, phenytoin, mood-altering drugs, insulin

Attachments: Medical Evaluation of Fitness for Scuba Diving Report
Diving Medical History Form
Question Evaluations for Diving Medical History Form
Recommended Physicians with Expertise in Diving/Undersea Medicine
References on Diving Medicine

APPENDIX B
MEDICAL EVALUATION OF FITNESS FOR SCUBA DIVING REPORT

Appendix B.–Medical evaluation of fitness for scuba diving report.

_____ _____

Name of Applicant (Print or Type) Date(Mo/Day/Year)

To The PHYSICIAN:

This person is an applicant for training or is presently certified to engage in scuba diving. This is an activity which puts unusual stress on the individual in several ways. 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. An absolute requirement is the ability of the lungs, middle ear and sinuses to equalize pressure. Any condition that risks the loss of consciousness should disqualify the applicant.

REQUIRED TESTS: Please initial which of the following tests were completed.

[ ] Initial Examination or

[ ] Examination at 6-year interval

_____ Medical History

_____ Chest x-ray

_____ Resting EKG

_____ Spriometry (minimum)

or pulmonary function (if warranted)

_____ Audiogram

_____ Visual examination

_____ Complete blood count (CBC)

_____ Blood chemistry

_____ Urinalysis

Re-examination at [ ] 1-year interval,

[ ] 2-year interval [ ] 3-year interval

_____ Medical History

_____ Complete blood count (CBC)

_____ Blood chemistry

_____ Urinalysis

RECOMMENDATION:

[ ] APPROVAL. I find no medical condition(s) which I consider incompatible with diving.

[ ] RESTRICTED ACTIVITY APPROVAL. The applicant may dive in certain circumstances as described in REMARKS.

[ ] FURTHER TESTING REQUIRED. I have encountered a potential contraindication to diving. Additional medical tests must be performed before a final assessment can be made. See REMARKS.

[ ] REJECT. This applicant has medical condition(s) which, in my opinion, clearly would constitute unacceptable hazards to health and safety in diving. See REMARKS.

REMARKS:

_____

_____

_____

I have discussed the patient's medical condition(s) which would not seriously interfere with diving but which may seriously compromise subsequent health. The patient understands the nature of the hazards and the risks involved in diving with these defects.

_____ M.D.
Date Signature

_____
Name (Print or Type)

_____
Address

_____
Telephone Number

My familiarity with applicant is:

O With this exam only

O Regular Physician for _____ years

O Other (describe)_____

_____

My familiarity with diving medicine:

O On attached list of physicians

O Other (describe)_____

_____

_____

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 _____ Dive Safety Officer and Dive Safety Board or their designee at (place) _____ on (date)_____.

Signature of Applicant _____

APPENDIX C
DIVING MEDICAL HISTORY FORM

DIVING MEDICAL HISTORY FORM

(To Be Completed by Applicant-Diver and discussed with physician only)

Name _____ Sex ____ Age ___ Wt.___ Ht. ___

Sponsor _____ Date ___/___/___
(Dept./Project/Program, etc.) **(Mo/Day/Yr)**

TO THE APPLICANT:

Scuba diving makes considerable demands on your physical and emotional condition. Diving with particular defects amounts to asking for trouble not only for yourself, but to anyone coming to your aid if you get into difficulty in the water. Therefore, it is prudent to meet certain medical and physical requirements before beginning a diving or training program.

Your answers to the questions are more important, in many instances, in determining your fitness than what the physician may see, hear or feel when you are examined. Obviously, you should give accurate information or the medical screening procedure becomes useless.

This form shall be kept confidential. If you believe any question amounts to invasion of your privacy, you may elect to omit an answer, provided that you shall subsequently discuss that matter with your own physician. Your physician 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, your physician's 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 your physician is concerned only with your well-being and safety. Respect the advice and the intent of this medical history form.

	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 nonprescription)	
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	
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	

–continued–

	Yes	No	Please indicate whether or not the following apply to you	Comments
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	
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;	

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

_____ _____

Signature **Date**

APPENDIX D
MEDICAL HISTORY QUESTIONS EVALUATION FORM

Appendix D.–Medical history questions evaluation form.

MEDICAL HISTORY QUESTIONS EVALUATION FORM

(Answer Screening Aid)

1 - A	21 - B	41 - A	61 - B
2 - B	22 - B	42 - B	62 - B
3 - B	23 - B	43 - B	63 - B
4 - B	24 - C	44 - B	64 - B
5 - C	25 - B	45 - B	65 - B
6 - B	26 - B	46 - B	66 - B
7 - B	27 - B	47 - B	67 - B
8 - A	28 - B	48 - B	68 - B
9 - B	29 - B	49 - B	69 - B
10 - B	30 - B	50 - B	70 - B
11 - B	31 - B	51 - B	71 - B
12 - B	32 - B	52 - B	72 - B
13 - B	33 - B	53 - B	73 - C
14 - B	34 - C	54 - B	74 - C
15 - B	35 - B	55 - B	75 - B
16 - B	36 - B	56 - B	
17 - C	37 - B	57 - A	
18 - B	38 - B	58 - B	
19 - B	39 - B	59 - B	
20 - B	40 - B	60 - B	

When a "Yes" answer is checked:

A = Absolute contraindication to diving;

B = Relative contraindication to diving, requires careful review by physician;

C = Of interest, not a contraindication.

APPENDIX E
LOCAL PHYSICIANS WITH TRAINING AND EXPERTISE IN DIVING OR UNDERSEA MEDICINE

Appendix E.–List of **r**ecommended local physicians with training and expertise in diving or undersea medicine.

1. Dr. William Palmer	**Juneau Medical Center**
Name	Clinic Name
9309 Glacier Hwy, Bldg. B, Suite 301, Juneau, AK 99801	
Address	
(907)- 586 - 1895 or Bartlett Hospital in Juneau (907)- 586 - 2611	
Telephone	
2. Dr. Aric Ludwig	**Bartlett Hospital, Juneau**
Name	Clinic Name
3260 Hospital Drive, Juneau, AK 99801	
Address	
(907)- 596 - 2611	
Telephone	
3. Dr. Donald Lehmann	**Sitka Medical Center**
Name	Clinic Name
700 Katlian St., Sitka, AK 99835	
Address	
(907)- 747 - 5861	
Telephone	
4. Dr. Hunter Judkins	**Tanana Valley Clinic**
Name	Clinic Name
1001 Noble St., Fairbanks, AK 99701	
Address and Telephone	
(907)- 459 - 3500	
Telephone	

APPENDIX F
SELECTED REFERENCES IN DIVING MEDICINE

Appendix F.–Selected references in diving medicine

DIVING MEDICINE, 1990. A. Bove and J. Davis. W. B. Saunders Company, Philadelphia

DIVING AND SUBAQUATIC MEDICINE, Third Edition, 1992. C. Edmonds, C. Lowery and J. Pennefather. Butterworth-Heinemann Ltd. Oxford. (Available from Best Publishing Company, P.O. Box 30100, Flagstaff, AZ 86003-0100)

MEDICAL EXAMINATION OF SPORT SCUBA DIVERS, Jefferson Davis, M.D. (ed.). Best Publishing Company, P.O. Box 30100, Flagstaff, AZ 86003-0100.

NOAA DIVING MANUAL, NOAA. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

SCUBA DIVING IN SAFETY AND HEALTH, C.W. Deuker. Madison Publishing Associates, Diving Safety Digest, P.O. Box 2735, Menlo Park, CA 94026

THE PHYSICIAN'S GUIDE TO DIVING MEDICINE, C.W. Shilling, C. B. Carlston and R. A. Mathias. Plenum Press, New York, NY (Available through the Undersea and Hyperbaric Medical Association, Bethesda, MD)

U.S. NAVY DIVING MANUAL. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.

APPENDIX G
DEFINITION OF DIVING TERMS

Air sharing - The sharing of an air supply between divers.

Bottom Time - The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins a direct ascent to the surface.

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

Buddy Breathing - The sharing of a single air source between divers.

Buddy Diver - Second member of the dive team.

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

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

Burst Pressure - The pressure at which a pressure containment device would fail structurally.

Certified Diver - A diver who holds a recognized valid certification from an organizational member or recognized certifying agency.

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

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

Decompression 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. (Also called dive tables.)

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 - The physical location of a diver during a dive.

Diver - An individual in the water who uses apparatus, including snorkel, which supplies breathing gas at ambient pressure.

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.

Diver-Carried 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.

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

Dive Safety Board (DSB) - The group of individuals who act as the official representative of the Alaska Department of Fish and Game in matters concerning the scientific diving program (see Sec. 1.24).

Dive Safety Officer (DSO) - The individual responsible for the safe conduct of the scientific diving program of ADF&G (see Sec. 1.23).

–continued–

Emergency Ascent - An ascent made under emergency conditions where the diver exceeds the normal ascent rate.

FSW - Feet of seawater, or equivalent static head.

Hookah Diving - A type of shallow water surface-supplied diving where there is no voice communication with the surface.

Hyperbaric Chamber - See decompression chamber.

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

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

Local Dive Safety Officer (LDSO) - Individual assigned the duties of the DSO within a division or region (see Sec. 1.25).

Maximum Working Pressure - The maximum pressure to which a pressure vessel may be exposed under standard operating conditions.

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

MSW - Meters of seawater or equivalent static head.

No-Decompression Limits - The depth-time limits of the "no-decompression limits and repetitive dive group designations table for no-decompression air dives" of the U.S. Navy Diving Manual or equivalent limits.

Normal Ascent - An ascent made with an adequate air supply at a rate of 60 feet per minute or less.

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.

Psig - pounds per square inch gauge.

Recompression Chamber - See decompression chamber.

Scientific Diving - Scientific diving is defined (29 CFR 1910.402) 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.

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

Surface Supplied Diving - A diving mode in which the diver in the water is supplied from the dive location with compressed gas for breathing.

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

Umbilical - The 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.

Weir – A series of pickets placed across a stream or river to block fish movement while still allowing water to pass between pickets.

Working Pressure - The normal pressure at which the system is designed to operate.

APPENDIX H
REQUEST FOR DIVING RECIPROCITY FORM

Appendix H.–Request for Diving Reciprocity form.

REQUEST FOR DIVING RECIPROCITY FORM

VERIFICATION OF DIVER TRAINING AND EXPERIENCE

Where divers from two or more institutions plan to dive together in a joint project, the DSOs of each institution must agree on the code of practice that will apply to all divers. The DSO or Dive Safety Board may develop reciprocity agreements with scientific diving organizations after review of that organization's Dive Safety Manual, appropriate Standard Operating Procedures, or Diving Rules. A standard operating code must be agreed upon and clearly communicated to all divers and personnel involved in each dive. A scientific diver that is currently certified under the auspices of an organizational member institution of the American Academy of Underwater Sciences (AAUS) shall be recognized by ADF&G and may apply for reciprocity in order to dive with ADF&G. The visiting diver will comply with the diving regulations of the host organization's Dive Safety Manual unless previously arranged by both organization's Dive Safety Boards or DSO.

The host organization has the right to approve or deny this request and may require, at a minimum, a checkout dive with the Dive Safety Officer (DSO) or designee of the host organization. If the request is denied, the host organization should notify the DSO of the visiting diver the reason for the denial. The DSO for the visiting scientific diver has confirmed the following information:

(Date of)	(Date)
_____ Last medical examination	_____ CPR training
_____ Depth certification	_____ Oxygen administration
_____ Most recent checkout dive	_____ First aid for diving
_____ Scuba regulator/equipment	_____ Date of last dive service/test

Number of logged dives completed within previous 12 months?_____

Any restrictions? (Y/N)_____ if yes, explain:

_____

Please check any pertinent specialty certifications:

_____ Dry Suit	_____ Rescue	_____ Blue Water	
_____ Dive Computer	_____ Dive Master	_____ Altitude	
_____ Nitrox	_____ Instructor	_____ Ice/Polar	
_____ Mixed Gas	_____ EMT	_____ Cave	
_____ Closed Circuit	_____ Dive Accident Management	_____ Night	
_____ Saturation	_____ Chamber Operator	_____ Other	
_____ Decompression	_____ Lifesaving		

_____

Name of diver: _____

Emergency Information: (To notify in an emergency)

Name:_____

Relationship:_____

Telephone: (work) _____ (home) _____

Address:_____

–continued–

This is to verify that the above individual is currently a certified scientific diver

at:_____

(Name of Organization)

Local Dive Safety Officer:

_____

(Signature) **(Date)**

_____ _____

(Print) **(Telephone, FAX, Email)**

cc. ADF&G Dive Safety Officer

APPENDIX I
CHECKLIST FOR SCIENTIFIC DIVER CHECKOUT DIVE

Appendix I.–Checklist for scientific diver checkout dive.

SCIENTIFIC DIVER CHECKOUT DIVE

Name: _____ Date: _____

Location: _____

Certified scientific divers and Divers-In-Training should be able to demonstrate proficiency in the following skills during checkout dives or training evaluation dives with the Local Dive Safety Officer (LDSO) or designee:

___ Knowledge of department diving standards and regulations
___ Pre-dive planning, briefing, site orientation, and buddy check
___ Use of dive tables and/or dive computer
___ Equipment familiarity
___ Underwater signs and signals
___ Proper buddy contact
___ Monitor cylinder pressure, depth, bottom time
___ Swim skills:
  ___ Surface dive to 10 ft. without scuba gear
  ___ Demonstrate watermanship and snorkel skills
  ___ Surface swim without swim aids (400 yd. <12 min)
  ___ Underwater swim without swim aids (25 yd. without surfacing)
  ___ Tread water without swim aids (10 min.), or without use of hands (2 min.)
  ___ Transport another swimmer without swim aids (25 yd)
___ Entry and exit (pool, boat, shore)
___ Mask removal and clearing
___ Regulator removal and clearing
___ Surface swim with scuba; alternate between snorkel and regulator (400 yd.)
___ Neutral buoyancy (hover motionless in midwater)
___ Proper descent and ascent with BC
___ Remove and replace weight belt while submerged
___ Remove and replace scuba cylinder while submerged
___ Alternate air source breathing with and without mask (donor/receiver)
___ Buddy breathing with and without mask (donor/receiver)
___ Simulated emergency swimming ascent
___ Compass and underwater navigation
___ Simulated decompression and safety stop
___ Rescue:
  ___ Self rescue techniques
  ___ Tows of conscious and unconscious victim
  ___ Simulated in-water rescue breathing
  ___ Rescue of submerged non-breathing diver (including equipment removal, simulated rescue breathing, towing, and recovery to boat or shore)
  ___ Use of emergency oxygen on breathing and non-breathing victim
  ___ Accident management and evacuation procedures

Additional Training (optional)

___ Compressor/ Fill station orientation and usage
___ Small boat handling

LDSO (or designee): _____ Date: _____

(signature)

_____

(print name)

APPENDIX J
CHECKLIST FOR WEIR DIVER CHECKOUT DIVE

WEIR DIVER CHECKOUT DIVE

Name: _____ Date: _____

Location: _____

Certified Weir Divers-In-Training, and 'Weir Divers' should be able to demonstrate proficiency in the following skills during a checkout dive with the Local Dive Safety Officer (LDSO) or designee:.

__ Knowledge of department diving standards and regulations
__ Pre-dive planning, briefing, site orientation, and buddy check
__ Equipment familiarity
__ Proper buddy contact
__ Monitor cylinder pressure
__ Weir dive skills:
    __ Shoreline entry
    __ Establish neutral buoyancy
    __ Stand/balance on weir against current
    __ Walk 25 feet along weir
    __ Descend to bottom
    __ Mask removal and clearing
    __ Regulator removal and clearing
    __ Underwater swim/pull 25 feet along weir
    __ Ascend from bottom, practicing safe ascent
    __ Swim/walk upstream 25 feet
    __ Shoreline exit
__ Rescue briefing:
    __ Self rescue techniques
    __ Tows of conscious and unconscious victim
    __ Simulated in-water rescue breathing
    __ Rescue of submerged non-breathing diver (including equipment removal, simulated
    __ rescue breathing, towing, and recovery to boat or shore)
    __ Use of emergency oxygen on breathing and non-breathing victim
    __ Accident management and evacuation procedures

Additional Training (optional)

__ Practice rescue of diver drifting downstream of weir (both self rescue and with dive tender)
__ Dive Tender ring toss
__ Small boat handling (optional)

LDSO (or designee): _____ Date: _____
(signature)

_____
(print name)

APPENDIX K
DIVING EMERGENCY MANAGEMENT PROCEDURES

Introduction

A diving accident victim could be any person who has been breathing air 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 each department diver to understand the procedures for diving emergencies including evacuation and medical treatment, prior to diving.

General Procedures

Depending on and according to the nature of the diving accident, stabilize the patient, administer 100% oxygen, contact local Emergency Medical System (EMS) for transport to medical facility, and contact dive physician/recompression chamber, as appropriate. 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.

1. Make appropriate contact with victim or rescue as required.
2. Establish (A)irway, (B)reathing, (C)irculation as required.
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.
5. Contact diving physician and recompression chamber as necessary.
6. Notify DSO or designee.
7. Complete and submit Incident Report Form (Appendix 13) to ADF&G's Dive Safety Board and the AAUS (As required in Section 2.72).

List of Emergency Contact Numbers Appropriate For Dive Location:

Divers Alert Network (DAN) - (919) 684-81111

Alaska Hyperbaric Chambers:

Bartlett Memorial Hospital Hyperbaric Chamber (Juneau) - (907) 586-2611

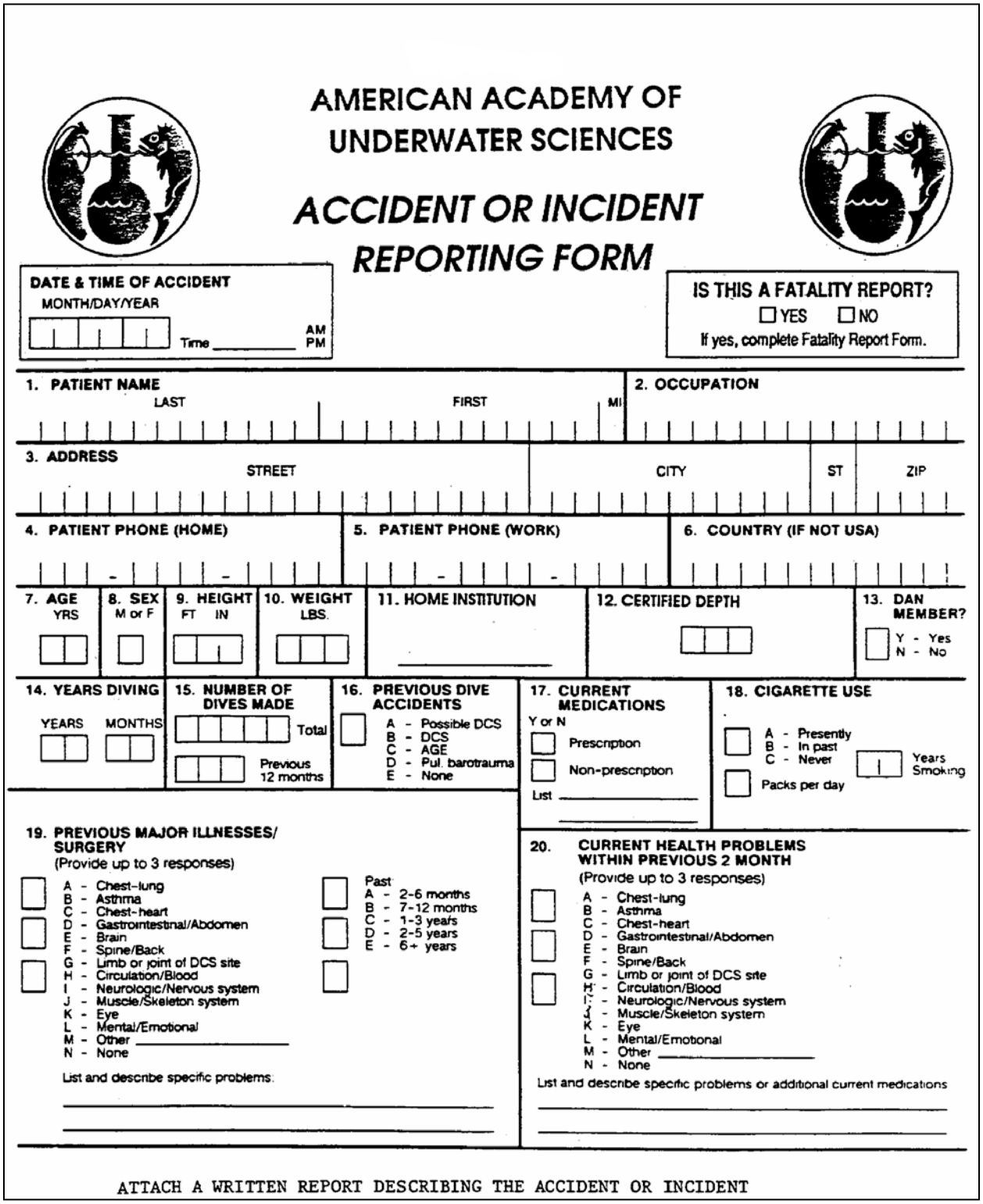
Alaska Regional Hospital (Anchorage) – (907) 264-1583

American Hyperbaric Center (Anchorage) – (907) 562-5420

American Marine Hyperbaric Center (Wasilla) – (907) 357-5400

APPENDIX L
DIVING ACCIDENT OR INCIDENT FORM

Appendix L.–Diving accident or incident form.



AMERICAN ACADEMY OF UNDERWATER SCIENCES

ACCIDENT OR INCIDENT REPORTING FORM

DATE & TIME OF ACCIDENT
MONTH/DAY/YEAR
Time _____ AM PM

IS THIS A FATALITY REPORT?
☐ YES ☐ NO
If yes, complete Fatality Report Form.

1. PATIENT NAME
LAST FIRST MI

2. OCCUPATION

3. ADDRESS
STREET CITY ST ZIP

4. PATIENT PHONE (HOME)

5. PATIENT PHONE (WORK)

6. COUNTRY (IF NOT USA)

7. AGE YRS

8. SEX M or F

9. HEIGHT FT IN

10. WEIGHT LBS.

11. HOME INSTITUTION

12. CERTIFIED DEPTH

13. DAN MEMBER?
Y - Yes
N - No

14. YEARS DIVING
YEARS MONTHS

15. NUMBER OF DIVES MADE
Total
Previous 12 months

16. PREVIOUS DIVE ACCIDENTS
A - Possible DCS
B - DCS
C - AGE
D - Pul. barotrauma
E - None

17. CURRENT MEDICATIONS
Y or N
Prescription
Non-prescription
List _____

18. CIGARETTE USE
A - Presently
B - In past
C - Never
Years Smoking
Packs per day

19. PREVIOUS MAJOR ILLNESSES/ SURGERY
(Provide up to 3 responses)
A - Chest-lung
B - Asthma
C - Chest-heart
D - Gastrointestinal/Abdomen
E - Brain
F - Spine/Back
G - Limb or joint of DCS site
H - Circulation/Blood
I - Neurologic/Nervous system
J - Muscle/Skeleton system
K - Eye
L - Mental/Emotional
M - Other _____
N - None

Past
A - 2-6 months
B - 7-12 months
C - 1-3 years
D - 2-5 years
E - 6+ years

List and describe specific problems:

20. CURRENT HEALTH PROBLEMS WITHIN PREVIOUS 2 MONTH
(Provide up to 3 responses)
A - Chest-lung
B - Asthma
C - Chest-heart
D - Gastrointestinal/Abdomen
E - Brain
F - Spine/Back
G - Limb or joint of DCS site
H - Circulation/Blood
I - Neurologic/Nervous system
J - Muscle/Skeleton system
K - Eye
L - Mental/Emotional
M - Other _____
N - None

List and describe specific problems or additional current medications

ATTACH A WRITTEN REPORT DESCRIBING THE ACCIDENT OR INCIDENT

–continued–

DIVE ACCIDENT OR INCIDENT

21. DIVE PLATFORM
A - Shore
B - Small boat
C - Research Vessel

22. DIVE ACTIVITY (up to 2 responses)
A - Collecting
B - Photography
C - Installing Equip.
D - Servicing Equip.
E - Observing
F - Under instruction
G - Providing instruction
H - Other: _____

23. ENVIRONMENT
A - Freshwater
B - Saltwater

24. ALTITUDE OF DIVE
A - Sea Level
B - > Sea Level but < 1000 ft
C - > 1000 ft

25. Was this dive or dive series typical of your normal type of diving?
Y - Yes
N - No
IF NO, Explain _____

26. DIVER'S PERCEPTION OF TEMPERATURE
A - Cold
B - Hot
C - Comfortable

27. CURRENT STRENGTH
A - Strong
B - Moderate
C - Mild
D - None

28. AIR SUPPLY
A - Scuba Air
B - Surface Supply Air
C - Mixed gas
D - None/Breath-hold dive

29. AIR CONSUMPTION
A - Ran low
B - Out of air
C - Not a problem
D - Buddy breathing (not octopus)

30. BUOYANCY PROBLEM
Y - Yes
N - No

31. RAPID ASCENT
Y - Yes
N - No

32. WITHIN LIMITS-Y or N
Tables (which table _____)
or
Computer (type _____)

33. TYPE OF SUIT
A - Wet
B - Partial Wet
C - Dry
D - Lycra
E - Swim

34. EQUIPMENT USED ON DIVE: (please check all that apply)
Depth gauge
Timing device/watch
Buoyancy vest
BC Inflator hose in use
Decompression computer

35. EQUIPMENT MALFUNCTION:
A - None
B - Regulator
C - BC Vest
D - Weight belt
E - Dry suit
F - DC Computer
G - Inflator hose
H - Contaminated air supply
I - Equipment was not familiar to you.
J - Other
Reason: _____

36. TYPE OF DIVE
Y - Yes
N - No
Single
Repetitive

37. WOMEN, PLEASE RESPOND (up to 2 responses)
When the accident occurred, were you:
A - Menstruating
B - On birth control medication
C - Pregnant
D - None of the above

38. DIVE LOCATION:
State, Province, or Island: _____
Country or nearest country: _____

39. How long ago was your last Dive Trip/Series?
Circle one:
Days Weeks Months

40. STRENUOUS EXCERCISE
Y - Yes
N - No
24 hours predive
During dive
6 hours postdive

41. PREDIVE HEALTH
A - Nausea/ vomiting
B - Hangover
C - Diarrhea
D - Other
E - No Problem

42. ALCOHOL
Please check:
Number of drinks, beers, or wine
None
Night Before
Predive
Between Dives
Post Dive

43. RECREATIONAL DRUG USE
Prior to, between, or after dive
Y - Yes
N - No

44. Do you consider yourself physically fit?
Y - Yes
N - No
Do you exercise on a weekly basis? (Y or N)
Days per week

45. FATIGUE OR LACK OF SLEEP PRIOR TO DIVE?
Y - Yes
N - No

46. DIVE SERIES

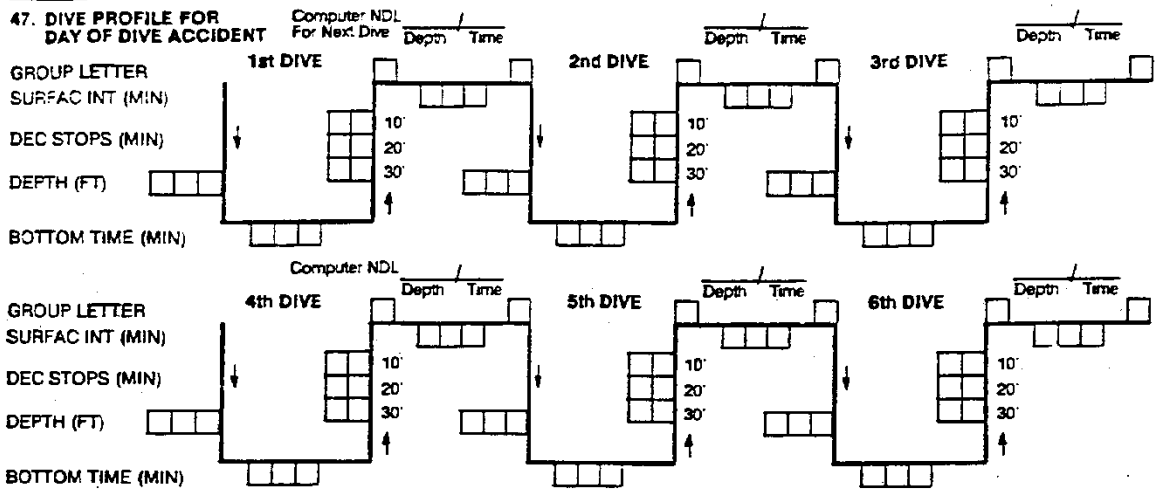
Please fill in all that apply up to and including your last dive. If you skipped a day please leave that day blank

	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
Total # of dives							
Any night dive? (How many)							
Any symptoms? (Y or N)							
A - All no stop dive(s) B - Any safety stop C - Any dive requiring decompression stops							
A - Multilevel (time divided) B - Square							
Deepest Dive (ft.)							

–continued–

DIVE ACCIDENT OR INCIDENT (con't)

47. DIVE PROFILE FOR DAY OF DIVE ACCIDENT



PRE-CHAMBER INFORMATION

48. INITIAL CONTACT WAS:

- A - DAN Emergency
- B - DAN Non-emergency
- C - Hospital emergency room
- D - Emergency medical service
- E - US Coast Guard
- F - Physician
- G - Dive instructor/shop
- H - Other _____

49. Total delay from symptom onset to contacting DAN or other medical help:

HOURS or DAYS

50. FLYING OR INCREASED ELEVATION AFTER DIVING AND PRIOR TO TREATMENT?

- A - Commercial airliner
- B - Unpressurized aircraft
- C - Med Evac Flight
- D - Mountain elevation
- E - Does not apply

Hours post dive (flew or went into elevation) _____

elevation (in feet) _____

51. SIGNS & SYMPTONS

1st Symptom, 2nd Symptom, 3rd Symptom, 4th Symptom, 5th Symptom, 6th Symptom

- A - Pain
- B - Rash
- C - Itching
- D - Weakness
- E - Numbness/Tingling
- F - Dizziness/Vertigo
- G - Semi-consciousness
- H - Unconsciousness
- I - Restlessness
- J - Extreme fatigue
- K - Visual disturbance
- L - Speech disturbance
- M - **Headache**
- N - Paralysis
- O - Difficulty breathing
- P - Nausea/Vomiting
- Q - Hemoptosis/coughing blood from lungs
- R - Muscle twitching
- S - Convulsions
- T - Hearing loss
- U - Ringing ears
- V - Decreased skin sensation
- W - Bladder problem
- X - Bowel problem
- Y - Personality change
- Z - Difficulty walking/standing
- 1 - Reflex change
- 2 - Other: _____

52. LOCATION: Block A = location of symptom Then please check (✓) L = Left R = Right B = Bilateral/Both Sides

	A	L	R	B
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

- A - Head
- B - Face
- C - Sinus
- D - Eyes
- E - Ears
- F - Neck
- G - Shoulder
- H - Entire arm
- I - Upper arm
- J - Elbow
- K - Forearm
- L - Wrist
- M - Hand
- N - Fingers
- O - Chest
- P - Back
- Q - Upper back
- R - Lower back
- S - Abdomen
- T - Buttock
- U - Groin
- V - Hip
- W - Entire leg
- X - Thigh
- Y - Knee
- Z - Calf
- 1 - Shin
- 2 - Ankle
- 3 - Foot
- 4 - Toes
- 5 - Trunk
- 6 - Generalized
- 7 - Other _____

53. SYMPTOM ONSET:

	HOURS	MINUTES	or	BEFORE SURFACING FROM DIVE
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

54. ANY OF THE SYMPTOMS FROM #51 PRIOR TO THE LAST DIVE?

Y - Yes N - No

If yes, which symptoms?

1st, 2nd, 3rd, 4th, 5th, 6th

Other

Explain _____

55. FIRST AID ADMINISTERED BEFORE HOSPITAL OR CHAMBER HELP WAS RECEIVED?

Y - Yes N - No

- Oxygen
- Aspirin
- Oral fluids
- Head down position/ Trendelenburg

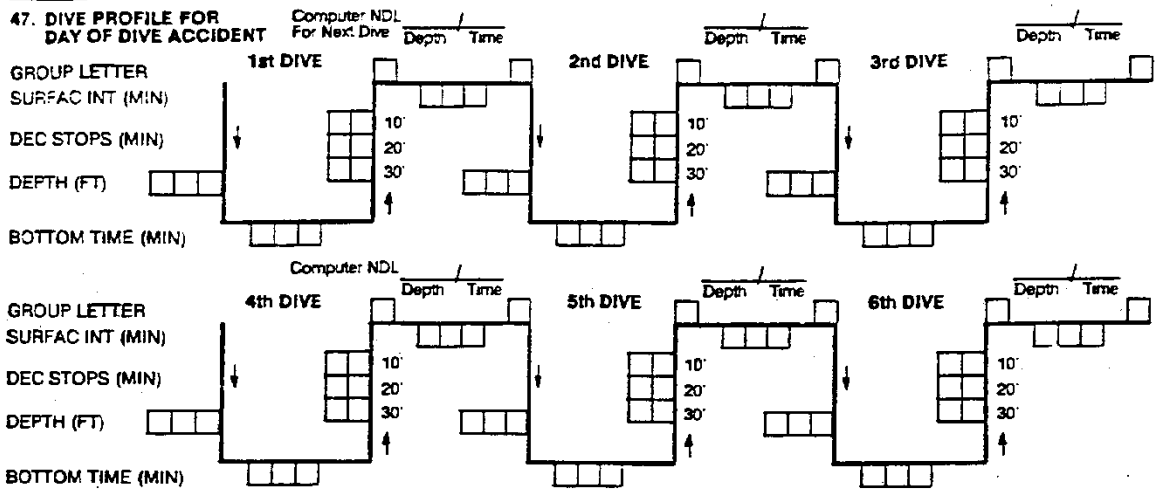
If oxygen was received was delivery by

- A - Demand valve
- B - Freeflow valve
- C - Don't know

–continued–

DIVE ACCIDENT OR INCIDENT (con't)

47. DIVE PROFILE FOR DAY OF DIVE ACCIDENT



PRE-CHAMBER INFORMATION

48. INITIAL CONTACT WAS:

- A - DAN Emergency
- B - DAN Non-emergency
- C - Hospital emergency room
- D - Emergency medical service
- E - US Coast Guard
- F - Physician
- G - Dive instructor/shop
- H - Other _____

49. Total delay from symptom onset to contacting DAN or other medical help:

HOURS or DAYS

50. FLYING OR INCREASED ELEVATION AFTER DIVING AND PRIOR TO TREATMENT?

- A - Commercial airliner
- B - Unpressurized aircraft
- C - Med Evac Flight
- D - Mountain elevation
- E - Does not apply

Hours post dive (flew or went into elevation) _____

elevation (in feet) _____

51. SIGNS & SYMPTONS

1st Symptom, 2nd Symptom, 3rd Symptom, 4th Symptom, 5th Symptom, 6th Symptom

- A - Pain
- B - Rash
- C - Itching
- D - Weakness
- E - Numbness/Tingling
- F - Dizziness/Vertigo
- G - Semi-consciousness
- H - Unconsciousness
- I - Restlessness
- J - Extreme fatigue
- K - Visual disturbance
- L - Speech disturbance
- M - **Headache**
- N - Paralysis
- O - Difficulty breathing
- P - Nausea/Vomiting
- Q - Hemoptosis/coughing blood from lungs
- R - Muscle twitching
- S - Convulsions
- T - Hearing loss
- U - Ringing ears
- V - Decreased skin sensation
- W - Bladder problem
- X - Bowel problem
- Y - Personality change
- Z - Difficulty walking/standing
- 1 - Reflex change
- 2 - Other: _____

52. LOCATION: Block A = location of symptom Then please check (✓) L = Left R = Right B = Bilateral/Both Sides

	A	L	R	B
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

- A - Head
- B - Face
- C - Sinus
- D - Eyes
- E - Ears
- F - Neck
- G - Shoulder
- H - Entire arm
- I - Upper arm
- J - Elbow
- K - Forearm
- L - Wrist
- M - Hand
- N - Fingers
- O - Chest
- P - Back
- Q - Upper back
- R - Lower back
- S - Abdomen
- T - Buttock
- U - Groin
- V - Hip
- W - Entire leg
- X - Thigh
- Y - Knee
- Z - Calf
- 1 - Shin
- 2 - Ankle
- 3 - Foot
- 4 - Toes
- 5 - Trunk
- 6 - Generalized
- 7 - Other _____

53. SYMPTOM ONSET:

	HOURS	MINUTES	or	BEFORE SURFACING FROM DIVE
1st Symptom				
2nd Symptom				
3rd Symptom				
4th Symptom				
5th Symptom				
6th Symptom				

54. ANY OF THE SYMPTOMS FROM #51 PRIOR TO THE LAST DIVE?

Y - Yes N - No

If yes, which symptoms?

1st, 2nd, 3rd, 4th, 5th, 6th

Other

Explain _____

55. FIRST AID ADMINISTERED BEFORE HOSPITAL OR CHAMBER HELP WAS RECEIVED?

Y - Yes N - No

- Oxygen
- Aspirin
- Oral fluids
- Head down position/ Trendelenburg

If oxygen was received was delivery by

- A - Demand valve
- B - Freeflow valve
- C - Don't know

APPENDIX M
GUIDELINES FOR USE OF DIVE COMPUTERS

Appendix M.–Guidelines for use of dive computers.

From AAUS Dive Computer Workshop. Lang and Hamilton (Eds.). U.S.C. Sea Grant Program, Los Angeles, CA, 1989

1. Only those makes and models of dive computers specifically approved by the LDSO may be used.
2. Any diver desiring the approval to use a dive computer as a means of determining decompression status must apply to the LDSO, and complete an appropriate practical training session.
3. Each diver relying on a dive computer to plan dives and indicate or determine decompression status must have his own unit.
4. On any given dive, both divers in the buddy pair must follow the most conservative dive computer.
5. If the dive computer fails at any time during the dive, the dive must be terminated and appropriate surfacing procedures should be initiated immediately.
6. A diver should not dive for 18 hours before activating a dive computer to use it to control his diving.
7. Once the dive computer is in use, it must not be switched off until it indicates complete off gassing has occurred or 18 hours have elapsed, whichever comes first.
8. When using a dive computer, non-emergency ascents are to be at a rate specified for the make and model of dive computer being used.
9. Ascent rates shall not exceed 30 fsw/min.
10. Whenever practical, divers using a dive computer should make a stop between 10 and 30 feet for 5 minutes, especially for dives below 60 fsw.
11. Only 1 dive on the dive computer in which the No Decompression Limits of the tables or dive computer has been exceeded may be made in any 18-hour period.
12. Repetitive and multi-level diving procedures should start the dive, or series of dives, at the maximum planned depth, followed by subsequent dives of shallower exposures.
13. Multiple deep dives require special consideration.

APPENDIX N
SAFE ASCENT RECOMMENDATIONS

Appendix N.–Safe ascent recommendations.

From: AAUS BI0MECHANICS OF SAFE ASCENTS WORKSHOP.1990 , Lang and Egstrom (Eds.)

It has long been the position of the American Academy of Underwater Sciences that the ultimate responsibility for safety rests with the individual diver.

The time has come to encourage divers to slow their ascents.

1. Buoyancy compensation is a significant problem in the control of ascents.
2. Training in, and understanding of, proper ascent techniques is fundamental to safe diving practice.
3. Before certification, the diver is to demonstrate proper buoyancy, weighting and a controlled ascent, including a "hovering" stop.
4. Diver shall periodically review proper ascent techniques to maintain proficiency.
5. Ascent rates shall not exceed 30 fsw per minute.
6. A stop in the 10–30 fsw zone for 3-5 min. is recommended on every dive.
7. When using a dive computer or tables, non-emergency ascents are to be at the rate specified for the system being used.
8. Each diver shall have instrumentation to monitor ascent rates.
9. Divers using dry suits shall have training in their use.
10. Dry suits shall have a hands-free exhaust valve.
11. BCs shall have a reliable rapid exhaust valve which can be operated in a horizontal swimming position.
12. A buoyancy compensator is required with dry suit use for ascent control and emergency flotation.
13. Breathing 100% oxygen above water is preferred to in-water air procedures for omitted decompression.

APPENDIX O

REQUEST FORM FOR CERTIFICATION OF A DIVER BY ALASKA DEPARTMENT OF FISH AND GAME

Appendix O.–Request form for certification of a diver by Alaska Department of Fish and Game.

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

Date:

Kyle Hebert
Dive Safety Officer
Alaska Department of Fish and Game
802 3rd Street
P.O. Box 110024
Juneau, AK 99811-0024

Dear Mr. Hebert,

Pursuant to satisfying those requirements described in the Alaska Department of Fish and Game's Dive Safety Manual, I am requesting that:

Name:
Position:
Location:
Division:

become certified for scuba diving under department auspices.

Sincerely,

Regional Supervisor or designee: _____
(signature)

_____
(print name)

APPENDIX P

CHECKLIST FOR DIVER AUTHORIZATION BY ALASKA DEPARTMENT OF FISH AND GAME

DEPARTMENT DIVER AUTHORIZATION CHECKLIST

Individuals wishing to be involved in scuba diving activities under department auspices must have prior supervisory approval and must adhere to the established Dive Safety Manual. The following listed items should be current and submitted to your Local Dive Safety Officer (LDSO) for approval prior to engaging in any department diving activities.

Name: _____

Employee ID Number_____

Division: _____

Location: _____

Position: _____

PCN: _____

Authorization to participate in diving letter (Appendix O): _____

Copies of the following current certifications:

Scuba diving certification card(s): _____

Basic open water scuba training (Sec. 4.00): _____

Diver-In-Training certification (Sec. 4.30): _____

Advanced scuba training (see Sec. 5.32 in the DSM): _____

Dive Master (Sec. 5.80): _____

All other diving certifications (e.g. Instructor, Rescue Diver): _____

Checkout Dive and Training Evaluation as required by the DSO or LDSO (Appendix I or J):

Field Practicum (Sec. 5.34): _____

First Aid: _____

CPR: _____

Oxygen administration:_____

All other certification cards (e.g. Life Saving, EMT): _____

Medical Evaluation of Fitness for Scuba Diving (Appendix B and Sec. 6.00): _____

Summary of the total number and accumulated bottom time of logged dives being used to fulfill the diving experience requirement. A complete dive history by year (number of logged dives and bottom time) is encouraged. (Do **NOT** submit your dive log or copies of your dive log):

LDSO: _____ Date:_____

Cc. Kyle Hebert, ADF&G Statewide Dive Safety Officer

APPENDIX Q

NOTIFICATION FORM FOR DIVER CERTIFICATION BY ALASKA DEPARTMENT OF FISH AND GAME

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

AUTHORIZATION TO DIVE FOR THE
ALASKA DEPARTMENT OF FISH AND GAME

To: [Diver's name and address, PCN]

LEVEL OF CERTIFICATION

You are authorized to the level indicated below, to use self-contained, underwater breathing apparatus incident to the performance of your official duties and subject to Alaska Department of Fish and Game policy and regulations. All appropriate levels must be initialed and dated by your Local Dive Safety Officer (LDSO) or the Dive Safety Officer (DSO) prior to participating at that level.

Diver-in-Training (Sec. 4.23):_____ Field Practicum (Sec. 5.33): _____

Scientific Diver (Sec. 5.00): _____

Ship Husbandry Endorsement (Chapter II, Sec. 3.20):_____

Depth Certification Level (Sec. 5.40): 30 fsw: _____ 60 fsw: _____

100 fsw: _____ 130 fsw: _____

Dive Master (Sec. 5.8.0): _____

Temporary Diver (Sec. 5.10.2):_____ Valid for a limited time as indicated here:_____

_____ Last medical examination _____ Oxygen administration (exp)

_____ First aid (exp) _____ 5-year refresher (due)

_____ CPR training (exp)

RESTRICTIONS

REMARKS

To maintain this authorization as an Alaska Department of Fish and Game diver, it is your responsibility to maintain familiarity and compliance with ADF&G's Dive Safety Manual (DSM) including maintaining diver proficiency by completing a minimum of 12 logged dives per 12 month period. All records documenting compliance with the DSM are to be provided to your assigned LDSO. This Authorization to Dive expires 12 months from the date signed below by the LDSO and must be renewed after that time prior to diving under Department auspices.

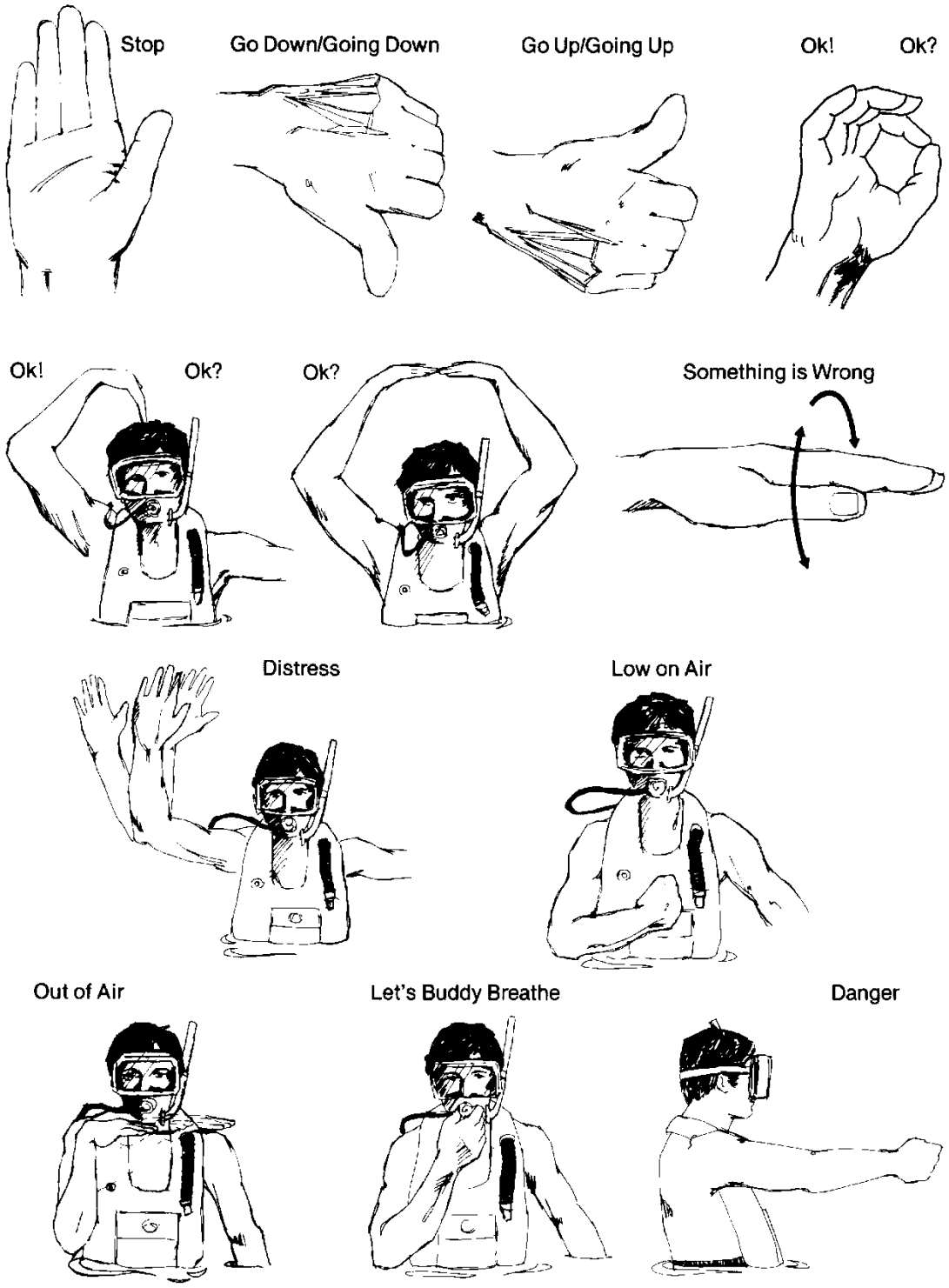
LDSO: _____ Date:_____

Cc. Kyle Hebert, ADF&G Dive Safety Officer

APPENDIX R
ILLUSTRATIONS OF SELECTED HAND SIGNALS

Appendix R.–Illustrations of selected hand signals.

From: NOAA Diving Manual, October 1991, Figs. 14-2A and 14-2B



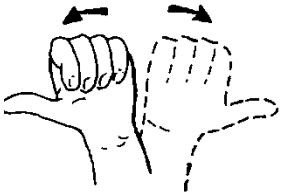
–continued–

Me, or watch me

Come here

Go that way

I am cold



Which direction?

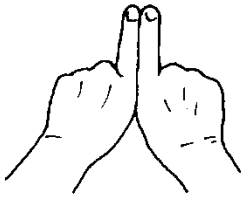
Yes

No

Take it easy, slow down

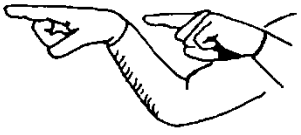
Ears not clearing

Hold hands



Get with your buddy

Look



You lead, I'll follow

What time? What depth?

I don't understand

APPENDIX S
FLYING AFTER DIVING

Appendix S**.–**Instructions for flying after diving, and table denoting desired interval between diving and flying.

If it is necessary to fly immediately after a decompression dive, after a series of repetitive dives, or after recompression treatment (as might occur in the case of an injury that requires medical capability beyond that available at the dive site), the diver should be transported at low altitude by helicopter or aircraft or in a plane having a cabin pressure of not more than 800 feet (244 meters) of altitude. The same rules should be followed if a diver experiencing decompression sickness must be transported by air, except that the victim should also breathe pure oxygen until arrival at a recompression chamber. Before flying in an aircraft in which the cabin atmosphere is less than 8000 feet (2438 meters) (usually the case in most flights), a diver who has completed any number of dives on air and been decompressed according to the U.S. Navy Standard Air Decompression Table should wait at sea level, breathing air, for the computed surface interval that allows him or her to be classified as a Group D diver, in accordance with the U.S. Navy No-Decompression Limits and Repetitive Group Designation Table for No-Decompression Dives. Before flying, the diver should check with the flight engineer to ascertain the maximum planned cabin altitude and to inform the engineer that divers will be aboard. For guidance, the following table was taken from the NOAA Dive Safety Manual. See Section 2.60 for additional information.

Repetitive Altitude Group Designator	**Altitude**									
	1,000	**2,000**	**3,000**	**4,000**	**5,000**	**6,000**	**7,000**	**8,000**	**9,000**	**10,000**
A	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
B	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	2:11
C	0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00	3:06	8:26
D	0:00	0:00	0:00	0:00	0:00	0:00	0:09	3:28	7:33	12:52
E	0:00	0:00	0:00	0:00	0:00	0:51	3:35	6:54	10:59	16:18
F	0:00	0:00	0:00	0:00	1:12	3:40	6:23	9:43	13:47	19:07
G	0:00	0:00	0:00	1:23	3:34	6:02	8:46	12:05	16:10	21:29
H	0:00	0:00	1:31	3:26	5:37	8:05	10:49	14:09	18:13	23:33
I	0:00	1:32	3:20	5:15	7:26	9:54	12:38	15:58	20:02	24:00
J	1:32	3:09	4:57	6:52	9:04	11:32	14:16	17:35	21:39	24:00
K	3:00	4:37	6:25	8:20	10:32	13:00	15:44	19:03	23:07	24:00
L	4:21	5:57	7:46	9:41	11:52	14:20	17:04	20:23	24:00	24:00
M	5:35	7:11	9:00	10:55	13:06	15:34	18:18	21:37	24:00	24:00
N	6:43	8:20	10:08	12:03	14:14	16:42	19:26	22:46	24:00	24:00
O	7:47	9:24	11:12	13:07	15:18	17:46	20:30	23:49	24:00	24:00
Z	8:17	9:54	11:42	13:37	15:49	18:17	21:01	24:00	24:00	24:00
Exceptional Exposure	Wait 48 hours before flying									

NOTE 1 When using Table 4·3, use the highest repetitive group designator obtained in the previous 24-hour period.

NOTE 2 Table 4–3 may only be used when the maximum altitude achieved is 10,000 ft. or less. For ascents above 10,000 ft., consult NOAA Diving Program for guidance.

NOTE 3 The cabin pressure in commercial aircraft is maintained at a constant value regardless of the actual altitude of the flight. Though cabin pressure varies somewhat with aircraft type, the nominal value is 8,000 feet to compute the required surface interval before flying.

NOTE 4 No surface interval is required before taking a commercial flight if the dive site is at 8,000 It. or higher. In this case, flying results in an increase in atmospheric pressure rather than a decrease.

NOTE 5 No repetitive group is given for air dives with surface decompression on oxygen or air For these surface decompression dives, enter the standard air table with the sea level equivalent depth and bottom time of the dive to obtain the appropriate repetitive group designator to be used.

NOTE 6 For ascent to altitude following a non-saturation helium-oxygen dive, wait 12 hours if the dive was a no-decompression dive. Wait 24 hours if the dive was a decompression dive.