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ORIGINAL RESEARCH

Search and Rescue Trends and the Emergency Medical Service Workload in Utah's National Parks

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Objective.—To identify the emergency medical service (EMS) workload and trends associated with search and rescue (SAR) operations in Utah's National Park Service (NPS) units.

Methods.—Data for this study were collected from the Annual Emergency Medical Services Report and the Annual Search and Rescue Report for National Park Service units in Utah from 2001–2005.

Results.—There were 4762 EMS incidents reported between 2001 and 2005, including 79 fatalities (50 traumatic; 29 nontraumatic). The most common EMS transportation method was ground (1505) and helicopter (553) transport. The heaviest trauma, medical, and cardiac workload was at Glen Canyon National Recreation Area (GLCA) and the heaviest first aid workload was at Zion National Park (ZION). There were 1190 SAR operations between 2001 and 2005 involving 67 fatalities, 623 ill or injured visitors, 1813 non-ill or non-injured visitors, and 92 saves. GLCA and ZION accounted for 47% and 21% of all SAR operations. The total cost of SAR operations was $1 363 920. SAR operations most commonly occurred on weekends, involved male visitors (59%), visitors aged 20–29 years (23%), and 40–49 years (20%), and visitors participating in day hiking (221), motorized boating (196), and canyoneering (98) activities. Most SAR operations were in lake (226), desert (147), and canyon (140) environments and were resolved within 24 hours.

Conclusions.—GLCA and ZION experienced heavy use of EMS resources that should be noted by EMS administrators and planners. GLCA and ZION also reported the most SAR operations. The development of techniques to prevent the need for SAR at GLCA and ZION would likely have the most potential to reduce the financial impact of SAR incidents and morbidity and mortality to visitors.

Key words: search, rescue, EMS, Utah, national park

Introduction

The state of Utah is a popular destination for outdoor enthusiasts. With almost 80% of land in the state administered for public use by federal and state government agencies, Utah has succeeded at becoming a magnet for outdoor recreation pursuits. In fact, active outdoor recreation in Utah contributes $5.9 billion USD annually to the state's economy and supports over 65 000 jobs.[1] Utah is also viewed as a capital for America's national parks because the state plays host to 5 national parks (Arches, Bryce Canyon, Canyonlands, Capitol Reef, and Zion), 5 national monuments (Cedar Breaks, Dinosaur, Hovenweep, Timpanogos Cave, and Natural Bridges), 1 national historic site (Golden Spike), and a major national recreation area (Glen Canyon). Together these National Park Service (NPS) units report an estimated 8.2 million recreational visitors per year.[2]

The 2003 National Survey on Recreation and the Environment reported that 97.6% of Americans over the age of 16 participate in some type of outdoor recreation activity each year.[3,4] Moreover, activities such as hiking and backpacking are among the most popular and fastest growing outdoor recreational activities.[3–6] The NPS units in Utah offer a wide range of recreational opportunities such as hiking and biking in Arches National Park, horseback riding at Bryce Canyon National Park, 4-wheel driving and whitewater rafting in Canyonlands National Park, canyoneering in Zion National Park, and boating and swimming at Glen Canyon National Recreation Area. With these opportunities, however, comes the risk of injury and illness that may require search and rescue (SAR) or emergency medical services (EMS) intervention.

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Despite the popularity of outdoor recreation, there is only a small body of literature dedicated to reporting the morbidity and mortality of recreation-oriented visitors to NPS units. Moreover, much of the published literature is heavily concentrated on NPS units in California, Hawaii, Washington, and along the Appalachian Trail.[5–15] Outside of 4 known manuscripts from Denali National Park and Preserve, Yellowstone National Park, Yosemite National Park, and Sequoia-Kings Canyon National Park, even less information has been published about SAR operations and the EMS workload in NPS units.[16–19] Since SAR and EMS are a vital component of any rural and wilderness emergency medical system, it is important to know the impact that lost, ill, and injured recreational users have on medical services.[20–22] Thus, the purpose of this investigation was to identify SAR trends and the EMS workload in Utah's NPS units. The results should provide valuable information for those involved in the management of EMS and the development of preventive SAR operations in Utah's NPS units.

Methods

Data for this study were collected from the Annual EMS Report and the Annual Emergency Medical Services Report and the Annual Search and Rescue Report for NPS units in Utah from 2001 to 2005. Arches National Park (ARCH), Bryce Canyon National Park (BRCA), Canyonlands National Park (CANY), Cedar Breaks National Monument (CEBR), Glen Canyon National Recreation Area (GLCA), Timpanogos Cave National Monument (TICA), and Zion National Park (ZION) were the Utah-based units reporting any EMS workload from 2001 to 2005. The Annual Emergency Medical Services Report details the number of trauma, medical (noncardiac), cardiac, and first aid incidents handled by each park unit and classifies them as either a basic life support (BLS) incident or an advanced life support (ALS) incident. ALS incidents are defined as EMS calls requiring ALS skill intervention, such as starting intravenous therapy (IV), intubation of a patient, or administering medications. All other incidents are defined as a BLS call. The reports also count the number of fatalities (traumatic and nontraumatic) and the type of EMS transportation (ground, helicopter, fixed-wing, vessel) workload handled by each individual unit.

From 2001 to 2005, SAR activity was reported by ARCH, BRCA, CANY, CARE, GLCA, and ZION. The Annual SAR Report includes information about the total number of SAR incidents in each park and how many SAR operations ended with a fatality, ill or injured person, non-ill or non-injured person, or a save. A save is defined as any case where death would have occurred without SAR intervention. The report also includes the total fiscal costs of SAR operations. These costs are determined by tallying the reported personnel, aircraft, vessel, and supply costs. In 2003 NPS changed to a more detailed SAR reporting form providing more detailed information about SAR operations. Hence, in this investigation, details about the demographics of persons involved in SAR operations, the day of week the SAR incident occurred, the subject activity at the time the SAR operation was initiated, and the factors contributing to SAR incidents were only reported for 2003 to 2005. Also, the reported notification method calling for SAR assistance, the SAR operation duration, the SAR environment, and the rescue methods used during the SAR operations were reported for 2003 to 2005. Dinosaur National Monument (DINO) was excluded from this study because the monument's headquarters and majority of acreage are in the state of Colorado. Also, it was impossible to determine the number of EMS and SAR incidents that occurred in the Utah or Colorado sections of the monument. The cumulative reported data for each year of the Annual EMS Report and the Annual SAR Report were entered into a spreadsheet and all calculations were performed using SPSS (v. 12.0) software.

Results

From 2001 to 2005, there were 4402 EMS incidents reported in Utah's NPS units. There were 79 fatalities (50 traumatic; 29 nontraumatic), 1744 trauma incidents, 1239 medical incidents, 192 cardiac incidents, and 1148 first aid incidents. GLCA recorded the highest number of traumatic and nontraumatic fatalities (Table 1). ZION recorded the highest number of first aid incidents and GLCA recorded the highest number of trauma, medical, and cardiac incidents in both BLS and ALS categories. The most common EMS transportation methods were ground transport, helicopter transport, water vessel transport, and fixed-wing aircraft transport (Table 2). GLCA accounted for 57% of all ground transports, 89% of all helicopter and fixed-wing transports, and 92% of all water vessel transports.

In addition to the EMS workload, there were 1190 SAR operations reported in Utah's NPS units from 2001 to 2005 (Table 3). These operations ended with 67 fatalities, 623 ill or injured visitors, 1813 visitors that were not ill or injured, and 92 saves (Table 4). GLCA accounted for 47% of all SAR operations, ZION accounted for 21%, CANY accounted for 14%, and ARCH accounted for 10%. GLCA was the only NPS unit in Utah to report more than 10 SAR operations ending with fatalities. GLCA additionally accounted for 46% of all ill or injured SAR incidents, 74% of the SAR incidents