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United States Underwater Fatality Statistics-1972

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ABSTRACT

Information is summarized on known underwater fatal accidents during 1972 that involved U.S. citizens wherever they may have been diving and non-U.S. citizens diving in U.S. waters. Information for 1970 and 1971 accidents is included for comparison.

There were 118 scuba diving fatalities and 16 skin diver fatalities during 1972. These deaths are reported and tabulated separately because it's difficult to obtain information on skin diving fatalities that is as complete as on scuba deaths. In addition there were two scuba deaths associated with a compressed air depth record attempt, two deaths involving the use of surface-supplied air, and one fatality caused by an exploding air cylinder in a compressor room. These fatalities are also treated separately because of their "special nature." A small submersible was involved in two deaths that are not included because they have been extensively investigated elsewhere.

In comparison there were 112 scuba diving fatalities in 1970 and 114 in 1971, but two factors must be considered: First, major recreational diver training organizations again reported a significant increase in training, from about 165,000 persons in 1971 to about 226,000 in 1972. (The actual numbers may be somewhat less because of individuals' being certified by more than one organization.) Secondly, there would have been a modest decrease in the absolute total of deaths between 1971 and 1972 if it were not for a sudden increase in multiple-victim accidents (two triple deaths and nine double deaths in 1972 as compared with four double deaths in 1971).

With some minor fluctuations, patterns remained relatively consistent from year to year, for instance with the 16- to 30-year age group suffering the greatest number of fatalities.

Initial reports of fatal accidents are usually obtained from a newspaper clipping service. They are also obtained from the Coast Guard, local coroners and law enforcement officials, cooperating diver organizations, and individuals. Additional information to document the accident as fully as possible is obtained by mail and telephone. Data on commercial underwater fatalities are more difficult to obtain because of limited press coverage and because of insurance investigations, possible litigation, and similar factors that limit the release of information.

Also provided are the findings of a Navy submarine medical expert who reviewed autopsies for 31 fatalities which occurred during 1970. Nonfatal accidents to which Coast Guard units responded are also analyzed.

PART 1

HISTORY AND SOURCE ANALYSIS

1.1 Introduction

During 1970 and 1971, the Scuba Safety Project collected data on fatal diving accidents involving U.S. citizens plus a few cases in which a foreign national died while diving in U.S. waters. This effort has been continued for the 1972 calendar year. Although each year's efforts have resulted in a report (Schenck and McAniff 1971, 1972a, b), location efforts for prior years have continued for two reasons: First, to be certain that statistical trends and conclusions are based on the total fatality population from each year; and, second, to ensure that the location methods are complete and exhaustive. This portion of our report will discuss the questions of data acquisition and completeness and also outline the ground rules for inclusion of a fatal event in the survey.

1.2 The 1970 Survey

The 1971 fatal accident survey found 21 fatal skin and scuba accidents that had not been reported for 1970. The 1970 total increased from 122 to 143 deaths. During 1972, two more skin diving deaths in 1970 were found during a check of nonfatal pressure accidents involving recompression treatments of Florida divers suffering bends. The 1972 study found no new 1970 scuba cases; therefore, we believe that the scuba numbers for 1970 are relatively complete. As has been noted before, skin diving accidents are much less "visible" in the press and among divers than those involving tanks and compressed air.

This report treats scuba and skin diving statistics separately. We recognize that skin diving fatalities share many common aspects with scuba deaths, including use of belts, suits, inflated vests, and other items plus similar dependence on weather, buddy, and experience factors. However, we feel that it is desirable to keep the statistics separate, because complete data on skin diving cases are more difficult to get than for scuba cases.

1.3 The 1971 Survey

The 1972 study located one additional 1971 scuba death. We spent considerable effort in mail queries, phone calls to police and divers, and appeals in magazines such as Skin Diver; therefore, this modest addition of one death suggests that the 1971 methods were relatively comprehensive. During the first 2 years, we learned there are areas, such as the Monterey coastal region in central California, where diving activity is important, but where newspaper coverage and accident reporting are relatively modest. Special efforts to collect information must be made in that region. The 1970 survey was incomplete by 25 fatal cases (Schenck and McAniff 1971); however, there is no indication that the 1971 effort is deficient to a similar degree. We feel that the 1972 census is probably as good as the 1971 census.

In addition to the 1970 and 1971 fatal cases, we obtained and studied U.S. Coast Guard records for a large number of nonfatal cases that were sufficiently serious to require response by Coast Guard units. These rescue cases will be analyzed and discussed in a separate section.

A skilled submarine medical specialist from the Naval Submarine Medical Research Laboratory in Groton, Conn., reviewed the autopsy findings in 31 cases in 1970 for which autopsy documents could be obtained. This effort, which is planned to cover additional later cases, yields information on the credibility of autopsies and interpretations for diving accidents.

The project now has filed case reports on almost 1,000 diving deaths, plus accounts of many hundreds of nonfatal accidents. There seems little doubt that this mass of data has a number of important lessons still to be detected and studied.

1.4 Source Analysis for 1972 Cases

The methods for locating fatal cases were similar to those successfully used in 1971. They included one dependable clipping service; mailing of queries (with return stamped envelopes and accident report forms) to over 1,000 active divers and persons involved with diving; phone queries to high-risk areas; Coast Guard SAR (Search and Rescue) reports; and very great assistance from regional specialists in scuba accident work including Tom Ebro of Los Angeles County, Dave Desautels and the Florida Cave Diving Association, and Roy Damron of the Governors Committee on Water Safety in Hawaii. After 3 years of effort, we are receiving unsolicited accident reports from police and coroners in high-risk areas and many letters and phone calls from divers who have become aware of this work. Hundreds of people are involved in a study of the numerous cases, and their interest and cooperation are essential to this sort of effort. "Instant Alert" postal reply cards were first used early in 1973 and are proving very helpful. (See figure 1.)

Table 1 shows the "primary" source of 1971 and 1972 accident data. We define a "primary" source as one that is planned and regular in character, such as the press-clipping service, SAR reports, or reports from regional investigators who study diving accidents. (In other words, if data on a fatal accident are received through the clipping service and then letters from local divers or a coroner are received, the clipping service data are regarded as primary.)

Excellent cooperation was also received from the U.S. Coast Guard Underwater Safety Project Office, which alerted the project by phone as soon as it had any word of a diving accident. Twenty-two fatal cases were noted in this manner.

The newsclipping service appears to have been about as effective in 1972 as in 1971. Clippings were located through other sources for 11 fatal cases that the clipping service had missed in 1972 and 8 such cases in 1971.

Our only method of judging the number of missed cases is based on comparing the University of Rhode Island (U.R.I.) effort with other lists, such

FIRST CLASS
Permit No. 73
Post Office
Wakefield, R. I.
02880

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

POSTAGE WILL BE PAID BY

NATIONAL UNDERWATER
ACCIDENT DATA CENTER

P.O. BOX 68

KINGSTON, R. I. 02881

. . INSTANT ALERT . . UNDERWATER ACCIDENT . .
(SKIN DIVER, SCUBA DIVER, ETC.)

(Mail Promptly . . . Complete Report to Follow)

Name of Victim: ..... *Last First Middle*

Address: .....

..... State .....

Location of Accident: .....

..... State .....

Name, Address, Phone of Reporter: .....

Address: .....

..... State .....

Date and Time of Accident: .... *Day Mo. Yr. (Use 24 Hour Clock)*

Fatal? ..... *(yes or no)*

Designate Location by code number .....

1. Ocean, Bay, Sea
2. Minor Lake, Pond, Slough
3. Quarry, Pit, Open Mine 3A. Cave
4. River
5. Major Lake, Pond
6. Swimming Pool
7. Great Lakes

Victim's Sex .... Age ....

Figure 1.--Instant Alert postal reply card.

Table 1.--Primary source of 1971 and 1972 fatality data (both skin and scuba diving)

Source	Fatal cases			
	1971		1972	
	Skin	Scuba	Skin	Scuba
Newsclipping service:	11	91	8	92
Official sources (coroners, police)	2	4	6	8
Solicited and unsolicited letters	3	15	1	17
Located while investigating another case	0	6	1	4
Not available	1	0	0	2
Total	17	116	16	123

as the SAR Coast Guard records or the Los Angeles County accident census. All SAR cases were in the files. The U.R.I. list of cases from the Los Angeles area showed three more cases than the Los Angeles County list. On the basis of such evidence, and in common with the 1971 survey, it appears that the number of missed scuba cases is very small, probably less than 10 and very likely less than 5. In short, it is doubtful that additional data on 1972 will significantly alter the conclusions and statistics.

1.5 Ground Rules for Inclusion in the Accident Census

The great bulk of the victims in this compilation were U.S. citizens diving in U.S. waters. Exceptions will be noted here as follows:

Twelve scuba victims were diving outside the country; the locations are shown in a later table. These victims were all involved in recreational diving. One of the 12 was a Jamaican citizen who died during a record attempt with his partner, a United States citizen.

Two citizens of other countries were included because both died in U.S. waters and both victims had learned diving in the United States. (One was under instruction at the time.)

A depth record attempt in 1971 in Jamaica led to a double fatality that was not included in the 1971 census because both participants were Jamaican. Also, the 1971 census included one non-U.S. citizen who was trained in the United States and died in California waters.

1.6 Conclusions

On the basis of the foregoing data, this report is believed to be a reasonably complete census of U.S.-related fatal diving accidents. The very great improvement in the reduction of missed cases between 1970 and 1971

suggests that the location methods have improved over the first year of effort and that the conclusions presented in this report will not be changed in any important way by future case acquisitions.

It should be noted that prompt awareness of an accident is important to a thorough investigation. A case 1 or 2 years old is very hard to document, especially if the victim was visiting out of his own area. If a fatal case can be located in a reasonable time after it occurs, then its study becomes mainly a matter of constraints in time and funding. If investigators simply miss a group of deaths, as U.R.I. did in the Monterey area in 1970, the resulting statistics and analysis may be biased to such a degree that they will affect important conclusions and cautionary advice to the diving community.

The Monterey example is apt, because a study of these deaths over the past 2 years reveals the important statistic that most victims lived a considerable distance from the ocean. Six 1970 Monterey cases were documented as a result of this followup, and a lack of familiarity with local conditions was found to be a contributing cause of death.

PART 2

GENERAL SCUBA FATALITY STATISTICS

2.1 Fatality Totals

In table 2, two deaths during a 1971 attempt to set a scuba diving depth record are not included since both victims were non-United States citizens diving in the Bahamas.

Table 2.--Summary of diving fatalities, 1970, 1971, and 1972

Activity	Fatalities					
	1970		1971		1972	
	Male	Female	Male	Female	Male	Female
Scuba diving	104	8	107	7	106	12
Scuba diving, record attempt	0	0	0	0	1	1
Skin diving	26	3	17	0	15	1
Diving with surface-supplied air	4	0	2	0	2	0
Compressed air explosion	0	0	0	0	1	0
Total	145		133		139	

As suggested later, the 1972 data would have shown a modest decrease in the absolute total except for a sudden increase in multiple-victim accidents.

Table 3 implies that trained divers increased by 37 percent in 1972 when compared with 1971; however, a number of factors must be considered. Many instructors issue certification for more than one agency. A person completing a single course may receive a "C" card for YMCA, PADI, and NAUI, thus distorting the total figures.

The totals for at least two of the instructor agencies include training outside the United States, e.g., in Canada and Japan, further reducing the validity of the totals.

Finally, the major training organizations estimate the "dropout" rate in recreational diving to be as much as 75 percent. Nevertheless, the 1972 totals probably indicate a decrease in the rate of fatalities when all is considered.

Table 3.--Scuba divers trained, pre-1971, 1971, and 1972

Training group	Divers trained		
	Pre-1971	1971	1972
	(Thousands)		
National Association of Underwater Instructors (NAUI)	212	54	67
National Association of Skin Diving Schools (NASDS)	133	52	55
Professional Association of Diving Instructors (PADI)	47	37	52
Young Mens Christian Association (YMCA)	172	12	42
Los Angeles County (LAC)	140	10	10
Total	704	165	226

2.2 Geographic variations

The geographic data in table 4 and figure 2 show the variation of fatal accidents within a given State over the 3-year period.

In the group of high-activity States (California, Florida, Hawaii, New York, and Washington), only California shows a reasonably stable pattern, and even here the variance is much greater than the national statistics in table 4. The patterns in Washington and New York changed dramatically year to year; there is no explanation for such fluctuations. Thus, one "bad year" in a State would not appear to be a valid basis for special regulation of scuba sports. Three years is insufficient for drawing any firm statistical conclusions, and the number of deaths in a given year may be due primarily to fluctuations encountered with small numbers.

Another possibility that the data modestly suggest is that a "bad year" and its attendant publicity induce caution among local divers during the next year, which becomes "better." This certainly seems to have happened in cave diving in Florida, where 1970 had a number of well-reported multiple disasters and 1971 was much quieter. 1971 was not only a bad year in New York, but a year in which press coverage of several spectacular accidents (boat rundowns and a double death in the Niagara bypass tunnel) must have reached many active divers in New York. If so, the return in 1972 to the 1970 pattern could lead to a hypothesis that public exposure of scuba accidents may have some social utility on a regional basis. However, this and other hypotheses from accident data are hard to draw and prove because in dealing with such small numbers one or two additional accidents can change significantly both absolute numbers and percentages. Only the continued accumulation and analysis of data over an extended period may lead to valid conclusions.

Figure 2 presents the 3-year data for the remaining States; it shows no significant changes or trends.

Table 4.--Scuba diving fatalities by State and foreign area, 1970, 1971, and 1972

Location	Fatalities		
	1970	1971	1972
State:			
Alabama	1	2	0
California	26	31	25
Colorado	0	1	1
Connecticut	0	0	2
Florida	22	13	26
Georgia	3	0	0
Hawaii	6	9	5
Illinois	2	0	0
Indiana	0	1	2
Kentucky	0	1	0
Louisiana	5	0	1
Maine	3	3	2
Maryland	2	1	0
Massachusetts	5	4	4
Michigan	1	3	4
Missouri	3	3	2
Nebraska	0	0	1
New Hampshire	2	0	0
New Jersey	1	4	2
New York	2	11	2
Ohio	1	2	2
Oklahoma	1	0	0
Oregon	1	2	2
Pennsylvania	1	0	0
Rhode Island	2	1	2
South Carolina	0	1	1
Tennessee	0	0	1
Texas	1	4	3
Utah	2	3	0
Virginia	1	1	1
Washington	10	3	15
Wisconsin	1	4	2
West Virginia	1	0	0
Foreign area:			
Australia	0	1	0
Bermuda	0	0	1
Canada	0	1	0
Caribbean area	5	5	8
Mexico	3	1	1
Okinawa	2	0	1
Total	116	116	118

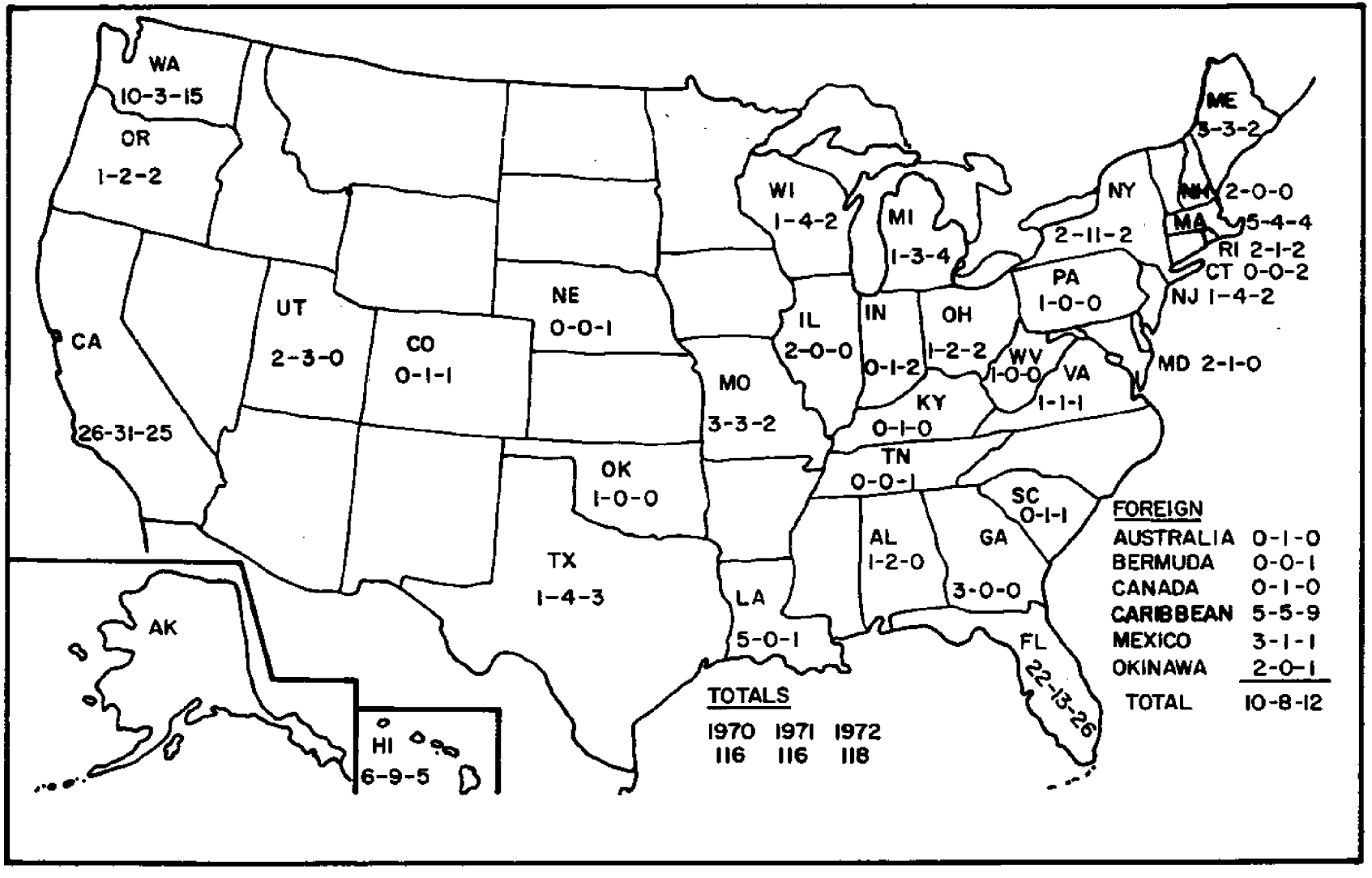

Figure 2.--Scuba diving fatalities by State, 1970, 1971, and 1972. Note: State totals for 1970, 1971, and 1972 are shown consecutively, e.g., 0-0-0. Five "special nature" fatalities are not included here.

2.3 Distribution by Weekday and Month

Table 5 shows remarkable stability with regard to the days of the week in which fatalities occur. In each of the 3 years, over 60 percent of the fatalities were on weekends (Saturday and Sunday). At the same time, table 6 shows only a slight seasonal trend. If the year is divided into quarters, the second and third quarters (which include the summer) only record slightly over 60 percent of the total. However, before drawing conclusions it will be necessary to review seasonality's relation to place of death, day of the week's relation to distance from the diver's home to place of death, and other similar possible relations.

Table 5.--Distribution of fatal scuba accidents by weekday, 1970, 1971, and 1972

Day	Accidents		
	1970	1971	1972
	(Percent)		
Monday	2	7	7
Tuesday	6	7	4
Wednesday	12	8	9
Thursday	6	4	9
Friday	10	9	5
Saturday	25	20	27
Sunday	39	45	39

Table 6.--Distribution of fatal scuba accidents by month, 1970, 1971, and 1972

Month	Accidents		
	1970	1971	1972
	(Percent)		
January	6	2	3
February	3	3	3
March	9	6	7
April	7	8	10
May	11	19	11
June	9	10	11
July	16	18	6
August	9	15	14
September	8	3	11
October	10	7	3
November	7	4	10
December	5	5	11

2.4 Environmental Factors

Table 7 shows the location of the scuba fatal accidents over the 3 years.

Table 7.--Location of scuba fatalities, 1970, 1971, and 1972

Location	Fatalities		
	1970	1971	1972
Ocean, bay, sea	73	69	73
Minor lake, pond, slough	18	25	19
Cave	11	8	19
River	4	9	2
Quarry, pit, open mine	7	5	1
Great Lakes	1	0	3
Swimming pool	2	0	1
Major lake, pond	0	0	0
Total	116	116	118

Note: The five "special nature" fatalities are not included here.

Figure 3 shows the cumulative depth distributions for the 3 years for scuba accidents. These depths were either the depth to which the victim went before his death or the depth at which the body was found. Accidents do seem to be occurring deeper each year: The median depth was 45 feet in 1972, compared with 40 feet in 1971 and 30 feet in 1970.

Weather is always a possible hazard in diving activity. Where eyewitnesses do not mention weather as a factor or where queries elicit no comment about weather or seas, we assumed that they were not important. Table 8 shows the breakdown where weather was determined to be contributory.

Table 8.--Fatal scuba cases involving weather and sea conditions, 1972

Condition	Scuba cases
Moderate (2-ft or less) waves	11
Heavy (over 2 ft) waves	5
Heavy or dangerous surf	4
Current, undertow, river	4
Ice (loss of exit hole)	3

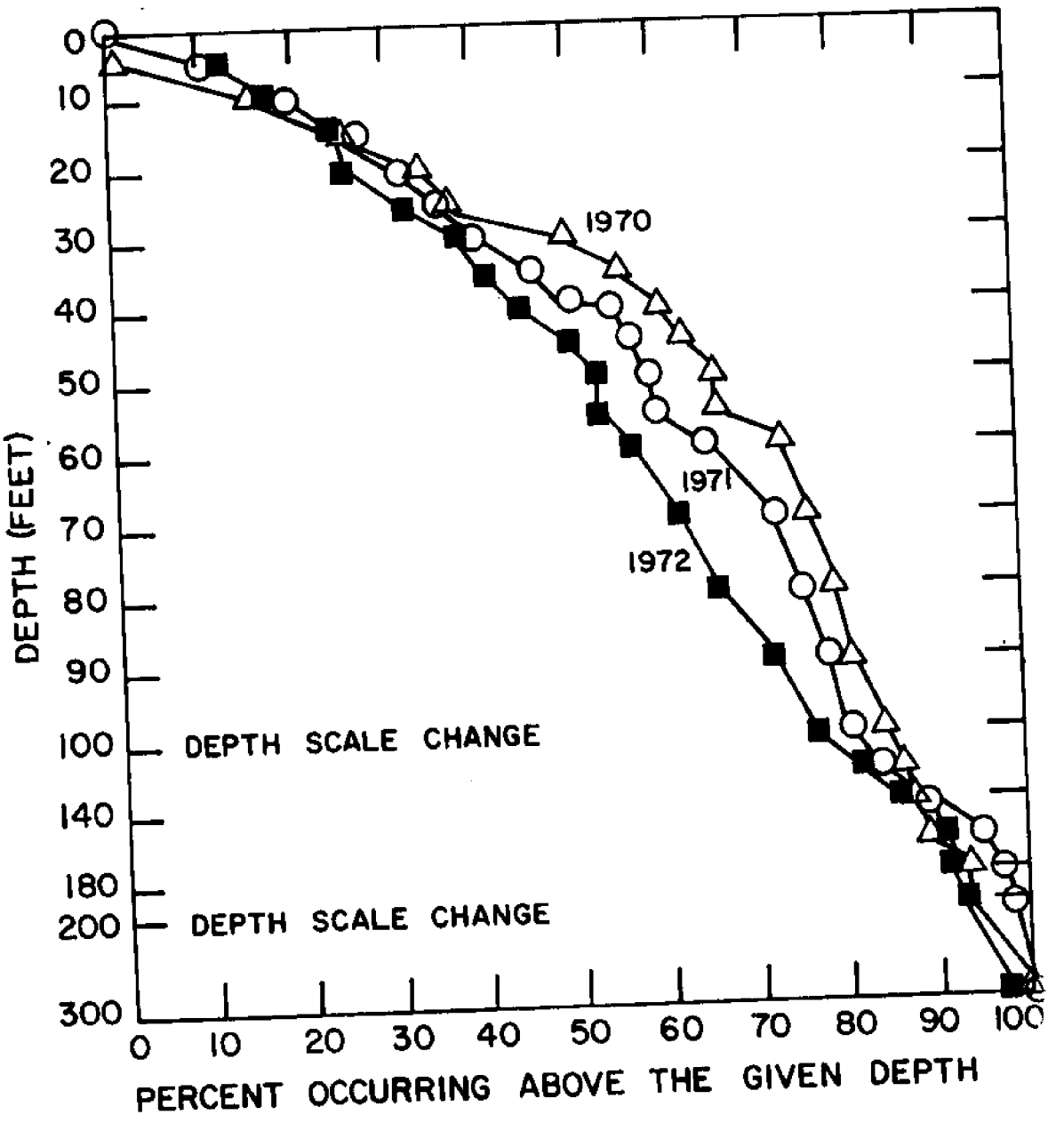

Figure 3.--Cumulative distribution curve of scuba accident depth for the y
1970, 1971, and 1972.

In the Webster (1966) study of 1965 and in the 1970 U.R.I. report (Schenck and McAniff 1971), seas and weather were involved in about one quarter of the scuba fatalities. In 1971 this proportion had dropped to about one-fifth of the cases. In 1972 the figure again appears to lie between a quarter and a fifth of the cases. However, it should be understood that weather was a primary problem in only 11 of these cases. (See final summary table on starting causes.)

Beach surf is also able to cause a fatal accident by catching a diver who is entering or leaving the water and driving him into rocks or the bottom. This is a particular problem along the California coast, and a deadly one in the Monterey area. In those waters, surf 2 or 3 feet high can build into huge rollers in less than an hour--often in the afternoon. Divers who have made a safe entry may find it impossible to make their way through the surf to the shore and thus are trapped offshore in a steadily worsening situation. Lack of knowledge of this phenomenon is the reason why most diving deaths in this area have involved divers visiting the area; local divers are well aware of this life and death situation and appear to take appropriate precautions.

In most other cases, the wave and weather situation is not a primary, but a contributory, cause of the fatal accidents. One would assume that weather might play a greater role in a novice accident than in a fatality involving a skilled scuba diver. This supposition is not, however, clearly proved by the 1972 data. Out of 29 fatal cases involving "first dive" or "early dive" (five dives or less) scuba victims, 8 involved weather or sea factors. While a slightly higher percentage than for the total sample, this is not a statistically significant increase.

Three divers were trapped under ice, two together. None of the three had used lifelines to assist them in finding the hole through which they had entered the water.

2.5 Work-Related Fatalities

The involvement of college students in diving accidents has definitely increased (table 9). Four of these were students working on college projects or thesis research. A fifth victim was a college student engaged in "part-time" commercial diving. Two of the three commercial divers were operating on surface-supplied air, and the third commercial diver "blew-up" from 280 ft when his new style dry suit overfilled with air. The police officer and the industrial employee both died while taking scuba instruction. The victim engaged in oceanographic research was reported to be "obtaining biological samples at great depth." The underwater archeologist who died was a recognized expert in his field with long experience in diving. He allegedly had a rather strange accident. Leaping into the water from his boat, he received a blow from the impact of water against his face mask. A bone was fractured and caused massive hemorrhaging from a ruptured artery.

Table 9.--Work-related diving fatalities, 1972

Occupation	Deaths
College student	4
"Part-time" commercial diver (college student)	1
Commercial diver	3
Police officer	1
Industrial employee	1
Oceanographic researcher	1
Underwater archeologist	1
Total	12

PART 3

THE SCUBA VICTIM: TRAINING AND MEDICAL ASPECTS

3.1 Age Distribution

Table 10 compares the age distribution of the scuba victims for the 3 years:

Table 10.--Age distribution of scuba diving victims, 1970, 1971, and 1972

Age	Victims		
	1970	1971	1972
Years			
10-15	5(1)	3(1)	1
16-20	27(1)	31(3)	22(1)
21-25	23(1)	23(1)	36(6)
26-30	18(3)	18(1)	25(2)
31-35	12	8	8
36-40	5	5	9(1)
41-45	12(1)	6	7(1)
46-50	6(1)	7(1)	5(1)
51-55	0	4	4
56-60	2	3	3
60-up	0	1	0
Total	111(8)	109(7)	118(12)

Note: 1. Numbers in brackets refer to number of female divers in group.

2. The five "special nature" fatalities are not included here.

The 1972 data suggest a slight increase in the median age of scuba divers involved in fatal accidents, but several more years would probably be required to establish such a trend. All three of these distributions are quite similar to the age distribution of scuba divers responding to a random-sample questionnaire from Skin Diver Magazine (Schenck and McAniff 1972b).

The ages and sex of the five "special nature" cases that are not included in table 10 are as follows: one 35-year-old male and one 42-year-old

female in the scuba record attempt, two males aged 37 and 56 in the surface-supplied air accident, and one 24-year-old male in the compressed air explosion.

3.2 Experience, Training, and Certification

Responses of family, buddy divers, and police investigators provide the basis for determining experience (table 11). In general, if the victim was undergoing a training dive, he is placed either in the "first open water" or "early open water" category. The "early open water" classification is intended for divers who have not exceeded five or six dives in lake or ocean. "Some experience" implies a diver who has been diving for 1 or 2 years, or longer at a low rate. "Considerable experience" and "very experienced" categories contain similar divers; "very experienced" is reserved for persons whose diving reputation is established either regionally or nationally.

Table 11.--Experience of scuba divers lost in fatal accidents, 1970, 1971, and 1972

Experience	Accidents		
	1970	1971	1972
	Percent		
First dive ever with scuba	12	14	6
First dive in open water	9	12	6
Early open water dive	15	19	21
Some experience	29	28	29
Considerable experience	21	20	32
Very experienced	14	7	6

Since the number of cases on which these data were obtained is similar for the 3 years, it is reasonable to suspect that the reduction in "first dive" accidents is a real effect. Undoubtedly, renters and sellers of scuba gear are exerting more care to ensure that their customers have some form of certification. Police are becoming more knowledgeable about this in high-risk areas and are following up on sources of scuba gear in their investigations. Skin Diver Magazine has also mounted a campaign to discourage the rental and sale of scuba to untrained persons. Nevertheless, the "first" and "early" dive categories make up about 25 percent of the total scuba fat group.

Table 12 suggests that "amateur" instruction may be declining, but the was an increase in deaths associated with "regular," that is, nationally recognized scuba training programs. (Each of the nationally recognized cer tifying organizations was identified with at least one student death.) Be cause of the small numbers involved, however, it is impossible to state if

Table 12.--Scuba training activities during a fatal accident 1970, 1971, and 1972

Activity	Accidents		
	1970	1971	1972
Open water instruction, regular	7	7	12
Open water instruction, friend	7	8	3
Died while instructing another, regular	2	0	1
Died while instructing a friend	1	0	0
Taking instruction in pool	2	0	1
Total	19	15	17

there is an increasing problem or if this is merely a fluctuation. It should also be noted that all of these agencies are reporting large increases in enrollment. Two of those who died taking instruction were in college scuba classes.

3.3 Diving Partners and Their Activities

The use of the "buddy system" remains as one of the first rules of diving, but concerted efforts must be made to develop accident management techniques, e.g., what to do in an emergency.

There does appear to be a significant increase in accidents on group dives in 1972. In a number of these cases witnesses noted that the victim "was not missed for a while" or that he became separated from the group (table 13). Thus, a diver becoming separated from a group remains a problem.

Table 13.--Scuba diving partners during a fatal accident, 1970, 1971, and 1972

Number with victim	Accidents		
	1970	1971	1972
Zero (diving alone)	13	12	11
One other (buddy)	47	54	41
Two others	11	20	20
Three others	10	10	4
Several others	19	17	33
Total	100	113	99

Note: The five "special nature" cases are not included here.

There is no overlap in the categories in table 14. When buddy breathing was attempted, even if the buddy lost his man later, the case was counted as a "buddy breathing" case.

Table 14.--Buddy activity during fatal scuba accident, 1971 and 1972

Activity	Accidents	
	1971	1972
Buddy stayed with victim	25	27
Buddy lost victim underwater	24	25
Attempted buddy breathing	15	14
Buddy left water ahead of victim	9	4
Buddy lost victim on surface	12	15
Total	83	86

Note: The five "special nature" cases are not included here.

Multiple fatalities increased substantially in 1972. In 1970 there were 10 multiple events, 9 double, and 1 triple for a total of 21 victims, about one-fifth of the scuba total (table 15). In 1971 there were only four double fatalities for a total of eight victims, less than one-tenth of the scuba total. In 1972 there were 10 multiple events, 8 double, and 2 triple for a total of 22 victims, again about one-fifth of the total scuba count. Four of the double fatalities and the two triple deaths occurred in caves, all in the North Florida area. Running out of air inside the cave was the general cause of these events. Most of these divers were visitors to the caves, and many had inadequate equipment for this type of diving.

Table 15.--Multiple scuba fatalities, 1970, 1971, and 1972

Multiple	Accident cases		
	1970	1971	1972
Double	9	4	8
Triple	1	0	2
Total victims	21	8	22

Note: The five "special nature" cases are not included here.

It is unusual that four double fatalities occurred in open water outside of caves. One double accident occurred in Michigan under ice when lifelines were not used. Neither man could find the access hole, and both ran out of air. The second pair were at an open-water class, but went diving before the class assembled. Both were very inexperienced and had plenty of air when found. Both divers in the third case had "several" beers, and one diver incorrectly mounted his regulator on his tank. Both had defective life vests, and one regulator "breathed hard." This was a classic example of how a number of different problems combine to produce the final deadly result. The final double case involved a checkout-dive in water described as very cold and with zero visibility.

Another fact of some interest is that four of the double cases involved a mixed diving team (man and woman forming a buddy pair).

3.4 Medical Aspects

There were 40 autopsies on 1972 scuba victims (table 16).

Table 16.--Results of autopsies, 1970, 1971, and 1972

Primary complaint	Autopsies		
	1970	1971	1972
Asphyxiation or drowning	25	26	22
Lung overpressure	9	12	9
Injury to head (often plus "drowning")	5	2	2
Heart attack	5	1	3
Aspiration of stomach contents	3	1	2
Explosive decompression	0	0	1
Intestinal disorder	0	0	1

The three heart attack victims were 40, 45, and 24 years old. The 24-year-old had had no warning of his condition, but the coroner seemed quite definite that he had severe arteriosclerosis. There were no boat rundown fatalities of scuba divers in 1972; the head injury cases resulted from diving in heavy surf. Several victims had traces of alcohol, but none of those autopsied were "officially" drunk.

The credibility of autopsies has always been a troublesome one in diving, especially in areas where coroners are unfamiliar with the unique character of pressure injuries. To explore this question further, the records for 31 autopsied cases from 1970 were sent to Captain John H. Baker, Officer in Charge of the Naval Submarine Medical Research Laboratory in Groton, Conn. Dr. Baker reviewed these cases as follows: He read all the case documents

and the autopsy material and then responded to the general question as to whether the official "cause of death" followed from the case description and the post mortem documents. He also attempted to note any medical problem that might have started the accident or drastically contributed to it. From 31 cases examined, he found the following.

3.4.1. Cause of Death. Baker agreed with the official cause of death on 25 of the cases, questioned 3, and disagreed on 3. In one "disagree" opinion, he noted that the autopsy protocol suggested an air embolism, but that the prosector failed to recognize the signs. In one "questioned" case, he felt that the victim had embolized during retrieval, not during the accident. In another "questioned" case, he felt that the prosector had again missed an air embolism. There were four detected air embolisms in the group of cases to which Baker added two and took away one. Clearly this sample is too small to warrant large conclusions, but it does suggest that a substantial fraction of overpressure cases may be missed by autopsy, and, of course, many are probably never autopsied at all. (It should be noted here that of the nine 1970 overpressure cases noted in table 16, actual documents could be obtained for only four.)

Baker considered one of the "questioned" cases might have been an embolism, but noted that there was no recorded medical evidence for this possibility.

He also noted that one of the diagnosed embolism cases had the possibility of "an air trapping anatomical variant" in the man's lungs. This situation can arise when air gradually forces into the lung past an obstruction during bottom time, but then is unable to escape when the man rises to the surface, thereby blowing through the lung wall into the bloodstream. This condition was detected in 2 submarine trainees out of some 130,000 who underwent the escape drill in the New London escape training tower. Since this type of overpressure accident cannot be prevented by exhaling during the rise, it is important that coroners understand this possibility and how to find it. In addition, ways of detecting the condition by external examination may be necessary.

3.4.2. Medical Causes of the Accident. Of the 31 cases, Baker detected 4 in which a medical condition contributed to the accident, not including those in which an embolism was involved. Two of these cases involved heart disease, one involved a victim with a history of pneumonia, and the fourth case involved a boat rundown in which the head injury caused the death. In other words, 3 of these 31 victims were diving with serious physical disabilities that led to their deaths.

In a final case, involving an epileptic who suffered a seizure underwater, Baker felt that the emergency triggered the seizure rather than vice versa, although he noted that diving is contraindicated for epileptics.

Certainly these small numbers make any statistical conclusions of doubtful worth. As time permits, all autopsy documents (over 120) in our files will be submitted to scrutiny and firmer conclusions may then become possible.

3.5 Search and Rescue

In 61 of the scuba cases, rescuers were aware that the victim was in trouble within 15 minutes of the onset of the accident (table 17). However, recovery often took a great deal of time.

There were 34 cases in which some form of resuscitation was attempted. In the 3 years, resuscitation was tried in virtually every case in which some hope existed. Of course, it was usually impossible to establish how effectively this was carried out.

Table 17.--Elapsed time between start of scuba accident and body recovery, 1970, 1971, and 1972

Time range	Recoveries		
	1970	1971	1972
Immediate, victim alive, died later	4	5	5
Immediate, victim dead	15	17	20
5 minutes or less	8	6	3
Over 5 to 10 minutes	4	1	5
Over 10 to 15 minutes	8	8	2
Over 15 to 60 minutes	11	14	9
Over 1 hour to 4 hours	10	13	14
Over 4 hours to 12 hours	9	8	7
Over 12 hours to 1 day	18	9	7
Over 1 day to 2 days	4	5	10
More than 2 days	6	7	8
Victim never found	6	11	7

Coast Guard assistance was involved in 34 cases in 1972, usually in a search or medivac capacity. In two additional cases, a Navy and an Air Force helicopter were involved.

PART 4

EQUIPMENT ASPECTS

4.1 Regulators and Air Supplies

The 1972 year was the third year with no verified case of regulator failure. Furthermore, in about one thousand fatal scuba cases during 1946-72, every case of "regulator failure" has been due to improper disassembly or clogging by weeds or bottom material.

In one fatal 1972 case the reserve assembly had been improperly assembled so that the reserve air was available when the valve was up and off when the valve was down. The diver pulled his valve down when breathing became difficult and shut off the air completely, thereby precipitating an emergency that resulted in his death. This error resulted in a memorandum from the Navy warning against this type of assembly error (this diver was treated in a Naval facility).

In a second fatal case, the reserve lever had become clamped under the straps holding the tank to the back-pack. The resulting lack of reserve air precipitated the fatal accident.

The account of a third case involving regulator action is sketchy. The diver reportedly ran into the bottom with such vigor that his regulator was jammed by bottom material.

Two regulators were reported as "hard breathing" by investigators, but, of course, this condition should be readily ascertained in advance or during the initial phases of the dive. All in all, there were 28 cases in which a witness noted that the regulator had been checked and found in good working order. However, it should be noted that this type of check is usually not made or noted unless the character of the accident suggests a failure of the air supply with air still in the tank.

There were 22 cases of "no air" in 1972 compared with 16 in 1970 and 19 in 1971, which reflects the several multiple cave accidents in which sufficient air was critical.

4.2 Entanglements, Ditching

In 1972 there were 8 fatalities in which tanks were ditched and 18 in which the weight belt was ditched. These 26 ditching cases compare with 26 in 1970 and 10 in 1971. In about half the cases, the buddy diver accomplished the ditching. Only two victims were entangled in kelp in 1972 compared with eight in 1970 and eight in 1971; in one 1971 case, it appears that the tangling occurred after the accident. There were three 1972 cases of entanglements in external lines, the same number as in 1971. In two of these cases, safety or descending lines were involved; in the third case, a fish line.

4.3 Inflated Vests

In two of the 1972 cases in which the vest inflated, witnesses specifically noted that the vest failed to support an unconscious diver (table 18). In one of these cases, the victim floated with his face underwater.

Table 18.--Performance of inflatable vests, 1970, 1971, and 1972

Situation	Cases		
	1970	1971	1972
Vest worn, not used, not checked	16	14	9
Vest worn, inflated during accident	6	9	15
Vest worn, not used, checked OK later	9	4	9
Vest worn, malfunction during accident	5	7	7
Vest worn, no cartridge	2	0	0
Total	38	34	40

4.4 Gas Explosions

There were two air station explosions in 1972; one killed a scuba instructor, and another severely injured the operator of a diving shop. In the fatal case, a compressor station in a room adjacent to a swimming pool utilized old oxygen cylinders (220 cubic feet) for an air bank. The compressor was reportedly set to vent at 2,200 psi; however, on the day of the explosion its pop valve had either failed or had been reset, because the gages were locked at 2,900 psi after the explosion. The oxygen tank containing compressed air that exploded at this Midwest location was found to have lost half its wall thickness at some points. Its last DOT stamp was 1961, and its history was unavailable. This accident focuses attention on problem that present air stations may have since 3,000 psi cylinders were introduced for diving. Also, the dangerous possibility of pumping present scuba cylinders to this high pressure will then exist. In any case, the accident stresses the need for frequent internal visual inspection of all tanks used in scuba work, not just those carried on the diver's back.

The second accident, also in a Midwest dive shop, involved an air filte explosion that seriously injured the owner. Here again, a pressure vessel associated with scuba activity failed, possibly as a result of oil residue ignited by the high-pressure oxygen. Oil filtered from breathing air must collect someplace and can constitute an explosive menace under the high oxygen partial pressure associated with scuba work.

PART 5

FATAL AND NONFATAL SCUBA CASE SUMMARIES

5.1 Fatal Scuba Case Summaries

As has already been noted in the section on weather involvement, many accidents result from a chain of events, none of them inherently deadly alone, but all together leading to a tragic outcome. There are a number of cases each year in which it is simply impossible to assign any cause whatever to the accident. These often involve a never-found victim or a victim diving alone and found floating hours or days later. Table 19 attempts to summarize what is defined as the "proximate starting cause" of those accidents for which sufficient data allow an opinion. As the reader will note, many of these "starting causes" should not lead to death; other problems and failures were needed to complete the event.

Table 19.--Proximate starting causes of scuba fatal accidents, 1972

Estimated cause	Cases
Possible embolism, panic, or exhaustion	26
Diagnosed air embolism	6
Diagnosed air embolism with alcohol involvement	2
Diagnosed air embolism during free ascent exercise	1
Out of air in cave	15
Out of air on deep dive	2
Diving in rough or dangerous water	11
Deep dive, apparent narcosis and confusion	4
Diagnosed heart attack	3
Head injury	3
Trapped under ice	3
Tangled in external line	3
Tangled in kelp	1
Aspiration of stomach contents	2
Overweighted	2
Possible drinking involvement	2
Reserve valve jammed or inoperative	2
Reserve rod jammed	1
Rebreather unit malfunction	1
Air storage tank explosion	1
Blowup in inflated dry suit	1
Drowned assisting panicked buddy	1
Jumped in water with tank valve off	1
Life vest failure during swim to dive area	1
Lost in cave, air remaining	1
Piece of steel pinched hose	1
Vascular spasm in cold water	1
Victim had fasted 2 days before dive	1

It is evident that the category, "possible embolism, panic, etc.," is a catchall in this table. Virtually all of these 26 cases involved a diver at the end of his dive on the surface, unable to reach a boat or shore, and eventually sinking or becoming unconscious. Without competent medical investigation, it is impossible to separate simple exhaustion from an overpressure event, because each simulates the other. Furthermore, even the buddy diver is usually unable to judge how hard the victim had been exerting prior to the final problem. This classic accident pattern of failure on the surface following a dive runs through all scuba safety work and strikes experienced divers as well as novices.

5.2 Nonfatal Accident Survey Based on Coast Guard Data

No doubt much can be learned about scuba safety by studying nonfatal accident reports. Equipment, training, and medical difficulties can be explored with the living victim rather than inferred from the accounts of witnesses. On the other hand, it is impossible to draw statistical conclusions from a random collection of this type of data. Some accidents, especially those in which a diver is stupid or careless, tend to be forgotten or suppressed.

One source of data on diving accidents, fatal and nonfatal, are Coast Guard Search and Rescue (SAR) reports. These documents are filled out for every Coast Guard rescue mission and eventually the information is put on computer retrieval tapes in Washington. Until 1970, these records had very little use for scuba accident studies, because scuba accidents were listed under the heading "swimmer in water." Officers of the Coast Guard Underwater Safety Project who attended the U. R. I. Ocean Engineering Program made efforts to provide a means of differentiating scuba diving accidents from the other types of accidents in this category. As a result of their efforts, a set of special code numbers on the SAR forms were assigned in 1970 to scuba accidents; these numbers cover such classification as "stranded," "bends," and "overdue-missing." These numbers in turn allowed the Underwater Safety Project to search periodically through the SAR records for diving accidents. Indeed, the 1970 SAR data enabled us to locate the several missing scuba diver deaths in the Monterey area.

The advantage of examining the nonfatal picture through SAR documents is that a level of importance is immediately established; the accident was bad enough, or seemed bad enough, to require Coast Guard assistance. However, the SAR computer retrieval is not complete, and it is necessary to examine its credibility.

Fortunately, the U.R.I. fatality census is an independent source of data on Coast Guard involvement in scuba cases. Almost every case investigated permits easy determination of Coast Guard involvement, either through newsclips, police reports, or eyewitness descriptions. Therefore, all 1970 and 1971 SAR scuba cases were cross-checked against the U.R.I. case files and then checked through the files for cases in which Coast Guard involvement was not indicated by the SAR computer search. Because the Coast Guard operates on a fiscal year rather than a calendar year basis and all SAR reports on 1972 will not be filed until summer 1973, the analysis for 1972 cannot be

completed until fall 1973. Table 20 shows the results of the 1970 and 1971 fatality checks:

Table 20.--Fatal cases identified by SAR and U.R.I. methods, 1970 and 1971

Condition	Cases	
	1970	1971
Fatal cases involving C.G., U.R.I.	32	34
Fatal cases involving C.G., SAR	24	17
Cases not in SAR computer file	8	14
Additional cases identified by C.G.	0	3

The "additional cases" in the table include two Coast Guard documents: the "Situation Report" and the "Daily Operations Highlights." These two items abstract items of interest from Coast Guard message traffic and activity.

The 1970 SAR's found two-thirds of the fatal cases in which the U.R.I. files show Coast Guard involvement, but by 1971 less than half the cases were retrieved. Also, the SAR system missed at least three cases that were in the other Coast Guard files. These findings were counter to the expectation that less cases would be missed the year after field units began using new diver codes.

Table 21 shows the reverse of table 20; that is, the nonfatal SAR search seems to have located about five times more nonfatal cases in 1971 than in 1970. Also, the U.R.I. newsclip survey turned up several Coast Guard rescues not in the SAR group in 1970, but only three in 1971. Until data from a year or two more are assembled, it does not appear possible to determine the reason for this.

Table 21.--Nonfatal diving accidents from SAR reports, 1970 and 1971

Condition	Accidents	
	1970	1971
Pressure-related accident	6	19
Diver located by Coast Guard	1	8
Diver located by others	3	11
False alarm (diver left in water or not in water)	1	5
Other diving accidents	1	15
Total nonfatal SAR cases	12	57
Nonfatal Coast Guard cases not in SAR reports	7	3

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The apparent increase in pressure accidents between the 2 years (6 in 1970 and 19 in 1971) appears to be partly reflected in comments by persons involved in recompression chamber work. Cases of bends, though sometimes crippling, are less often fatal, especially when they involve a sport diver. Thus an increase in cases of bends could actually occur at the same time that fatal accidents were stable or declining. Bends also may involve an entirely different sort of person than fatal events, e.g., an experienced, stable, deep-diving "professional" who takes chances with decompression to get a job done.

As time permits, a survey of treatment facilities might verify (or refute) the trends suggested by the SAR data.

PART 6

GENERAL SUMMARY OF SKIN DIVING FATALITIES

6.1 Skin Diving Fatality Total

As mentioned previously, this study probably does not cover all skin diver fatalities for a number of reasons. Some such cases are probably missed because of loss of equipment (mask, snorkel, fins) during or immediately following the accident. Other cases are probably missed because they have been noted as "swimmer" drownings. With this in mind, little in the way of conclusions can be drawn from so small a number of cases. Nevertheless, we present the data for the 16 cases in 1972.

6.2 Geographic Variations

Table 22 shows that half the skin diver fatalities were in California waters (eight cases) and that about one-fifth of the cases were in Hawaii.

Table 22.--Skin diver fatalities by State, 1972

State	Fatalities
California	8
Hawaii	3
North Carolina	2
Michigan	1
New York	1
Florida	1
Total	16

6.3 Environmental Data

Table 23 shows more fatalities in ocean water than in freshwater.

Table 23.--Location of skin diver fatalities, 1972

Area	Fatalities
Ocean, bay, sea	14
Minor lake, pond, slough	2

The next two tables, 24 and 25, follow closely the pattern that seems to emerge as far as weekend and summer popularity is concerned. We do not have a table showing the weather or sea condition involvement in fatal skin

diving accidents, but rather note that such conditions definitely contributed to 6 of the reported 16 cases.

Table 24.--Distribution of skin diver fatalities by weekday, 1972

Day	Fatalities
Monday	1
Tuesday	1
Wednesday	0
Thursday	3
Friday	2
Saturday	4
Sunday	5

Table 25.--Distribution of skin diver fatalities by month, 1972

Month	Fatalities
January	0
February	1
March	3
April	0
May	0
June	2
July	5
August	1
September	1
October	1
November	2
December	0

Some case notations of interest were as follows:

"Attempting to reach shore through heavy surf, victim disappeared."

"Caught in undertow and swept seaward."

"Very rough, strong current, victim 'cramped up' and went under."

6.4 Age Distribution and Other Data

Table 26 shows the age distribution of skin diving fatalities in 1972 and requires no further comment.

Table 26.--Age distribution of skin diving victims, 1972

Age	Victims
Years	
10-15	1
16-20	2
21-25	5
26-30	2
31-35	0
36-40	2
41-45	1
46-50	1
51-55	0
56-60	2

The experience of the 16 skin divers who died in 1972 was difficult to ascertain, but was determined in 6 cases. Three of these victims were considered "good to expert," and the remaining three included one "novice" and two "weak swimmers."

Some insight can be gained from the data obtained on these 16 cases when one looks at table 27, which shows the relationship of partners in the water versus those cases in which the buddy system was used. Of the 16 fatalities, 5 were diving alone. Eleven victims were in the water with other persons, but in only four cases could a buddy relationship be established. There seems to be a tendency to abandon the buddy system when snorkel diving.

Table 27.--Partners-buddy relationship of skin diving victims, 1972

Number in water	Victims	Buddy system used
Diving alone	5	--
One other	3	2
Two others	1	--
Three others	2	1
Several others	5	1

Little can be concluded from table 28, which lists elapsed time to recovery of the victim except to note that in about half the cases elapsed time was more than that in which successful resuscitation might reasonably have been expected.

Of the 16 fatal skin diving cases investigated in 1972, Coast Guard involvement was noted in 7 cases only. The Coast Guard advised this office of two of the seven cases. Just as in the scuba fatality cases, data on the five remaining skin diver cases should be forthcoming when the Coast Guard computer summary becomes available later in 1973.

One final observation can be made regarding these 16 skin diver deaths: Only 1 of the victims was established as using an inflatable vest that proved later to be unused, but workable. Two others had inner tube floats at hand, but still succumbed.

Table 28.--Elapsed time between accident onset and recovery of skin diving victim, 1972

Time	Victims
5 minutes or less	2
10 to 15 minutes	5
15 minutes to 1 hour	1
1 to 4 hours	1
Over 12 hours to one day	2
Not recovered	2
Unknown	3

Figure 4 depicts the newly approved American National Standards Institute Z-86.2 Underwater Accident Report Form, officially designated "ANSI Z-86.2, 1973." All readers are urged to cooperate in advising of any underwater accident.

UNDERWATER ACCIDENT REPORT

Forward report to:

NATIONAL UNDERWATER ACCIDENT DATA CENTER
P.O. Box 68 — Kingston, R. I. 02881

VICTIM INFORMATION

Name of Victim: ..... (Last / First / Middle)
Address: .....
..... State .....

Victim's Sex ..... Age ..... Hgt. ..... Wgt. .....
Marital Status: M .... S .... D .... W ... UNK ...
Occupation .....
Employer .....

LOCATION OF ACCIDENT

Location of Accident .....
(use landmarks, distance from prominent terrain features. Attach Chart or Map if available) ..... State .....

CIRCLE LOCATION
(By Code Number)
1. Ocean, Bay, Sea
2. Minor Lake, Pond, Slough
3. Quarry, Pit, Open Mine
3A. Cave
4. River
5. Major Lake, Pond
6. Swimming Pool
7. Great Lakes

TIME AND PLACE OF ACCIDENT

Date and Time of Accident ..... (Day Mo. Yr. Use 24-Hr. Clock)
Date and Time of Death .....
Date and Time of Recovery .....
Death Occurred in Water? ..... (Yes or No)

Autopsy Performed: ..... (Yes or No)
Cause of Death: .....
Medical Examiner ..... (Name)
.....
..... (Address / Phone)

CODE FOR NON-FATAL INCIDENT
Circle one only (A, B, C, or D) which best describes seriousness of incident. Important: Report all "incidents", however minor. Describe in detail on page 4. Include equipment factors.

A. Incapacitating injury rendering person unable to perform normal activities as walking or diving or to leave scene without assistance.
B. Nonincapacitating evident injury as loss of blood, abrasions, lump on head, etc.
C. Possible injury indicated by complaining of pain, blackout, limping, nausea, etc.
D. Incident with no apparent injury, (near miss, etc.)

DESCRIPTION OF DIVES AND ACTIVITIES

Description of all dives within previous 12 hours including accident dive.

Depth	Time Down	Surface Interval
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

Type of Diving: (Explain if Necessary)
Scuba ..... Skin ..... Other ..... Unknown .....
Others in accident ..... (Yes or No)
Separate report filed ..... (Yes or No)

At time of incident, Activities engaged in:
Recreational .....
Commercial .....
Under instruction .....
Instructing .....
Cave diving .....
Spear fishing .....
Photography .....
Night diving .....

At time of incident, Buddy record:
Diving alone ..
Diving with buddy .....
Buddy distance .....
Diving with more than one ...
Distance to next nearest diver ....

Vessels involved ..... (Yes or No)
U.S. Coast Guard aid sought ..... (Yes or No)
(Give Details in "Description of Accident", Name, Captain, Address, Phone, etc.)

WITNESSES

Name	*Address*	*Phone*	*Function/Role*
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

Reported by:
Name .....
Address .....
City ..... Phone .....

Other Contacts:
Name .....
Address .....
City ..... Phone .....

Figure 4.--Underwater accident report form.

ENVIRONMENTAL CONDITIONS

Sea: Calm ..... Moderate ... ... Rough ..... Weather: Clear .. Cloudy . Fog .. Snow .. Rain ..

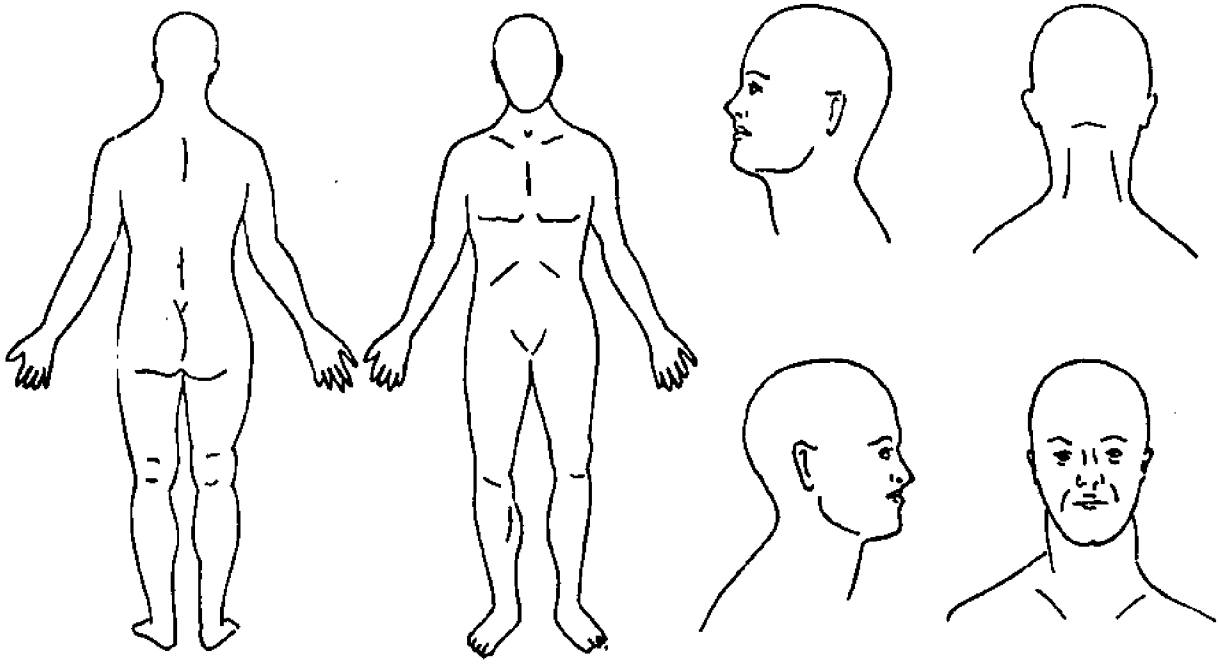
Current: Slight . Moderate .. Strong . Direction ... Thunderstorm . Tornado, Hurricane Other

Wave Height: ... Water Depth: ... Type Bottom: ... Wind Force .... Direction ...

Water Temperature: (°F) ..... Air Temperature: (°F) .....

VISIBLE INJURIES

Illustrate all visible injuries (cuts, abrasions, fractures, etc.)



EXPERIENCE DATA

Swimming Experience: Years .....

Skindiving Experience: Years .....

Scuba Experience: Years .....

Courses and Agency

(1) ..... Certification Date ...

(2) ..... -DO- .....

(3) ..... -DO- .....

HUMAN FACTORS

Hours of sleep in past 24 hours .....

Time of last meal ..... What and how much? .....

Time of last alcoholic drink ..... What and how much? .....

Any known physical ailments, disability or impairment? .....

.....

Figure 4.--(Continued)

EQUIPMENT DATA

NOTE: *Equipment Brand, Type and Serial Number data need be included only if malfunction or failure was contributory to the incident.*

Equipment Data Date and Time of Inspection	Brand, Type	Present Before Diving (Yes or No)	Present at Time of Recovery (Yes or No)	Condition	Equipment	Brand, Type, Serial No.	Present Before Diving (Yes or No)	Present at Time of Recovery (Yes or No)	Condition
Diving Suit					Knife (Pocket)				
Hood					Ab Iron				
Boots or Socks					Flashlight				
Gloves or Mitts					Depth Gauge				
Mask					Spear Gun				
Snorkel					Compass				
Fins					Regulator				
Weight Belt (lbs.)					Tank				
Buckle					Reserve				
Flotation Device					Watch				
Other Equipment									

Flotation Device: Used ..... (Yes or No)

Tested after event? ..... (Yes or No)

Regulator Tested? ..... (Yes or No)

Results .....

Tank: Air Left ..... (PSIG) MFG. ..... Date .....

Last Hydro-Test Date .....

Last Visual Inspection Date .....

Internal Condition: Clean .....

Slight Corrosion .....

Extensive Corrosion .....

By: ..... NAME ..... ADDRESS ..... PHONE

Special Comments on Equipment .....

Equipment Inspected by: ..... NAME ..... ADDRESS ..... PHONE

Equipment: Released to/or Held by: ..... NAME ..... ADDRESS ..... PHONE

Figure 4.--(Continued)

DETAILED DESCRIPTION OF ACCIDENT

Describe in detail how the accident happened, including what the person was doing, any specific marine life or objects and the action or movement which led to the event. Include details of first aid or resuscitation efforts. Describe any "Decompression" and/or "Recompression-Treatment" in description of accident.

Figure 4.--(Continued)

PART 7

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