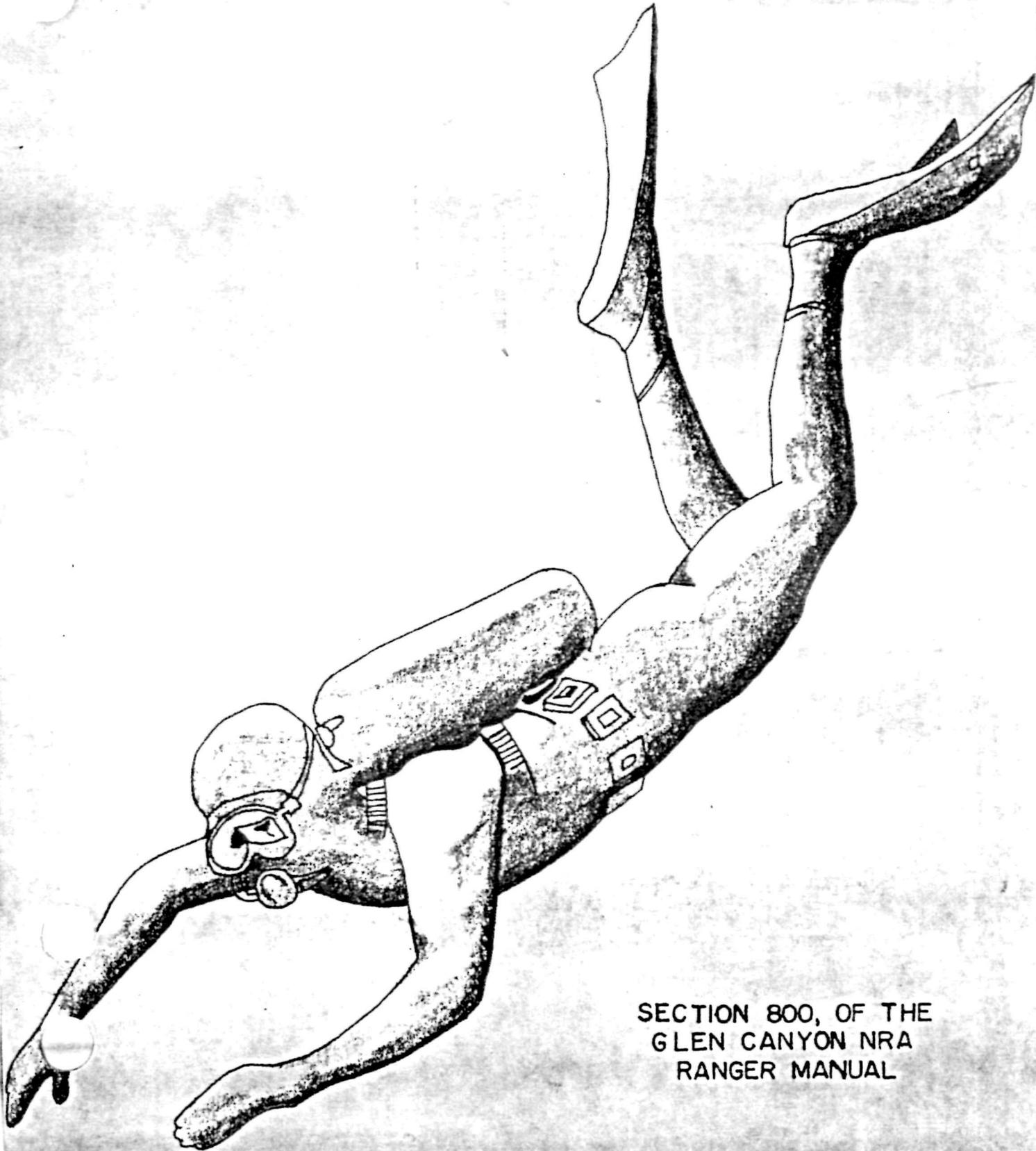


GLEN CANYON NATIONAL RECREATION AREA

DIVING MANUAL



SECTION 800, OF THE
GLEN CANYON NRA
RANGER MANUAL

GLEN CANYON NATIONAL RECREATION AREA

MANUAL OF SCUBA DIVING OPERATIONS

800. Purpose of Manual

The purpose of this manual is to accent National Park Service policies in those operations requiring the use of self-contained underwater breathing apparatus (SCUBA) by Service personnel and to set forth area policies, instructions and directives to safeguard our employees participating in official diving activities. It will also serve as a source of guidelines for operational procedures that will encourage uniformity and efficiency in this program. One section is devoted to our official attitude and approach to visitor participation in recreational diving. A Diving and Safety Emergency Plan is included in the appendix.

801. SCUBA Activities in Parks - General

Skin and SCUBA diving are becoming increasingly popular forms of water recreation. Many park lakes and rivers and coastal waters adjoining certain parks are now being used by divers for recreational purposes. Underwater nature trails have recently been added to Service interpretive programs in several areas. The National Park Service is now using SCUBA equipment to assist in carrying out fish management programs, marine and fresh water research, historical and archeological research, and routine and emergency protection operations. The contribution skilled divers can make to the Glen Canyon operations has been officially recognized and, to meet the requirements of such a highly specialized activity, training of selected personnel and purchase of SCUBA equipment have been included in the area program.

The use of any diving equipment is hazardous even in the most carefully conducted operations. Safety will be the prime and unequivocal consideration in any diving operation carried on by Glen Canyon personnel. Every effort must also be made to convince the general public interested in this phase of recreation that exceptional skills and adequate equipment are necessary if disastrous physical damage to a diver or his death is to be avoided.

802. Approval of Proposed SCUBA Activities in Glen Canyon NRA

Approval for the operational SCUBA program in Glen Canyon National Recreation Area has been secured from the Regional Director. Such approval implies sanction of the Director to carry on this program. This approval is based on the premise that all official diving shall be carried out within the policies and directives set forth by the Service.

The Superintendent of the Glen Canyon National Recreation Area has approved the area SCUBA program as it is specifically detailed in this manual provided no deviation from these directives is made without his concurrence. Before any action is commenced on a SCUBA project, a plan shall be submitted to the Chief Ranger outlining objectives, working conditions, qualifications of employees involved, equipment to be used and safety precautions to be taken. The Chief Ranger will present the plan to the Superintendent for approval. Any questionable proposals will be submitted to the Regional Director for clearance.

803. Certification of Divers

National Park Service policy states that divers shall be fully qualified by training, experience and physically conditioned to meet the hazards that may be encountered.

To qualify for the diving program in Glen Canyon National Recreation Area each diver must meet the following requirements:

1. Obtain approval from his supervisor and the Chief Ranger; such approval to be in writing and incorporated in his personnel record.
2. Undergo a thorough physical examination by a competent physician including chest X-ray and oxygen tolerance test if available. Certification must be made by the examining physician that the applicant is physically qualified for the duties. Such certification is to be made a part of the applicant's personnel record. An approved examination is a government function and may be an authorized expenditure of government funds.
3. Be thoroughly trained in a Service-approved SCUBA training program. A record of completion of training and competency shall be maintained by the Chief Diver of the area.

or

4. In lieu of formal training in a recognized school, a minimum of three years of SCUBA and/or other diving experience of a nature similar to that to be performed will be acceptable upon a showing of competency in SCUBA diving theory and practice. This showing shall be certified by an authorized Service employee who is a graduate of a U. S. Navy or equivalent and recognized SCUBA diving school and designated as a Service diving examiner. Such certification shall be made a part of the personnel record.

5. Certification designating the employee as a qualified diver shall be made on a memorandum of diving authority signed by the diving examiner, Superintendent and approved by the Regional Director.

804. Recertification of Divers

At periods of no more than 2 years, or when the diving examiner requests, each diver shall undergo a physical examination and certifying review to determine his continuing ability to dive.

805. Chief Diver and Diving Examiner - Glen Canyon NRA

The area Diving Examiner must be a Service employee who is a graduate of a U. S. Navy or equivalent and recognized SCUBA diving school and designated by the Service as an authorized examiner.

The authorized Service examiner in Glen Canyon NRA will normally be designated as the Chief Diver for the area and will, in addition to his training and examining duties, be responsible for all diving activities within the area as spelled out in succeeding sections of this manual.

806. Diving Team - Glen Canyon NRA

The official diving unit of Glen Canyon NRA will consist of a three man team: Chief Diver and two other certified members. As time permits the proper training of other employees leading to certification by the diving examiner and higher approval is authorized and encouraged. The team of three men, however, is the basic unit and other certified employees may be listed only as qualified substitutes.

807. Glen Canyon NRA Approved Minimum Diving Training Curriculum

The Service employee will show that he understands the theory and practical applications of SCUBA diving. The minimum training will take approximately 25 hours which consists of the following:

1. Physics
2. Physiology and Diving Diseases
3. Diving tables
4. Orientation on equipment and Diving procedures

808. Minimum Examination for Qualification as Diver - Glen Canyon NRA

To qualify for diver, the trainee must complete the outline in paragraph 807, and demonstrate his physical ability by swimming a 1000 yards with SCUBA gear using a compass on a designated compass course. Since 60 feet is the normal working depth with SCUBA, the trainee must show that he can enter this depth without any ill effects physically. By the time the trainee has completed the diving program approved by the National Park Service, he will have demonstrated his ability to adapt psychologically to his new environment.

809. Minimum Re-training and Re-certification Program

The re-training program will be a review of theory, diving diseases and the techniques of diving. The program will be scheduled annually. For re-certification refer to paragraph 804.

810. SCUBA Equipment

810.1 General

SCUBA equipment is highly specialized, precision made and, therefore, expensive gear. The dependence of human life upon its design, manufacture and condition permits no compromise with quality or the care demanded of it. The equipment purchased for official diving operations in Glen Canyon represents a considerable governmental expenditure and for this reason, as well as for the safety involved, nothing less than the highest degree of care and maintenance can be acceptable.

810.2 Ownership of SCUBA Equipment

The Government will provide all diving equipment for its official activities except diving masks, swimfins, snorkel tubes and wetboots. This latter equipment is relatively inexpensive and, since it is of a somewhat personal nature, individual divers must provide it at their own expense.

810.3 Identification of Government Property

Each component of SCUBA equipment purchased by the Government must be clearly identified with a non-removable marking as "Property of National Park Service". Accountability in the Ranger Services Division inventory file must be maintained.

810.4 Approved Equipment

Only equipment approved by the Chief Diver shall be used as any component of diving gear or its appurtenances. This requirement shall also apply to that personal gear owned by a diver and to be used in official operations. The Chief Diver is directed to adhere to standards of the highest order and reputable design in considering such approval.

The use of SCUBA and any other diving equipment shall be limited to the open circuit type using compressed air only. Oxygen or mixed gases shall not be used.

Only SCUBA air tanks which have been approved by ICC regulations and only steel tanks shall be used. Aluminum air tanks although approved by the ICC shall not be used in official diving activities.

810.5 Responsibility for Equipment

The Chief Diver will be responsible for the storage, maintenance, care and accountability of all government diving equipment. He will, also, be responsible for the training of divers in this phase of the activity. He shall, through regular inspections, determine that personal equipment owned by divers and to be used in official operations is in safe condition.

810.6 Storage of SCUBA Equipment

The Chief Diver will ascertain that all diving equipment is provided proper and secure storage in accordance with the U. S. Navy Diving Manual, Navships 250-538, equipment manufacturer's instructions and area policies.

No diving gear shall be removed from this storage without the approval of the Chief Diver or, in his absence, the Chief Ranger or Superintendent.

810.7 Equipment for Official Activities Only

Government equipment is to be used only in official, approved diving activities. Approval will not be granted for its use in off-hours or out-of-area activities.

811. Diving Operations - Glen Canyon NRA

811.1 General

Diving, as any precision operation, emphasizes the necessity for planning and foresight. Underwater time is a premium.

The diver must be placed on the job under the absolute optimum conditions of knowledge, equipment, ability, safety and freedom from distractions. Tender assistance must be well organized and capable. Most important, the life of a diver may be jeopardized by lack of foresight and failure to consider all eventualities. The diving operation must be thoroughly analyzed, exactly planned and capably executed if it is to be successful. A routine diving operation is dangerous. Precautions must not be relaxed.

811.2 Operational Decisions

All over-all major operational decisions concerning diving operations are the responsibility of the Superintendent and, under him, the Chief Ranger. During the course of an approved diving operation, the management of the activity is the responsibility of the Chief Diver.

811.3 Delineation of Area of Operations

A display of the recognized SCUBA diving flag and diving buoys shall be made upon the site of every diving operation. Buoys shall be provided in such numbers to thoroughly and unquestionably delineate the operational area. A 12 inch square flag is to be flown from a one or two man float; a 21 inch square flag from boats up to 40 feet in length and a 33 inch square flag from craft up to 80 feet in length. Flags must be placed so as to be easily seen from all directions of possible approach.

Utmost caution must be taken with respect to surface traffic; divers must surface only at the flag location and the flag must be hauled down when there are no divers in the water.

811.4 Mandatory Buddy System

All diving operations in Glen Canyon shall be conducted under terms of the BUDDY SYSTEM. This system is the biggest single safety factor in SCUBA diving. It makes two divers responsible for each other's safety over and above all other safety precautions which the Chief Diver may take. The Buddy System is to be strictly adhered to even for surface-tended SCUBA divers.

811.5 Lifelines

When underwater visibility is poor during diving operations, a short buddy line of six to 10 feet in length shall be used to link divers. A lifeline and/or float line shall be attached to each diver and extending to the surface when deemed appropriate by the Chief Diver.

When underwater visibility is good, the Chief Diver may dispense with the buddy lines providing divers keep the other continuously in sight at short range.

Under conditions of excellent visibility and when a lifeline to the tender is used, a qualified and equipped SCUBA diver may serve as a surface tender in lieu of a buddy operation so long as the diver does not exceed 30 feet in depth and the surface tender can keep the diver in clear visibility and signal range. This is the only permissible deviation from the normal buddy system.

811.6 Surface Tender

A Surface Tender who is a fully qualified and equipped SCUBA diver for each working unit or buddy pair must be provided. This Surface Tender may operate from shore or from the deck of a boat or vessel as may be appropriate as long as he is in close proximity to the divers. The Surface Tender, under the direction of the Chief Diver, will be responsible for all necessary emergency equipment needed for each operation.

In operations not exceeding 10 feet in depth, the Surface Tender need not be qualified as a SCUBA diver, but shall be a strong swimmer having a working knowledge of SCUBA and the operation underway. A lifeline to the tender must be used during such circumstances.

811.7 Solo Dives Prohibited

Solo diving or unattended diving is prohibited at all times except a single diver may operate in the water under the conditions set forth in 811.5.

811.8 Chief Diver in Charge of Operation

The Chief Diver of the area will be in full charge of each diving operation and, in this capacity, will be present at the site of descent. He shall remain on location whenever a diver is in the water. He may and normally will be a member of the team. He is responsible in line of authority to the Chief Ranger and Superintendent.

811.9 Personal Readiness for Diving Operation

All diving shall be done on a voluntary basis and no diver shall engage in any diving operation beyond his ability, contrary to his training or in opposition to this manual.

Prior to each dive the Chief Diver will ascertain that all divers are in good physical condition and psychologically adapted for the planned operation before they enter the water.

811.10 Briefing of Divers

The Chief Diver, prior to placing the team in the water, will thoroughly brief the divers in the operation and its plans. He will not permit the team to enter the water until he is satisfied that all members fully understand the plan.

811.11 Air Supply

The Chief Diver will take all the necessary steps to assure a pure air supply in tanks. Compressors and associated equipment for charging SCUBA tanks will be given diligent maintenance. He will ascertain fully that Surface Tenders or other responsible personnel operate the equipment carefully. Output from compressors must be free of dust, excessive moisture, oil vapor and toxic gases. Air samples shall be analyzed at approved intervals.

811.12 Depth Limits

All diving in Glen Canyon shall be limited to depths and times that will not require decompression staging in accordance with the U. S. Navy Standard Decompression Tables and Repetitive Dive Tables (Tables 1-5, 1-6, 1-7, 1-8 U. S. Navy Diving Manual) except as they may be necessary for emergency rescue, in which case the standard Navy decompression tables will be adhered to. Dives shall not, under any condition, exceed 130 feet.

811.13 Safety Equipment on Divers

Each diver shall be equipped with an inflatable vest capable of being both manually and automatically activated, wrist watch, depth gauge and when needed, a compass. The Chief Diver may indicate other optional equipment when it appears desirable.

A first Aid kit and resuscitator shall be available at the site of each descent.

811.14 Emergency Plans

The Chief Diver shall prepare and make a matter of record an EMERGENCY PLAN FOR DIVING. A copy of the plan will be made available to all responsible officials. It shall include but not be restricted to the following:

1. Mechanics of reporting the emergency to superiors.
2. Instructions to Surface Tender
3. Instructions to Divers

4. Location of nearest medical assistance
5. Location of nearest evacuation transportation and means of alerting the facility
6. Location and means of alerting nearest available recompression chambers.
7. Plan of action for diving emergency.

This plan shall be thoroughly understood by all qualified divers in the area.

811.15 Emergency Actions

The Chief Diver will ascertain that all safety precautions are taken during the course of emergency action to avoid compounding the hazards of the existing condition.

811.16 Diving Charts

The Chief Diver is responsible for the maintenance and entry of performance for every dive in the standard Service Diving Chart of individual divers (NPS Form 10-419).

812. Recreational Diving - Visitors

Recreation diving by visitors to Glen Canyon is destined to become increasingly popular. Some of this will be by experienced, well-equipped divers; other by rank neophytes with inadequate gear. Our official approach should be to encourage safe diving activities by competent persons. On the other hand, we should take every opportunity to discourage, with all means available to us, individuals and groups headed for submerged trouble. Our personnel should make every effort to promote safe diving through education, assistance, and good-example on a professional scale while discouraging potentially disastrous activities by interception and enforcement of available regulations.

SCUBA MANUAL - APPENDIX

DIVING SAFETY PLAN AND EMERGENCY PROCEDURES

This plan supplements the Glen Canyon NRA Diving Manual and also must be thoroughly understood by all qualified divers and protection personnel.

1. Submission of Diving Plan to Chief Ranger and approval by Chief Diver.
2. Briefing of divers and planning of operation by Chief Diver. All conditions of the dive will be discussed. The briefing includes surface support. Operation will not be routine.
3. Buoys placed in proper position and diving flag up on all boats taking part in the operation.
4. Radio to the office that divers are in the water. Be sure that radio contact is maintained on all diving operations. Chief Ranger shall be notified, or in his absence, Acting Chief Ranger or Superintendent.
5. Tender must be sure that resuscitator, first aid kit, diving charts, decompression tables, and diving log are ready for immediate use. Is tender ready for an emergency dive?
6. Divers check equipment before entering water. After entering water each diver will check the other's gear.
7. Commence the dive if everything is O.K.
8. If a diver comes to the surface without being signalled to come up, the tender must retrieve him immediately.
9. In case of faulty dive or accident, indicating that recompression chamber must be used, proceed as follows:
 - a. Radio office- be sure Superintendent and Chief Ranger are notified.
 - b. Office should phone doctor- Kazan if possible.
 - (1) Page Clinic - 645-2464
 - (2) Hospital - 645-2424
 - c. Office phone- Page Aviation - 645-2231. Arrange point of evacuation if necessary.
 - d. Office phone area where recompression chamber is located arranging necessary detail:
 - (1) Lt. J.E. Bloom, MC, USN (USS Nereus)
Phone: 224-2733 Sick Bay (day)
222-9656 Ballast Pt. San Diego, Calif.
273-0661 Home (night)

(2) Cdr. Ben K. Hastings, MC, USN (USS Sperry)
Phone 222-2991 Sick Bay San Diego, Calif.
222-1741 State Room
222-9385 Personnel Office
435-5940 Home

(3) Lt. G.C. Coervillion, MC, USNR (Staff NOSG)
Phone 435-6692 Ex. 643 San Diego, Calif.
435-3775 Home
Lt. Coervillion will be available for all medical
and diving emergencies unless otherwise notified.

(4) Rescue Coordination Center, USAF
Phone 884-4112 Ignacio, Calif.
454-6535 San Rafael, Calif.
454-6537 San Rafael, Calif.

- e. Patrol boat must then take the retrieved diver to the established evacuation point.
10. Location of pertinent phone numbers in case of an emergency are as follows:
 - a. Bulletin Board in office
 - b. Chief Ranger's desk
 - c. In home of every diver
 - d. Concession boat house
11. Debriefing of divers after every operation has been completed. Can operation be improved upon? If so, how?
12. Overhaul of all equipment and proper storage. Report to Chief Ranger and Chief Diver any apparently faulty or defective equipment.

GLEN CANYON N.R.A. SCUBA DIVING REPORT

Specific Location of Dive: _____ *Date of Dive _____

Number of Divers: _____ Number of Dives Planned Per Person: _____

Depth of Deepest Dive: _____ Purpose of Dive (check one or more):

Recreation _____ Training _____ Photography _____ Skin Diving _____ Research _____

Name of Diver	City & State	Diving Club Affiliation	Certifying Organization
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____

Equipment on Hand

	Yes	No	Total Number
Tanks (71.2 cu. Ft.)	_____	_____	_____
Snorkels	_____	_____	_____
Depth Gauges	_____	_____	_____
Watches	_____	_____	_____
Knives	_____	_____	_____
Compasses	_____	_____	_____
Life Vests	_____	_____	_____
Octopus	_____	_____	_____
Marker Buoys	_____	_____	_____
Boats	_____	_____	_____
Decompression Charts	_____	_____	_____
Compressor	_____	_____	_____
Submersible Pressure Gauges	_____	_____	_____

Are any decompression dives planned? _____ If so, are all divers familiar with required decompression procedures? _____

Comments: _____

Signature of Diver in Charge: _____ Date: _____

Issued by: _____ Certified Park Diver Notified: _____

*Separate report to be made out for each day of diving activity

Please send to Park Diving Officer