

Devils Hole Dive Team Swim Test Fatality

Serious Accident Investigation

Factual Report



National Park Service
Death Valley National Park

March 18, 2018

SERIOUS ACCIDENT INVESTIGATION FACTUAL REPORT

Accident Name: Devils Hole Dive Team Swim Test Fatality

Injury Description: Fatality

Location: Palm Desert Aquatic Center, Palm Desert CA

Date: Sunday, March 18, 2018

SERIOUS ACCIDENT INVESTIGATION TEAM

Team Leader

Colin Smith Chief Ranger, Pacific West Region



Signature

8-30-2018
Date

Chief Investigator

David Schifsky Chief Ranger, Golden Gate National Recreation Area (Team Lead shadow)

Team Members

Janette Chiron Chief Ranger, Pu'uhonua o Hōnaunau National Historical Park and Kaloko-Honokōhau National Historical Park (Investigator shadow)

Steve Sellers National Dive Safety Officer (Dive Program Subject Matter Expert)

Daniel Durand Safety and Occupational Health Specialist, Mojave Desert Network (Safety Professional)

Gordon White Chief, Integrated Resource Management, Point Reyes National Seashore (Writer/Editor)

EXECUTIVE SUMMARY

Devils Hole is located on a 40-acre parcel of land that is part of Death Valley National Park (DEVA), but is not contiguous to the main park. It is located adjacent to the United States Fish and Wildlife Ash Meadow National Wildlife Refuge in Amargosa Valley, Nevada. In 1952, President Harry S. Truman issued a Presidential Proclamation under the American Antiquities Preservation Act effectively adding Devils Hole and a 40-acre parcel of land surrounding it to Death Valley National Park (then Monument). In 1967, Devils Hole pupfish was listed as federally endangered under the Endangered Species Preservation Act of 1966 (the predecessor of the current Endangered Species Act of 1973). Death Valley National Park took a hands-off approach to management of Devils Hole until a first crisis occurred due to groundwater pumping in the vicinity of Devils Hole. In the last decade, the NPS and DEVA has taken an active role in the conservation and recovery of the pupfish. This allowed for the development of the Devils Hole/Aquatics Program, including NPS staff. One main focus of the program is to oversee long-term ecosystem monitoring of the Devils Hole ecosystem and its resident pupfish.

Counting of the Devils Hole pupfish started in 1972. Dives were lead by nearby university Professors and their recruits. In 1992, Volunteer1 was asked to take underwater video of Devils Hole and the pupfish. A VIP Dive Team was put in place to oversee dive safety at Devils Hole. In 2002 Regional Dive Officer (RDO), Dave Stoltz was contacted about the dive program at Death Valley National Park. By 2003, the RDO required the VIP divers to take dive classes and training administered by the Pacific West Region of the NPS. The VIP Dive Team to this day has provided safety divers for the Devils Hole dive program. In 2008, RDO Stoltz initiated that all VIP Dive Team members should become NPS Blue Carded divers. This requires annual dive qualifications, a three year interval 40-hour training, and dive physicals. Also in 2008, a minimum certification of Introduction to Cave Diving was required to dive in Devils Hole. All NPS Blue Carded divers working in Devils Hole, including VIP safety divers, have full Cave dive training. The Park Dive



Officer (PDO) works closely with the lead VIP diver to schedule dives in order to have the safety diver support needed to conduct the counts in Devils Hole.

On the morning of March 18, 2018 Volunteer1 met Volunteers2,3,4 and NPS1 at the Palm Springs Swim Center to complete their annual NPS Blue Card refresher. The pool was closed due to malfunctioning equipment so the group moved to the PDAC, approximately 13 miles or 30 minutes away in Palm Desert.

All personnel moved their equipment inside the PDAC and began the swim test portion of the refresher. Volunteer1 was one of the volunteers who went first to complete the annual swim test under the observation/evaluation of NPS1. During lap 7 (of 8) NPS1 asked Volunteer1, who had changed his kick and reduced his speed, if he was okay; Volunteer1 continued to swim. At the end of lap 7, the one-lap remaining signal was given by NPS1. During the final lap of the swim test, NPS1 entered the water and swam beside Volunteer1.

Within 10 feet of the wall near the pool exit stairs, Volunteer1 showed signs of unresponsiveness. NPS1, immediately beside Volunteer1, lifted his head out of the water and carried Volunteer1 to the pool exit stairs where he was lifted out of the pool. NPS1 and Volunteers 2,3,4 yelled for help, began CPR, administered oxygen, and supported Volunteer1.

Lifeguard2 activated the PDAC emergency action plan, ran to Volunteer1, and provided life support with NPS1 and Volunteers2,3,4. Lifeguard1 retrieved the PDAC medical kit and AED and requested a 911 call before arriving to Volunteer1. AED use and CPR continued; upon arrival of M71 and E71, Cal Fire EMS personnel took over AED use and life support measures. Volunteer1 was loaded into the ambulance and transported to the Eisenhower Medical Center(EMC). Volunteer1 was placed on life support at EMC.

NPS1 made notifications per NPS policy. NPS1 collected witness statements and other information. After consultation with medical experts determined that his injuries were unrecoverable, the family decided to remove Volunteer1 from life support on March 24, 2018.

The Washington Support Office delegated authority to the Deputy Regional Director, Operations Pacific West Region to activate a Serious Accident Investigation Team (SAIT) on March 26, 2018. The SAIT arrived in the Las Vegas/Palm Springs area on Sunday, April 1, 2018.

ACKNOWLEDGEMENTS

The SAIT would like to make several acknowledgements here:

- NPS1 and the dive team volunteers who provided immediate rescue assistance to Volunteer1 at the pool.
- Lifeguards and staff of the PDAC for activating 911 and performing CPR.
- Battalion Chief and the medics of Battalion 12A of Cal Fire for their response and lifesaving measures.
- Volunteer1's family for graciously meeting with us and sharing photographs and details of his life.
- Devils Hole Dive Team volunteers for taking time to meet with us and help us understand DHDT and the incident.
- Park staff who spent significant time before the arrival of the SAIT investigating the accident events, collecting witness statements, and compiling critical information. This was invaluable, and the support continued through the entire report preparation process.
- The Devils Hole Program staff who provided office space and staff time in support of our efforts.
- Director of Public Safety and the Public Safety staff of Spotlight 29 Casino for sharing information about Volunteer1's employment at the Casino..
- Riverside County Sheriff's Department for providing information and office space at the Palm Desert Station.
- Lastly, the Pacific West Regional office and parks for their support in assembling the team and their support of the park and team during the investigative process.

ABBREVIATIONS

Code	Description
AED	Automated External Defibrillator
CAD	Computer Aided Dispatch log
DAN	Divers Alert Network
DEVA	Death Valley National Park
DHDT	Devils Hole Dive Team
EMC	Eisenhower Medical Center
EMS	Emergency Medical Services
PDAC	Palm Desert Aquatic Center
NPS1	DHDT Leader, witness
NPS2	Devils Hole Program Manager
NPS3	Devils Hole Fisheries Biotech
NPS4	DEVA Chief Ranger
Volunteer1	DHDT Volunteer (patient/deceased)
Volunteer2	DHDT Volunteer, witness
Volunteer3	DHDT Volunteer, witness
Volunteer4	DHDT Trainee, witness
Volunteer5	DHDT Trainee, witness
Lifeguard1	PDAC Supervisor
Lifeguard2	PDAC Guard on Stand
Lifeguard3	PDAC Backup Guard
Family1	Wife of Volunteer1
Sheriff1	Riverside Sheriff Deputy (report writer)
M71	CalFire Station 71 Medic 71
E71	CalFire Station 71 Engine 71

SAIT OBJECTIVES & INVESTIGATIVE PROCESS

The Washington Support Office delegated authority to the Deputy Regional Director, Operations Pacific West Region to activate a Serious Accident Investigation Team to investigate the Devils Hole Dive Team Swim Test Fatality (the incident occurred in Palm Desert, CA) on March 26, 2018 with the following objective:

(1) complete a Factual Report and Draft Management Report within 45 days of the incident

During a five-day visit to the areas associated with the incident, SAIT members considered environmental, material, and human factors that may have contributed to the incident and considered contributing causes of the event. The team attempted, unsuccessfully, to obtain information on the victim's cause of death and coroner's report. The team viewed the Palm Desert Aquatic Center, emergency response equipment, and facilities utilized by the Devils Hole Dive Team for their annual NPS Blue Card refresher. The team also visited Devils Hole.

The SAIT conducted five (5) interviews which included all NPS personnel, NPS Volunteers, and Lifeguard Staff present at the time of the incident at the Palm Desert Aquatic Center. Several other conversations were held with the Cal Fire Battalion Chief, employer representative and family of the deceased.

The SAIT examined DO/RM-4 programmatic documentation, the Death Valley National Park Volunteer Services Agreement for Natural Resources Agencies, the DOI SMIS Accident Report, the Riverside County Sheriff's Office Incident Report, the Cal Fire Interagency Report of Incident and Dispatch Action, Palm Desert Aquatic Center Injury Report, and NPS witness statements to inform the events and causal analysis, timeline, findings, and narrative.

Subsequent to the site visit, in mid-June, the NPS received the autopsy report from the Riverside County Sheriff, Coroner Division, which provided information on the cause of death.

Findings are organized around the eight elements of the Operational Leadership Risk Assessment GAR (Green-Amber-Red) Model - supervision, planning, contingency resources, communication, team selection, team fitness, environment, and incident complexity. Analyses of accidents in the NPS indicate that these eight elements affect operational risk and one or more account for most serious accidents and fatalities. The GAR Model is a tool for assessing general risk associated with an operation or task that has been widely adopted within the NPS as part of Operational Leadership.

The team completed its work by developing recommendations to improve the safety and effectiveness of dive operations and to prevent similar accidents in the future.

NARRATIVES

Devils Hole Dive Team Narrative

Devils Hole & Monitoring Program Background

Devils Hole is located on a 40-acre parcel of land that is part of Death Valley National Park (DEVA), but disjunct from the main park. It is located adjacent to the Ash Meadow National Wildlife Refuge in Amargosa Valley, Nevada, about 50 miles east of Furnace Creek, Death Valley, California. In 1952, President Harry S. Truman issued a Presidential Proclamation under the American Antiquities Preservation Act effectively adding Devils Hole and a 40-acre parcel of land surrounding it to Death Valley National Park (then Monument). This was before any specific legal protections for wildlife, such as the Endangered Species Act, existed. In 1967, the Devils Hole pupfish was listed as federally endangered under the Endangered Species Preservation Act of 1966 (predecessor of the current Endangered Species Act of 1973).

Death Valley National Park took a hands-off approach to management of Devils Hole until the early 1970's when a crisis occurred due to groundwater pumping in the vicinity. Expanding agricultural groundwater pumping caused water level in Devils Hole to decline exposing a shallow shelf that is critical habitat for pupfish spawning and foraging.



Devils Hole Pupfish

The fight to secure water rights and suitable habitat for the Devils Hole pupfish made its way through district and circuit courts, eventually landing in the U.S. Supreme Court (*Cappaert v.*

United States 1976). The Supreme Court favored conservation of the pupfish, and ruled a minimum water level be maintained above the shallow shelf to ensure the survival of the species. In the last decade, the NPS and DEVA has taken an active role in the conservation and recovery of the pupfish. A base funding increase to support this effort came to DEVA in 2007. This allowed for the staffing of the Devils Hole/Aquatics Program. One main focus of the program is to oversee long-term monitoring of the Devils Hole ecosystem and its resident pupfish.

Devils Hole Dive Team Background

Counting the Devils Hole pupfish started in 1972. Dives were led by Dr. Jim Deacon from the University of Nevada, Las Vegas. Dr. Deacon would recruit divers from the University and the local community to conduct counts. Dr. Stan Hillyard, also a professor from UNLV was recruited by Dr. Deacon in 1974. Dr. Hillyard also recruited divers in the same manner as Dr. Deacon. In 1992, Volunteer1 was asked to take underwater video of Devils Hole and the pupfish. He recommended that Cave Diving certification be a requirement of anyone diving in Devils Hole.



Divers in Devils Hole

A VIP Dive Team was put in place to oversee dive safety at Devils Hole. In 2002 the Regional Dive Officer (RDO) was contacted about the dive program at Death Valley National Park. By 2003, the RDO required the VIP divers to take dive classes and training administered by the

Pacific West Region of the NPS. The VIP Dive Team provides safety divers for the Devils Hole dive program to this day.

In 2008, the RDO initiated all VIP Dive Team members become NPS Blue Carded divers. This requires annual dive qualifications, a 40-hour training every three years, and dive physicals every three years (every two years for those over 60 years old). Also in 2008, the RDO required a minimum certification of Introduction to Cave to dive in Devils Hole. DEVA Blue Carded divers, scientific divers from the US Fish and Wildlife (FWS), the Nevada Department of Wildlife (NDOW) and VIP safety divers all have Full Cave dive training. Volunteer3 is a Master Instructor (cave diving instructor) who teaches all levels of cave diving each year as well as CPR/First Aid and Oxygen

The Park Dive Officer (PDO) works closely with the lead VIP diver to schedule dives to have the safety diver support needed to conduct the counts in Devils Hole. As of the time of this report the Death Valley PDO is NPS1, who was certified for this role in 2016. Until this incident, Volunteer1 was the lead VIP diver.

INCIDENT NARRATIVE

Before the Incident

On Thursday, March 15, Volunteer1 completed a business trip in Reno, NV and returned to his home in Palm Desert, CA. On Friday March 16 he went to tire store and worked in his office from about 7:00am-1:00pm. It was his routine for the last 22 years to work Friday and Saturday nights at the Spotlight 29 Casino as a security guard. He usually took a nap on Fridays before starting work. On the 16th, perhaps after a nap, he began an 8-hour shift at the casino from 4:00pm to midnight, returning home afterwards. On Saturday morning he completed errands, visited with Volunteer2, then at noon, began a 12-hour shift at the casino, returning home afterwards.

The annual Dive Team Blue Card recertification was originally planned for February, then rescheduled for Sunday March 18, 2018 at the Palm Springs Swim Center. The recertification includes both swim and dive skills tests. On Sunday morning, the testing location was changed to the Palm Desert Aquatic Center (PDAC) due to pool equipment problems at the Palm Springs location.

The March 18 Blue Card recertification was administered by NPS1, the DEVA Park Dive Officer and test examiner, and included Volunteers1-4. Volunteers1-3 are very long standing DHDT members, while Volunteer4 is a DHDT trainee.

Volunteer4 was to perform the NPS Blue Card entry level pool or confined water skills:

- 75 foot underwater swim without swim aids and 1,200 foot swim without swim aids completed within 15 minutes;
- Tread water for 10 minutes, or 2 minutes without use of hands/arms, without swim aids;
- Surface dive without swim aids to at least 10 feet and recover an object.

Volunteers 1-4 and the PDO were to perform the Annual Blue Card Skills:

- swim 2,700 feet within 18 minutes using mask, fins and snorkel and any stroke;
- demonstrate three methods of water entry with full SCUBA;
- perform an underwater ditch/recovery of scuba unit, fins, mask, and weight;
- demonstrate a scuba bailout (diver enters the water carrying scuba unit, mask, fins, and weight and dons all equipment after settling to the bottom);
- demonstrate static and dynamic buddy breathing and use of alternate air source, as both donor and recipient, both masked and unmasked in the water;
- demonstrate surface tired diver assist;
- demonstrate transport of an unconscious diver at the surface;
- demonstrate rescue of an unconscious diver from depth.

Day of the Incident

At about 7:30am Volunteer 1 met Volunteer 4 at the Palm Springs Swim Center, found it closed, spoke with NPS 1 and were redirected to PDAC. Volunteer 3, enroute to Palm Springs, was also redirected to the PDAC.

All arrived at the PDAC parking lot, hung out and talked before entering the facility sometime around 8:15am. Volunteers 3&4 reported that nothing seemed out of place or abnormal and that Volunteer 1 was his "usual jovial, joking self".

Upon entering the pool the group was assigned two lanes in the 50m pool running long course, meaning each leg of a lap is 50m. The group began preparing dive equipment for the dive skills review and dressing for the swim test.



dive skills test beginning with the 75 foot underwater swim /1200 foot swim and treading water requirements. Volunteer4 had completed the entry level underwater and 1200 foot swim and had progressed to the 10 minute tread water portion of the swim test when Volunteer 1 and Volunteer3 began their 2700 foot swim.

At about 8:55am NPS1 instructed Volunteer1 and Volunteer3 to enter the pool to begin the 2700 foot (800 meter) swim test. In a 50m pool the test would be to swim 8 laps or 16 legs in less than 18 minutes. Volunteer2, assisting NPS1, remained on the pool deck to observe and count laps.

Volunteer1 & Volunteer3 began the swim test just after 8:55am. Volunteer3, the faster swimmer, began to slowly pull away from Volunteer1, but noticed that Volunteer1 was swimming steadily. When Volunteer3 reached the beginning of lap 8, Volunteer1 was completing lap 6. Volunteer3 noticed that Volunteer1 had slowed considerably and switched

to the elementary backstroke. He thought to himself "he must be tired." It is not unusual for divers to change stroke during the swim test, so this did not seem out of the ordinary.

At about 9:10 Volunteer3 completed his swim and began a cool-down lap. As Volunteer1 made the turn to begin lap 7, NPS1 noticed that he raised his head and took a couple of deep breaths. NPS1 told Volunteer1 "one lap left, but you can end the test now." Volunteer1 put his snorkel back into his mouth and NPS1 wondered whether Volunteer1 had heard him. Volunteer1 is known to the DHDT to be competitive and stubborn, so NPS1 asked Volunteer2 if he thought Volunteer1 had heard him, then continued to monitor Volunteer1.

Volunteer1 began his last lap swimming very slowly doing frogkick instead of his normal kick. As Volunteer1 passed the halfway mark of that leg, NPS1 stopped the timer at 17:49.76, put down his clipboard, jumped into the pool, swam over to Volunteer1, and waved his hands in front of his face to get his attention. Volunteer1 glanced at NPS1, then looked straight ahead and kept swimming. The norm among the divers was that even if they were not able to complete the test in 18 minutes, they would still try to complete the ½ mile swim. So NPS1 swam next to Volunteer1, about one foot away, to the end of the leg.

NPS1, Volunteer2, Volunteer4 and Lifeguard2 all noticed that Volunteer1 turned around to begin the last leg of the swim well short of the wall. NPS1 continued to swim next to Volunteer1. Approximately 15 feet from the end of the swim NPS1 heard a little water in the snorkel and waited for Volunteer1 to blow it out. Volunteer4 moved toward NPS1 and Volunteer1 to assist if necessary.

About 10 feet from the end of the swim NPS1 heard the snorkel fill with water, but Volunteer1 continued to swim. NPS1 touched Volunteer1, who stopped swimming and went limp. NPS1 immediately lifted Volunteer1 up by his chest and his snorkel fell out of his mouth. Volunteer1 was unresponsive at this point. It was about 9:15am.

EMS Response

NPS1 & Volunteer4 removed his mask and underarm-carried Volunteer1 to the stairs exiting the pool, where Volunteer2 helped them get him out of the pool. NPS1 checked for a pulse, found none and began chest compressions. Volunteer4 yelled for the lifeguard and retrieved the Divers Alert Network (DAN) oxygen kit from the mid-pool area. NPS1 and Volunteer2 alternated chest compressions and rescue breathing, with Volunteer2 maintaining head stabilization. Fluids in the mouth of Volunteer1 were cleared by rolling him on his side. Volunteer4 set up the DAN oxygen kit with a manually triggered ventilator (MTV-100) and face mask.



At 9:16am Lifeguard1 blew his whistle three time to activate the PDAC emergency action plan and immediately joined the resuscitation effort. PDAC called 9-1-1 at 9:17am. NPS1 began administering two 1-second doses of oxygen with the MTV between chest compressions. Volunteer3 noticed that the oxygen was not flowing and told Volunteer4 to turn it on. Lifeguard3 arrived with a medical bag and began setting up the AED. After the leads were attached the AED analyzed Volunteer1 and indicated "No shock advised." Several cycles of chest compressions, ventilations, fluid clearing, and AED indications of "no shock advised" followed.



Automated External Defibrillator

Riverside County Sheriff1, CalFire E71, and M71 were dispatched at 9:18am and arrived on scene at 9:22am. Sheriff1 secured the scene while M71 assessed the situation and began transferring care to advanced life support. Additional EMS units arrived on scene in support.

At 9:36am M71 departed for Eisenhower Medical Center (EMC) with Volunteer1. During transport Volunteer1 regained a pulse and heartbeat. At 9:43a M71 arrived at the EMC (emergency service department), 28 minutes after Volunteer1 became unresponsive. At 9:45am Sheriff1 arrived at the EMC and was told that Volunteer1 had a pulse, blood pressure of 125/62, and a heart rate of 72.

After M71 departed, Volunteer2 called the wife of Volunteer1 to inform her of the situation, then left for the EMC. Meanwhile NPS1 made notification calls to his supervisor, the NPS Dive Safety Officer, PWR Regional Dive Officer, DEVA Superintendent, and DEVA Chief of Resources. For about the next hour the dive team packed up all their gear, then departed for the EMC.

At the EMC Volunteer1 was placed on life support. DEVA staff were informed of Volunteer1's condition by Volunteer2 who was informally acting as the liaison between the family and NPS.

From March 18-24, multiple park employees maintained communication with the family through Volunteer2. Volunteer1 remained in the EMC on life support until Saturday March 24, 2018, when, after consultation with medical experts determined that his injuries were unrecoverable, the family decided to remove Volunteer1 from life support.

On April, 5, 2018, the forensic pathologist performed an autopsy on Volunteer1 at the Indio office of the Riverside County Sheriff-Coroner. As stated by Riverside County Sheriff Deputy Coroner Daisy Ordaz, the "cause of death was determined to be "hypertensive and atherosclerotic cardiovascular disease" with no other significant conditions... I mannered his death to be "Natural". " The coroner's report was completed on April 27, 2018.

FINDINGS

PLANNING

Consider how much information you have, how clear it is, and how much time is available to plan the activity or evaluate the situation. Planning includes the development and use of pre-defined plans, training programs, operating procedures, SOPs, operational guidelines, JHAs, etc.

- The swim test was originally scheduled to take place on February 11, 2018. Volunteer1 sent the information to the group sometime mid-January for the February date. NPS1 and Volunteer2 later changed the date to March 18, 2018. Volunteer2 informed Volunteer1 and the rest of the group about the change in date.
- Volunteer3 reserved the pool at Palm Springs Aquatic Center in advance of the Swim Test.
- Requirements for the annual swim test are established in RM-4, Diving Management.
- Objectives for March 18, 2018 Blue Card skills review included
 - Annual Certification Requirements for Volunteer 1, 2, 3 and NPS 1: Swim 2700 feet in 18 minutes using mask, fin and snorkel and any stroke. Completion of annual NPS Blue Card scuba skills demonstration (Bailout, Scuba Ditch & Recovery, Air Sharing, Diver Rescue)
 - Entry Level Requirements for Volunteer4: 75-foot underwater swim and tread water for 10 minutes, or 2 minutes without hands without the use of hands/arms, without swim aids.
 - Completion of annual NPS Blue Card skills demonstration by Volunteer4
- NPS1 gave a pre-exercise brief before the swim and skills review began, outlining the activities for the day.
- RM 4 requires the team to have oxygen equipment on site for diving activities. RM-4. (4.2 Requirements and Diving Procedures for NPS Diving Operations).

SUPERVISION/LEADERSHIP

Consider how qualified and able the supervision is to act as a control to minimize risk rather than to provide subject matter expertise. In moderate to high risk conditions a supervisor actively involved in completing a task is generally too distracted to be an effective safety observer. The higher the risk, the more the supervisor needs to focus solely on observing and checking.

- NPS1 is the DEVA Park Dive Officer and was also a Dive Examiner for the Blue Card skills certification and testing.
- NPS1 and Volunteer2 were both on-deck observing and timing the swim tests while Volunteers 1, 3 and 4 were in the water.
- Volunteer1 was regarded as the functional leader of the Dive team and is viewed as the leader of the volunteer group.

- Despite the formal roles on the dive team, there was fluidity of leadership, with the more experienced divers recognized as leaders due to their expertise.
- NPS1 was trained and mentored by Volunteer3 and Volunteer1
- NPS 1 transitioned to the role of Park Dive Officer under the guidance of the former DEVA Park Dive Officer. NPS1 completed the NPS Dive Leadership Training program in 2016.

TEAM SELECTION

Consider the qualifications and experience level of the individuals used for the specific mission or activity. Participants should have the skills and experience necessary to perform tasks/assignments including the ability to use specialized equipment, make decisions, use judgment, and operate effectively in a team environment. Individuals may need to be replaced during the activity and the experience level of new team members should be assessed. Teams should have an adequate number of qualified members from which to choose for any single mission or activity.

- The Devils Hole Dive Team is comprised of 9 Members, 3 NPS employees and 6 volunteers. Many of the volunteers have been on the team for over 15 years and are well-qualified and experienced; one member is a certified dive instructor with specialization instructing Cave Diving; all members are certified Cave Divers.
- Several of the volunteers are over age 60.
- There are no local, regional or national policies on upper age limits for divers or for NPS volunteers working in other NPS programs.

TEAM FITNESS

Consider the physical and mental state of the team. This is often a function of basic physical fitness related to the mission or activity and the amount and quality of rest a team member has had. Quality of rest considers conditions slept in, potential sleep length, and interruptions. Other factors to consider are necessary equipment, physical preparedness and personal life factors that may influence mission outcome.

- All divers had passed their required medical examinations and were within the approval interval for their age. Divers over age 60 are required to have a medical clearance once every two years; those under 60 are required to have a medical clearance once every three years. All examinations include an electrocardiogram (EKG).
- Personal equipment used by Volunteer1 included mask, fins and snorkel. Volunteer 1 used a brand new snorkel for the dive test because he left his in Hawaii. The snorkel was opened at the pool by Volunteer1. By NPS policy all personal equipment used must be approved by the PDO.
- Volunteers were asked verbally about their fitness before the test by the PDO; all reported feeling fine.

- Volunteers 2, 3, 4 and NPS1 all stated that Volunteer 1 was his normal “jovial” self during the morning before the swim test.
- Volunteer 1 brought all of his dive gear into the pool area, including heavy equipment and cylinders.
- Volunteer 1 is 72 years old.
- During the 72 hours preceding the swim test, he worked at his full time job and his part time job:
 - On Friday 3/16, he ran errands and worked from approximately 8am until approximately 1:30pm, then returned home before working at Spotlight 29 Casino from 4pm - midnight
 - On Saturday, 3/17 he worked at Spotlight 29 Casino from 12pm - midnight.
 - On Sunday 3/18 he went to the Palm Springs Aquatic Center at 8am; this would have given him the opportunity for approximately 6-7 hours of sleep.
 - Volunteer 1’s normal routine included working full time Monday-Friday, travelling by air for work from Monday - Thursday. He routinely worked two 8 hours shifts at the Casino from 4 pm - midnight on Friday and Saturday; sometimes he worked a 12 hour shift on Saturday.
 - Volunteer 2 reported that Volunteer 1 typically slept 4-5 hours per night and usually took a short nap at 2pm before working at the Casino.
 - Volunteer 2 said that on Saturday 3/17, Volunteer 1 told him that he was feeling fine but that he would “be a little slow” during the swim test.
 - Volunteer 1 was exposed to secondhand smoke while working at the Spotlight 29 Casino; he worked Fridays and Saturdays at the Casino for 22 years. Acknowledgement of this exposure is a pre-condition of employment for working at the Casino. Volunteer 1 was reported to not smoke.
 - NPS1 travelled to Palm Springs the night before the Swim Test because he lives and works approximately 4-5 hours away from the location of the Swim Test.

COMMUNICATION

Good communications ensure clear and accurate sending and acknowledging of information, instructions, commands, and useful feedback. This includes interpersonal communications and the physical communication equipment if personnel are not within immediate voice contact. Communication should consider radio/cellular capability, dispatching and overall infrastructure and operational reliability. In addition to the technical means to communicate you should also consider the communication culture of the organization.

- The team communicated with each other by cell phone on the morning of the Swim Test.
- The Palm Desert Aquatic Center activated the EMS response by calling 911.
- There were no communication issues identified during the incident.
- The Dive Team has a well-established history of pre-dive briefings and checking in with one another.

- Volunteers1 and 2 checked in with each other regularly by text and in person.
- Communications culture among team members is very strong; the team has been together for years, particularly the volunteers; many have known each other for over 15 years.
- There was lack of direct communication between NPS and medical providers. Volunteer2 informally served as a liaison between the family and NPS.
- NPS1 did not have Volunteer1's emergency contact information with him at the pool. He was able to get Volunteer1's wife's phone number by guessing his password on cell phone.

CONTINGENCY RESOURCES

Contingency resources will be called upon if mission or activity conditions deteriorate or an emergency occurs. The team pre-defines the resources they will call in an emergency or when mission or activity demands exceed the capability of existing resources. You should consider whether you can activate the resources, whether they will respond in the expected timeframe, and whether there are pre-plans in place for those resources.

- Riverside County EMS response is available through the 911 system. Two fire stations are located within close proximity to PDAC.
- Per RM 4 policy, the Dive Team had oxygen equipment available onsite.
- All Dive team members have current DAN Diving First Aid for Professional Divers certification which includes CPR, AED and oxygen administration.
- Volunteer3 is a certified instructor for DAN Diving First Aid for Professional Divers.
- The PDAC is staffed by lifeguards, with 3 lifeguards on duty at all times.
- The PDAC has an AED readily available; the AED is checked monthly.

ENVIRONMENT

Consider factors affecting human performance and factors affecting the performance of equipment used for the mission or activity. Factors include time of day, temperature, humidity, precipitation, and altitude.

- The test was conducted at an outdoor swimming pool with controlled pool temperature and conditions.
- The weather on 3/18/18 was fair, with temperatures between 52-72 degrees F and no precipitation.
- The PDAC assigned the team to two undivided 50 meter lanes of the pool adjacent to the bleachers.
- The pool and site were easily accessible to the team with no barriers or interference from other swimmers.
- Volunteer1 and Volunteer3 swam in close proximity during the early portion of the swim test.

INCIDENT COMPLEXITY

Consider both the required time and the situation. Generally, the longer the exposure to a hazard, the greater the risks. Factors to consider include: dynamism of environmental conditions; specialized skills required; team is required to divide their attention among multiple tasks; stress induced by fast-paced activity and sense of urgency; adequacy of pre-plans and operating procedures; necessity of team members to use judgment and experience to respond to novel circumstances.

- The team was unable to do the Swim Test as planned at the Palm Springs Aquatic Center due to issues with the pool temperature. They were able to access and use two lanes at the PDAC because Volunteer 3 had his scuba instructor information and insurance on file. The two facilities are approximately 30 minutes apart. The start of the swim test was delayed approximately 1 hour due to the change in location.
- The Dive examiner was overseeing two tests at the same time - the 2700 foot swim test for Volunteer1 and 3 and the Tread Water Test for Volunteer4. Volunteer2 was also on deck assisting with tracking laps and observing the tests.
- The swim tests are standardized. NPS1 had administered this test several times as a Dive Examiner. Volunteers1,2 and 3 had taken and passed the swim test multiple times.
- Volunteers1, 2 and 3 needed to pass the 2700 foot swim test to be current on their NPS Blue Card. Divers can retake the test at any time if they do not pass on their first attempt; there is no limit to how many times they can retake the swim test.
- Failure to pass the swim test puts a diver into restricted status. A diver on restricted status can participate in dive activities such as the semi-annual monitoring dive at Devils Hole as a diver, but not as a lead diver.

Appendix A. Timeline

Date/Time	Approx.	Event	Source
BACKGROUND			
1930		Taxonomic description of Devils Hole pupfish (Joseph Wales)	
1952		Devils Hole added to Death Valley National Monument (became National Park in 1994)	
1967		Devils Hole Pupfish designated as Endangered on first ESA listing	
1976		Supreme Court rules in favor of NPS water rights, protecting the pupfish and its ecosystem (Cappaert v. United States).	
1992		Volunteer1 helped created the DHDT	NPS1
2009		Devils Hole Dive Team formalized as volunteer program.	NPS1
2016		NPS1 assumes leadership of the DHDT.	NPS1
INCIDENT			
3/15/2018 1700	approx	Volunteer1 returns from Reno business trip	Family1
3/16/2018 16:00		Volunteer1 begins 8-hour shift at Spotlight 29 casino	Family1
3/17/2018 0:00	approx	Volunteer1 completes 8-hour shift	Family1
3/17/2018 0:30	approx	Volunteer1 arrives home	Family1
3/18/2018 8:30	approx	Volunteer1 begins personal errands	Family1
3/17/2018 12:00	approx	Volunteer1 begins 12-hour shift at Spotlight 29 casino	Family1
3/18/2018 0:00	approx	Volunteer1 completes 12-hour shift	Family1
3/18/2018 0:30	approx	Volunteer1 arrives home	Family1
		<i>Note: DHDT annual Blue Card skills test scheduled for Palm Springs Swim Center was relocated to PDAC due to pool equipment failure.</i>	
3/18/2018 7:30	approx	Volunteer4 meets Volunteer1 at Palm Springs Swim Center but find it closed. Drive to PDAC after talking to NPS1.	Volunteer4
3/18/2018 8:15	approx	Volunteers meet in parking lot of PDAC and hang out, talking. All seems normal.	Volunteer3 & Volunteer4
3/18/2018 8:20	approx	NPS1 and four volunteers enter PDAC	NPS1, others
3/18/2018 8:40	approx	The group begins preparing dive equipment for skills review and dressing for swim test	Volunteer3 & Volunteer4
3/18/2018 8:50	approx	Volunteer4 begins dive entry level swim test.	NPS1
3/18/2018 8:55	approx	Volunteer1 and Volunteer3 enter the pool to complete 800m (eight laps) mask, snorkel, and fins swim test, which they need to complete in less than 18 minutes.	NPS1

Date/Time	Approx.	Event	Source
		Note: Afterwards, NPS1 estimated swim test began about 9:40. By correlating times from other incident reports it seems likely the swim test began sometime just before 9:00.	
3/18/2018 8:55	approx	Volunteer1 and Volunteer3 begin annual swim test. Volunteer3 slowly pulls ahead of Volunteer1, who swims his first six laps at a slightly slower but steady pace.	NPS1 & Volunteer 3
3/18/2018 9:09	approx	During lap seven Volunteer1 slows noticeably. As Volunteer3 completes his swim he notices Volunteer1 doing elementary backstroke and thinks to himself that he must be tired.	NPS1, Volunteer3 & Volunteer4
3/18/2018 9:10	approx	Volunteer3 begins a cool-down lap.	
3/18/2018 9:10	approx	NPS1 notices Volunteer1, at the end of his 7th lap, raise his head up and take a couple of deep breaths.	NPS1
3/18/2018 9:10	approx	NPS1 tells Volunteer1 "one lap left but you can end the test now." Volunteer1 puts snorkel back in his mouth and does not appear to hear NPS1.	NPS1
3/18/2018 9:10	approx	Volunteer1 begins swimming his last lap very slowly and begins frog-kicking	NPS1 & Volunteer4
3/18/2018 9:12	approx	NPS1 stops timer at 17:49.76, puts down clipboard, jumps into the pool, swims over to Volunteer1, and waves his hands in front of his face to get his attention.	NPS1 & Volunteer4
3/18/2018 9:12	approx	Volunteer1 glances at NPS1, then looks ahead and keeps swimming. NPS1 assumes Volunteer1 wants to complete the swim.	NPS1
3/18/2018 9:13	approx	NPS1 swims at the side of Volunteer1, less than 1 foot away, to the end of the lane, where they turn around and begin the last leg of the swim.	NPS1
3/18/2018 9:15	approx	About 15 feet from the end of the swim NPS1 hears a little water in the snorkel and waits for Volunteer1 to blow it out.	NPS1
3/18/2018 9:15	approx	Volunteer4 moves to end of the pool near NPS1 & Volunteer1	Volunteer4
3/18/2018 9:15	approx	About 10 feet from the end of the pool NPS1 hears the snorkel fill with water, but Volunteer1 continues to swim.	NPS1
3/18/2018 9:15	approx	NPS1 touches Volunteer1, who immediately stops swimming and goes limp. NPS1 lifts Volunteer1 out of the water by his chest and the snorkel falls out of his mouth. Volunteer1 is unresponsive.	NPS1 & Volunteer4
3/18/2018 9:15	approx	NPS1 & Volunteer4 remove mask from Volunteer1 and underarm-carry him to the pool exit stairs.	NPS1 & Volunteer4

Date/Time	Approx.	Event	Source
3/18/2018 9:15	approx	Lifeguard2, the guard on stand, activates Emergency Action Plan (EAP) by blowing his whistle three times, and joins in resuscitation efforts.	Lifeguard1
3/18/2018 9:16	approx	Volunteer2 helps NPS1 & Volunteer4 get Volunteer1 out of pool.	NPS1 & Volunteer4
3/18/2018 9:16	approx	NPS1 checks for a pulse, finds none, and immediately begins chest compressions. Volunteer2 provides head stabilization and Lifeguard 2 gives rescue breaths. Fluids in the mouth of Volunteer1 are cleared by rolling him on his side.	NPS1 & Volunteer4
3/18/2018 9:16	approx	Volunteer4 retrieves DAN oxygen kit from mid-pool area and sets it up with Manually Triggered Ventilator (DAN MTV-100) and face mask.	NPS1 & Volunteer4
3/18/2018 9:16	approx	Lifeguard1 arrives with AED and medical bag, and begins deployment.	Lifeguard1
3/18/2018 9:17		PDAC front desk calls 911	CAD
3/18/2018 9:17	approx	NPS1 begins administering two 1-second doses of oxygen between chest compressions. Volunteer3 notices oxygen is not flowing from oxygen equipment and tells Volunteer4 to turn it on. Responders rotate administering chest compressions to prevent fatigue.	NPS1 & Volunteer3
3/18/2018 9:18	approx	AED analyzes Volunteer1 and indicates "No shock advised." CPR continues, with O2 administered as rescue breaths, alternating with AED analysis and indications of "No shock advised."	Volunteer3
3/18/2018 9:22		Sheriff1 arrives, secures scene, and contacts NPS1.	Sheriff1
3/18/2018 9:22		E71 & M71 arrive. Medic1 begins assessing the situation.	CAD
3/18/2018 9:24		EMS care transferred to Medic1	NPS1
3/18/2018 9:24		Additional EMS resources arrive.	CAD
3/18/2018 9:36		M71 departs for EMC with Volunteer1	CAD
3/18/2018 9:38	approx	Volunteer2 calls wife of Volunteer1 to inform her of the situation.	NPS1
3/18/2018 9:40	approx	NPS1 notifies supervisor, SDO, RDO, Superintendent and Chief of Resources of incident.	NPS1
3/18/2018 9:43		M71 arrives at EMC and transfers Volunteer1 to definitive care (28 minutes after becoming unresponsive in the pool).	CAD
3/18/2018 9:45		Sheriff1 arrives at EMC. Volunteer1 has a pulse, blood pressure of 125/62, and heart rate of 72.	Sheriff1
3/18/2018 10:40	approx	NPS1, Volunteer3 & Volunteer4 pack up all gear and leave for EMC.	NPS1

Date/Time	Approx.	Event	Source
3/24/2018		Volunteer1 is removed from life support and pronounced deceased	
4/1/2018		SAIT arrives in Las Vegas to begin investigation.	
4/5/2018		Riverside SO Coroner's autopsy performed	Coroner Report
4/27/2018		Riverside SO Coroner's Report Completed	Coroner Report

Appendix B. Palm Desert Aquatic Center Diagram

Map of the incident area at Palm Desert Aquatic Center

