

# Memorandum

**Date** : December 1, 2006

**To** : Selected Dive Team Members

**From** : **Department of Parks and Recreation**  
Alex K. Peabody, Aquatic Safety Specialist  
Diving Safety Board Chairman

**Subject** : **2007 Dive Team Refresher Training: September 24 - 28, 2007**

You have been pre-selected to attend State Park Dive Team Refresher Training beginning on Monday, September 24, 2007 at 1500 hours through Friday, September 28, 2007.

Please take the time to carefully course syllabus. The training program will include lectures, safety reviews, open water altitude diving skills, and practical exercises for NAUI Scientific Diver certification. Each diver will be participating and contributing to one of two reports that will be produced on the final day of the course.

**For diver safety while engaged in repetitive diving at altitude, all divers must spend the night of Friday, September 28th at the provided lodging before traveling out of the Tahoe area.**

**A pre-training exam is included and must be completed prior to arriving at the refresher training.**

**Please bring all of your diving equipment including two (2) tanks and weight belt** (unless you are flying). Also, bring any equipment or diving related materials that you would like to share with the class.

The course cost for the training will be covered by the State Park Training Center when you submit your travel claim. Your District must pay for the cost of travel to / from the training location.

Please notify Course Coordinator, Alex Peabody immediately if you are unable to attend or if you have any questions at (831) 649-7132, or Cell phone (831) 402-7805. You can Email Alex at [apeabody@parks.ca.gov](mailto:apeabody@parks.ca.gov) .



# 2007 Dive Team Refresher Training

## SYLLABUS

### Monday, September 24<sup>th</sup>

*Location: Granlebakken Conference Center*

<b>Time:</b>	<b>Subject:</b>	<b>Instructor:</b>
1200 – 1500	Check-in	
1500 – 1800	Classroom: Introductions State Park Dive Team Mission, Purpose, and Policy Diving at Altitude Lecture and NAUI Training <ul style="list-style-type: none"><li>• Effects of Altitude on the Human Body</li><li>• Altitude decompression tables and dive computers</li></ul>	Alex Peabody  Dive Instructor
	Pre-Test Altitude Diving Review and Safety Reminders	Dive Instructor
1800	Dinner	

### Tuesday, September 25<sup>th</sup>

0715	Breakfast	
	Classroom:	
0800-0900	Underwater Science and Archeology	Charles Beeker
0900-1000	Underwater Data Collection Techniques	
1000-1100	Emerald Bay's Underwater Fleet	John Foster
1100-1130	The moorings of Emerald Bay	
1130 -1200	Detection and reporting of Eurasian watermilfoil in Emerald Bay	Tamara Sasaki
1200-1300	Box Lunch and travel to Emerald Bay S.P.	
1300-1500	Emerald Bay State Park, Boat-in Campground: Safety Check of Equipment/Practical Skills Review: <ul style="list-style-type: none"><li>• Dive computers and decompression tables</li><li>• Proper weighting for fresh water</li><li>• Basic Skills Review</li><li>• Emergency Skills Review</li></ul>	Dive 1
1500-1700	Begin mapping and documentation of Boat-in Camp Vessel Moorings <ul style="list-style-type: none"><li>• Dive groups to inspect and document assigned moorings</li></ul>	Dive 2
1700	Debrief and return to lodge	Dive Instructor
1800	Dinner	

### **Wednesday, September 26<sup>th</sup>**

0715	Breakfast	
0800-1200	Travel to Dive Site at Emerald Bay S.P. Boat-in Campground <ul style="list-style-type: none"><li>• Complete inspections and documentation of moorings</li><li>• Dive groups to inspect and document assigned sunken vessels</li><li>• Set-up PORTS for transmission at 1300 hours to Sacramento H.Q.</li></ul>	Dive 3
1200-1300	Box Lunch	
1300-1600	1 hour (1400 hrs.) P.O.R.T.S. transmission to Sacramento H.Q. and narration by John Foster on the sunken vessels and Emerald Bay S.P.	Dive 4
1700	Debrief and travel back to lodge	Dive Instructor
1800	Dinner	

### **Thursday, September 27<sup>th</sup>**

0715	Breakfast	
0800	Travel to Dive Site	
0900-1200	Sunken Vessel Survey and Inspections	Dive 5
1200	Box Lunch	
1300-1600	Sunken Vessel Survey and Inspections	Dive 6
1600-1700	Debrief and travel back to lodge	Dive Instructor
1800	Dinner	

### **Friday, September 28<sup>th</sup>**

0800	Breakfast	
0900-1200	Classroom <ul style="list-style-type: none"><li>• Altitude Diving Test</li><li>• Format and complete Boat Mooring Report</li><li>• Format and complete Sunken Vessel Survey Report</li></ul>	Dive Instructor Charles Beeker John Foster
1200	Lunch	
1300-1600	Complete reports Dive logs P.O.S.T. and Instructor Evaluations Final course debriefing	All
1800	Dinner BBQ with Sierra District Staff and Dive Class	All

### **Saturday, September 29<sup>th</sup>**

0800	Breakfast	
0900	Check-out	

## Directions to Granlibakken Conference Center:

### Getting to Granlibakken

Granlibakken Conference Center and Resort is located in a tranquil mountain setting with all the wonders of the Sierra at your doorstep. Whether you arrive by car or plane, getting here is easy.

#### **We are located at:**

725 Granlibakken Road  
Tahoe City, CA 96145  
Phone: Reservations: 800-543-3221

#### **From Sacramento (100 miles)**

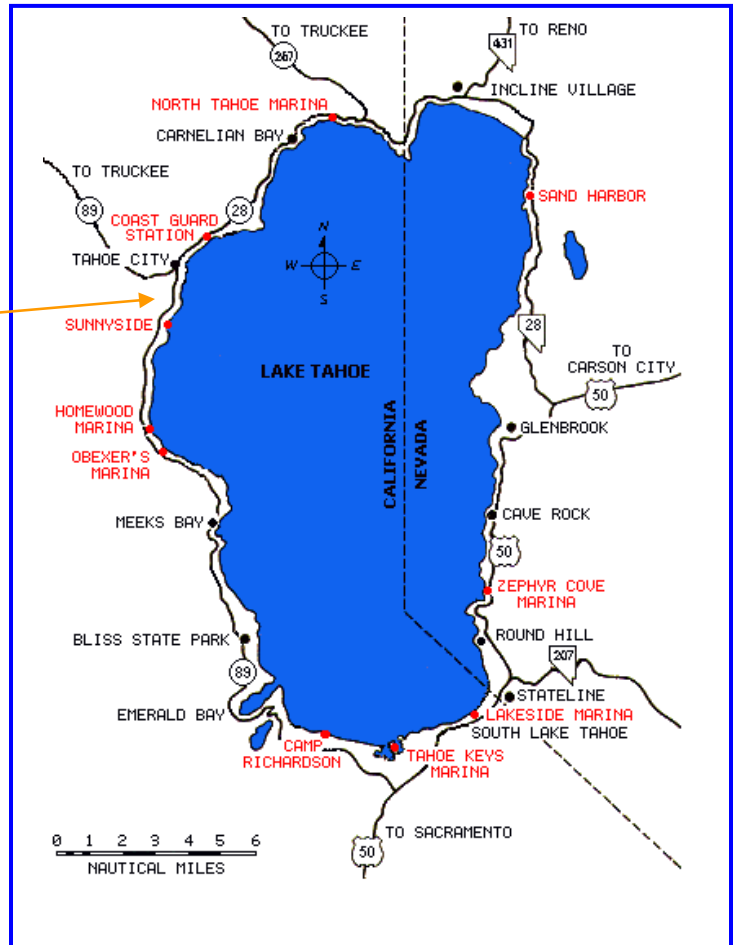
From Interstate 80 take Highway 89 south from Truckee to the "Y" in Tahoe City. Follow Highway 89 south for 1/2 mile to Granlibakken Road. Turn right and continue for 3/4 of a mile to the deck overhang of the main lodge.  
From Southern California  
Follow Highway 395 to Highway 50 west in Carson City. Turn right on Highway 28 along the east and north shores of Lake Tahoe to Tahoe City. Turn left at the stoplight and continue 1/2 mile on Highway 89 to Granlibakken Road. Turn right and continue for 3/4 of a mile to the deck overhang of the main lodge.

#### **From Reno/Tahoe International Airport (54 miles)**

Take the Highway 395 north on-ramp from the airport, then exit to Interstate 80 west. Use directions from Sacramento (above).

#### **Airport Shuttle Service**

Granlibakken offers its own shuttle service to and from the Reno/Tahoe International Airport. Seven day advance reservations and pre-payment are required. Call (800) 543-3221 for details.



## **Diver Equipment Checklist:**

1. **Two (2) tanks (air)**
2. BC, regulator, pressure gauge
3. Compass (adaptable to altitude diving)
4. Dive Computer
  - a. New Batteries (bring an extra!)
5. Wetsuit / drysuit
6. Weight belt
7. Gloves and booties
8. Mask, fins, snorkel
9. Dive light

## **Weather and Climate**

The beauty and character of Lake Tahoe and the Tahoe Basin have been well known since its discovery in 1844. Few places on earth can claim a climate of such great variety and year-round enchantment as that which graces the Sierra. The four sharply defined seasons bring to the high country a continual round of variety and change.

The summer season, like the Tahoe winter, is quite extraordinary. Though easily as dry and sunny as anywhere in the arid desert Southwest, daytime highs rarely exceed 80 degrees. Because of the abundance of heavy pine forests and the moderating influence of the 193 square miles of Lake surface, the evenings do not turn cold. June, July and August average just one day of precipitation each and that can be as little as .10 of an inch. Picnic planning is not a problem in the Tahoe Basin at any time, but in the summer, sun probability is about 93% for the entire 90-day period.

Spring and fall temperatures are very similar, as are both seasons' rainfall figures, though the March/April/May period averages somewhat cooler temperatures and more precipitation than the fall. Rainfall is usually recorded 14 days out of Spring's 90-day period and on 13 days in Autumn. Spring's average high daytime temperature is 56 degrees, with May's record high 88 degrees and record low 12 degrees. In the fall, the daytime high average is 57 degrees, with September's record high 87 degrees and low 12 degrees. Tahoe in late September means generally warm and pleasant days with cold nights and mornings.

The surface temperature of the main body of the lake, in the summer, is about 67 degrees. Out in the shallow beaches, it is warmer, varying with the temperature of the air, and swimming is enjoyed by thousands. There is a significant thermocline when diving.

## **Diving in Lake Tahoe**

- Maximum Depth: 1645 Ft. off Stateline Point (92 ft below Carson City).
- Lake level is 6225 feet above sea level.
- Surface temperature ranges from 75° F in summer to 37° F in winter.
- Life: Brown, cutthroat, rainbow, salmon, mackinaw trout, f/w sculpin, f/w shrimp, crawdads.

## High Altitude Diving

### THEORETICAL DEPTH AT ALTITUDE

ActualDepth	Theoretical Depth at Various altitudes (feet)									
Sea Level	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
0	0	0	0	0	0	0	0	0	0	0
10	10	11	11	12	12	12	13	13	14	15
20	21	21	22	23	24	25	26	27	28	29
30	31	32	33	35	36	37	39	40	42	44
40	41	43	45	46	48	50	52	54	56	58
50	52	54	56	58	60	62	65	67	70	73
60	62	64	67	69	72	75	78	81	84	87
70	72	75	78	81	84	87	91	94	98	102
80	83	86	89	92	96	100	103	108	112	116
90	93	97	100	104	108	112	116	121	126	131
100	103	107	111	116	120	124	129	134	140	
110	114	118	122	127	132	137				
120	124	129	134	139						
130	135	140								

### Safety/Emergency Decompression Stop Depth (feet)

Sea Level	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
15	14	14	13	13	12	12	12	11	11	10

### Rules For Altitude Diving:

#### ASCENT RATE AT ALTITUDE

- 30 feet per minute at all altitudes above sea level

#### HOW TO FIND YOUR PRESSURE GROUP AFTER ARRIVING AT ALTITUDE

- If your starting altitude is less than dive altitude then add 2 pressure groups for each 1000 feet of altitude you increase. If starting at altitudes of 4000 or higher, add 4 pressure groups for each 1000 feet of altitude increase. If diving at an altitude of 8000 feet or greater wait 6 hours before diving.

#### REPETITIVE DIVING

When diving at altitude it is recommended to limit your diving to no more than 2 dives per day.

#### SAFETY STOP REQUIREMENT

A safety stop is required for all dives at altitude. The depth of the safety stop changes with altitude. Refer to the above chart for correct depth.

#### DEPTH GAUGES

Your depth gauge or computer must be adjusted for altitude diving. If you gauge cannot be adjusted then use the following formula to convert the closed bourdon tube gauge to get actual depth.

Depth Shown in feet + 1 foot + (1 foot per 1000 feet above sea level)=Actual depth

**Dive Team**  
**REFRESHER TRAINING COURSE**  
**PRE-TRAINING EXAM**

Please complete prior to arriving at the refresher training.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_\_ / 35 pts.

**True or False (15 Points)**

1. T F Each individual diver is responsible for his/her personal safety.
2. T F The dive team leader responsible for the fitness inquiry, pre-dive briefing, equipment inspection, and debriefing during each dive.
3. T F Dives may be made in unsafe conditions if the majority of the divers agree.
4. T F Non-departmental certified divers may dive with department divers if they are certified and qualified to participate in the dive project.
5. T F Department divers may SCUBA dive alone if they do not exceed 15 feet in depth.
6. T F Repetitive dives should be plan so that the shallowest dives are first and the deepest dives are last.
7. T F The NOAA Dive Manual is the general procedural manual for all department divers.
8. T F A minimum of 12 dives per year must be made by each DPR diver to retain Departmental dive certification.
9. T F Dives requiring decompression should be avoided.
10. T F Department dive policies may be violated when danger to life exists.
11. T F The NAUI Dive Tables should be followed when you are doing repetitive dives.
12. T F As volume increases, pressure and density decrease.
13. T F Saltwater is denser (weighs more) than freshwater.
14. T F Bubbles will come out of solution faster as temperature increases.
15. T F Breathing pure (100%) oxygen when scuba diving is extremely dangerous.



**Multiple Choice (10 Points)**

17. Department divers are required to surface with at least \_\_\_\_\_ psi remaining in their tank.
- A. 1,000 psi
  - B. 500 psi
  - C. 300 psi
  - D. 1500 psi
18. The maximum depth for recreational scuba divers is....
- A. 150'
  - B. 100'
  - C. 130'
  - D. 60'
19. The most applicable physics law in scuba diving is....
- A. Kenny's Law
  - B. The Milosh Rule of Diving
  - C. Loren's Law
  - D. Boyle's Law
20. Decompression sickness is caused when \_\_\_\_\_ is absorbed by the bodies tissues then released in the form of bubbles into the bloodstream.
- A. oxygen
  - B. carbon dioxide
  - C. helium
  - D. nitrogen
21. When contact is lost with a dive buddy, what should you do?
- A. Continue diving on a reciprocal course.
  - B. Make a quick 360 degree check, safely ascend to the surface and re-establish contact at the surface.
  - C. Return to the beach, or boat as soon as possible and wait for your partner there.
  - D. Call 9-1-1, or the Coast Guard immediately.
22. The proper ascent rate when diving is \_\_\_\_\_ feet per minute.
- A. 30' per minute
  - B. 60' per minute
  - C. 90' per minute
  - D. 15' per minute
23. A depth of 99' is equal to \_\_\_\_\_ atmospheres absolute (ATA).
- A. 3
  - B. 5
  - C. 6
  - D. 4

24. A balloon filled with 90 liters of air at 33 fsw will have a volume of \_\_\_\_\_ liters at 66 fsw.

- A. 4.5
- B. 6
- C. 12
- D. 18

25. 55 fsw is equal to \_\_\_\_\_ATA.

- A. 3
- B. 2.6
- C. 6
- D. 1.5

26. A cylinder of air filled at the surface (sea level) will have \_\_\_\_\_ the volume of air at 33' feet.

- A.  $\frac{1}{4}$
- B.  $\frac{1}{2}$
- C.  $\frac{3}{4}$
- D. the same

**Dive Table Problem (10 Points)**

A buddy pair dives their first dive at Lake Tahoe (6225 feet above sea level) to 65' for 15 minutes. They have a surface interval of 2 hours. Their second dive is to 50' for 30 minutes. They have a surface interval of 2 hour and 50 minutes. Their final dive of the day is to a wreck that is located at 50 feet. What will be their maximum bottom time without having to decompress?

DIVE PROFILE INFORMATION			
DATE/DIVE NO.	DATE/DIVE NO.	DATE/DIVE NO.	DATE/DIVE NO.
_____ : _____ _____' _____'	_____ : _____ _____' _____'	_____ : _____ _____' _____'	_____ : _____ _____' _____'
AMDT: _____	AMDT: _____	AMDT: _____	AMDT: _____
AMDT: _____	AMDT: _____	AMDT: _____	AMDT: _____
RNT: 0	RNT: _____	RNT: _____	RNT: _____
ADT: _____	ADT: _____	ADT: _____	ADT: _____
_____	_____	_____	_____
TNT: _____	TNT: _____	TNT: _____	TNT: _____

# NAUI (SEA LEVEL) DIVE TABLES



## DIVE TABLES

TABLE 1 - END-OF-DIVE LETTER GROUP

WARNING: EVEN STRICT COMPLIANCE WITH THESE TABLES WILL NOT GUARANTEE AVOIDANCE OF DECOMPRESSION SICKNESS. CONSERVATIVE USAGE IS STRONGLY RECOMMENDED.

**RNT** RESIDUAL NITROGEN TIME  
**+ADT** ACTUAL DIVE TIME  
**TNT** TOTAL NITROGEN TIME

(USE THIS FIGURE TO DETERMINE END-OF-DIVE LETTER GROUP.)

START DEPTH		00 MAXIMUM DIVE TIME (MDT)										00 DIVE TIME REQUIRING DECOMPRESSION NO. MINUTES REQUIRED AT 15' STOP (5M)	
M	FEET	5	15	25	30	40	50	70	80	100	110	130	150
12	40	5	15	25	30	40	50	70	80	100	110	130	150
15	50		10	15	25	30	40	50	60	70	80		
18	60		10	15	20	25	30	40	50	55	60		
21	70		5	10	15	20	30	35	40	45	50	60	70
24	80		5	10	15	20	25	30	35	40	45	50	60
27	90		5	10	12	15	20	25	30	35	40	45	50
30	100		5	7	10	15	20	25	30	35	40	45	50
33	110			5	10	13	15	20	25	30	35	40	45
36	120			5	10	12	15	20	25	30	35	40	45
39	130			5	8	10	15	20	25	30	35	40	45

M. FT.	12	15	18	21	24	27	30	33	36	39	NEW GROUP
7	6	5	4	4	3	3	3	3	3	3	< A
13	11	9	8	7	7	6	6	6	6	6	< B
21	17	15	13	11	10	10	9	8	8	8	< C
29	24	20	18	16	14	13	12	11	11	11	< D
37	30	26	23	20	18	16	15	13	13	13	< E
45	36	31	28	24	22	20	18	16	16	16	< F
53	42	37	32	29	26	24	21	19	19	19	< G
61	48	43	38	33	30	27	25	22	22	22	< H
69	54	49	43	38	34	31	28	25	25	25	< I
77	60	55	50	45	40	38	34	31	31	31	< J
85	66	61	56	51	46	43	40	37	37	37	< K
93	72	67	62	57	52	49	46	43	43	43	< L
101	78	73	68	63	58	55	52	49	49	49	
109	84	79	74	69	64	61	58	55	55	55	
117	90	85	80	75	70	67	64	61	61	61	
125	96	91	86	81	76	73	70	67	67	67	
133	102	97	92	87	82	79	76	73	73	73	

NEW GROUP	A	B	C	D	E	F	G	H	I	J	K	L
< A	24:00 0:10	24:00 3:21	24:00 4:49	24:00 5:49	24:00 6:35	24:00 7:06	24:00 7:36	24:00 8:00	24:00 8:22	24:00 8:51	24:00 8:59	24:00 9:13
< B		3:20 0:10	4:48 1:40	5:48 2:39	6:34 3:25	7:05 3:58	7:35 4:26	7:59 4:50	8:21 5:13	8:50 5:41	8:58 5:49	9:12 6:03
< C			1:39 0:10	2:38 1:10	3:24 1:58	3:57 2:29	4:25 2:59	4:49 3:21	5:12 3:44	5:40 4:03	5:48 4:20	6:02 4:36
< D				1:09 0:10	1:57 0:55	2:28 1:30	2:58 2:00	3:20 2:24	3:43 2:45	4:02 3:05	4:19 3:22	4:35 3:37
< E					0:54 0:10	1:29 0:46	1:59 1:16	2:23 1:42	2:44 2:03	3:04 2:21	3:21 2:39	3:36 2:54
< F						0:45 0:10	1:15 0:41	1:41 1:07	2:02 1:30	2:20 1:48	2:38 2:04	2:53 2:20
< G							0:40 0:10	1:06 0:37	1:29 1:00	1:47 1:20	2:03 1:36	2:19 1:50
< H								0:36 0:10	0:59 0:34	1:19 0:55	1:35 1:12	1:49 1:26
< I									0:33 0:10	0:54 0:32	1:11 0:50	1:25 1:05
< J										0:31 0:10	0:49 0:29	1:04 0:46
< K											0:28 0:10	0:45 0:27
< L												0:26 0:10

TABLE 3 - REPETITIVE DIVE TIMETABLE

TABLE 2 - SURFACE INTERVAL TIME (SIT) TABLE

00 LIGHT FACE NUMBERS ARE RESIDUAL NITROGEN TIMES (RNT) TIME RANGES IN HOURS : MINUTES © 1990 NAUI 89-0019  
 00 BOLD FACE NUMBERS ARE ADJUSTED MAXIMUM DIVE TIMES (AMDT) - ACTUAL DIVE TIME SHOULD NOT EXCEED THIS NUMBER

**Notes:**