

VISITOR PERCEPTIONS OF TECHNOLOGY AND RESCUE IN THE WILDERNESS

by

Kristen E. Pope

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## ABSTRACT

### Visitor Perceptions of Technology and Rescue in the Wilderness

Kristen E. Pope

As devices like personal locator beacons become readily available, more visitors will bring them into wilderness and use them to request rescues. Visitors may develop unrealistic expectations of rescue based on these devices, and come to rely on them instead of developing appropriate knowledge and skills. In 2009, 235 overnight visitors to the King Range Wilderness in California completed a written survey. Visitors with previous involvement in a serious wilderness accident were more likely to believe that technology creates a false sense of safety for wilderness users than were people who had not been involved in a serious wilderness accident. Experienced visitors were likewise more likely to believe that technology makes visitors feel that they have a safety net which in reality may not exist. Experience was also positively correlated with the belief that technology makes people feel that their safety is not their personal responsibility.

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## INTRODUCTION

The National Park Service (2008) described the Grand Canyon's Royal Arch Loop as a route “for canyon experts only” that offers “a million ways to get into serious trouble”. In September 2009, two men and their teenage sons ventured out on this 35-mile loop with, among other items, a personal locator beacon (PLB). During their brief trip, they activated this beacon three separate times. PLBs are equipped to send rescuers only the location of the party requiring rescue and no additional details. The group activated their beacon for the first time at night when they ran out of water; by the time rescuers arrived in the morning (via a dangerous canyon helicopter ride) the group had already found water and refused help. The same evening, the group signaled another emergency. Rescuers used a night-vision enabled helicopter to make a risky night journey into the canyon arriving to find the same group telling them that the water they found tasted salty. Again, the group refused evacuation but they accepted water from the rescuers. In the morning, the group activated the beacon for a third time; rescuers required the group to leave with them and cited one man for “creating a hazardous condition” (Cone 2009).

As technological devices such as cellular phones, satellite phones, and personal locator beacons become more readily available, greater numbers of recreation visitors will bring these devices into the wilderness and use them to request rescues. While these devices have sometimes alerted rescuers to emergencies early enough to save lives, it remains to be seen whether visitors, particularly those with limited wilderness experience

and skills, may develop unrealistic expectations of rescue based on their possession of and reliance on these devices. Visitors may come to rely on these devices in the wilderness instead of developing appropriate knowledge, abilities, experience, and skills. The Royal Arches foursome is an example of an inexperienced group that used their beacon in place of appropriate knowledge, abilities, experience, and skills. When rescuers asked the men what they would have done had they not possessed the device, they said: “We would have never attempted this hike.” As a result of this type of incident, some rescuers refer to personal locator beacons as “Yuppie 911” (Cone 2009).

Though people may rely on them, personal locator beacons are by no means foolproof. First introduced in the early 1980's with a \$1,200 price tag, personal locator beacons were legalized for public use in 2003. The price has dropped considerably in recent years (Cone 2009). In February 2010, a SPOT brand personal locator beacon was selling for \$99.95 plus a \$99.99 annual service fee (SPOT 2010). The basic SPOT model offers three signaling options: “OK” which provides pre-selected friends or family members with the device’s location and notifies them everything is “OK”; “help” which notifies friends or family of the device’s location and the user's request for assistance (but no other details), and “911” which alerts emergency responders of the user’s location and request for assistance. SPOT also offers an option to contract with GEOS Search and Rescue through the International Emergency Rescue Coordination Center. This service will reimburse up to \$100,000 in search and rescue expenses for rescues abroad, obtaining a private search and rescue contractor if necessary (SPOT 2010).

The two federal agencies primarily responsible for conducting search and rescue missions in the United States are the National Park Service (NPS) and U.S. Coast Guard (USCG). Counties are typically responsible for search and rescue missions on other public land, including Bureau of Land Management (BLM) and U.S. Forest Service (USFS) land; inter-agency efforts are very common.

Heggie and Heggie (2009) found that between 1992 and 2007, the NPS responded to 65,439 “search and rescue incidents” that involved a total of 78,488 individuals in the 390-unit NPS system. Individuals in need of search and rescue assistance comprised a very small percentage of visitors. During the same period, there were a total of 4,408,708,929 recreational visits to the National Parks and a total of 2,215,378,596 non-recreational visits (defined as “visits going to and from inholdings, through traffic, tradespeople and personnel with business in the area”) (National Park Service Public Use Statistics Office 1992-2007, U.S. Census Bureau 2000).

The most common causes for these search and rescue incidents included: judgment errors (22.3%), lack of physical preparation/fatigue (16.8%), “insufficient equipment, clothing, or experience” (15.6%), falls (8.9%), and weather (7.4%). One out of five people rescued (20%) would have died without search and rescue intervention. However, 65.7% of those rescued were not ill or injured (Heggie and Amundson 2009, Heggie and Heggie 2009).

From 2003 to 2006, people used cellular and satellite phones to report 18% of the 12,337 search and rescue incidents in the U.S. National Parks. Current figures are

unavailable, but it is likely the percentage has climbed considerably with the proliferation of new technology in recent years. During the same years, 1% of incidents were reported via emergency position indicating radio beacons similar to SPOT. However SPOT, the first widely available and reasonably affordable personal locator beacon, was not released until 2007 and is not included in those figures (Heggie and Heggie 2009). It is likely that this number has increased substantially, though the data are not yet available.

These technological trends raise concerns regarding reliability of the devices (and batteries) and a potential for over-reliance on technology, possibly perceiving a false “safety net”. Technological devices are fallible and can break or be lost and batteries drain over time (especially in cold weather).

One of the major differences between devices (such as SPOT) and equipment (such as a topographical map and compass) is that equipment requires utilizing skills and practice as well as incorporating environmental knowledge. Devices may provide instantaneous results, but they fail to involve or engage us with the surrounding environment (Pohl 2006). This lack of engagement with one's environment can contribute to a lack of visitor autonomy, self-sufficiency, and sense of self-responsibility. In turn, these factors may contribute to changes in visitor behavior and use patterns, including risk-taking behaviors, as well as not understanding the dangers involved with particular behaviors, and the availability of rescue assistance.

Many land managers feel that the average level of experience and skill among users is decreasing as more people venture into the wilderness with technology. This

technology is allowing people with less skill to access areas that were once only available to the highly skilled (Hollenhorst 1995). The subsequent diminishing capacity for self-rescue can lead to a “society of rescuers and rescuees” where rescue (including self-rescue) is a specialized niche instead of an essential skill. Lack of visitor self-reliance has distressed wilderness proponents for decades. This is especially problematic when individuals are “no longer willing to extricate themselves” from trouble (Setnicka 1980). Robert Marshall, one of the pioneers of wilderness preservation, said in 1930, “In a true wilderness if a person is not qualified to satisfy all requirements of existence, then he is bound to perish” (McAvoy and Dustin 1981). Now that many wilderness visitors bring technology on trips and rely on this technology in the event of an emergency situation, they are no longer prepared to “satisfy all requirements of existence” and may rely on professional rescuers to fill in the gaps. San Bernardino County Emergency Coordinator John Amrhein deals with the repercussions of this on a daily basis. “In the past, people who got in trouble self-rescued; they got on their hands and knees and crawled out,” Amrhein said. “We saw the increase in non-emergencies with cell phones: people called saying 'I'm cold and damp. Come get me out.' These take it to another level” (Cone 2009).

This increasing reliance on others also includes reliance on the financial resources of others (particularly public agencies) in order to fund search and rescue missions. From 1992-2007, the NPS spent over \$58 million on search and rescue missions, often reallocating resources from other budgets (such as park maintenance) to fund rescues.

Rescues at Alaska's Wrangell-St. Elias and Denali National Parks were the most expensive (averaging \$29,310 and \$18,345 per SAR respectively) due to the need for extensive aerial searches (Heggie and Amundson 2009). Despite the high costs of rescue, the NPS provides search and rescue services “without subsequent cost recovery from the person(s) assisted” as a member of the United States Search and Rescue Plan. There are also concerns that charging for rescue would open the NPS up to legal liability and create a legal mandate for rescue (Heggie and Amundson 2009).

## STUDY SITE

The Lost Coast Trail follows 25 miles of remote Northern California coastline, nestled between the Pacific Ocean and the mountains of the King Range National Conservation Area. Managed by the Bureau of Land Management (BLM), 42,585 out of the 68,000 acres in the King Range National Conservation Area are officially designated as wilderness. Visitation is steadily increasing, from 3,302 self-registered visitors in 2007 to 4,646 in 2009, with an estimated registration compliance rate of 80 to 90 percent (Carr 2009, Pritchard-Peterson 2010). The topography is so rugged that engineers located coastal roads farther inland. This rugged isolation makes the area an excellent place to study technology and rescue.

Lost Coast Trail dangers include: high tides that leave miles of trail underwater, unexpectedly large “sneaker” waves, high winds, precarious cliffs, river crossings, slippery rocks, environmental hazards, and wildlife. Rescues often involve multiple agencies including: Humboldt County Sheriff's Office, Bureau of Land Management, Cal Fire, U.S. Coast Guard, local volunteer fire departments, Southern Humboldt Technical Rescue, and other volunteers. However, no one agency keeps comprehensive records of Lost Coast Trail rescues.

## MATERIALS AND METHODS

From May through September 2009, 235 King Range National Conservation Area overnight wilderness visitors completed a survey along the Lost Coast Trail. Sampling occurred on a stratified sample of weekdays, weekends, and holidays at three points along the trail: the northern trailhead (Mattole Beach), southern trailhead (Black Sands Beach), and a popular resting spot three miles south of the northern trailhead (Punta Gorda Lighthouse). All adult visitors on an overnight backcountry trip were asked to complete the survey. The response rate was 92%. Many visitors were surveyed while they were self-registering for a backcountry permit at the kiosks at Mattole Beach and Black Sands Beach.

Respondents answered questions about their wilderness skills, experiences, and beliefs regarding rescue and technology in the wilderness. Respondents answered some questions on a 7-point Likert scale. Other questions were answered by checking “yes” or “no” or one of several pre-selected responses. Space was provided at the end for respondents to provide any additional comments.

Data was entered into an SPSS database and analyzed using bivariate regression, t-tests, crosstabs, and ANOVA.

## RESULTS

Respondents ranged in age from 18-80 (median age: 28). Sixty-five percent of respondents were male and 35% were female. They traveled a median of 268 travel miles to reach the Lost Coast Trail.

Visitors reported a median of 10 years of experience making overnight wilderness trips, with a median of 2.5 trips (median of 6 nights total) in the previous 12 months. For 32 visitors (13.6%), this was their first trip in the prior 12 months. Groups ranged from 1-11 people, with a median of 4 people. Additionally, 32 visitors (13.6%) reported serving in a leadership or guide role on a wilderness trip in the previous 12 months.

King Range National Conservation Area visitors believed that factors they felt they could personally control (such as inexperience) were greater contributing factors in the need for visitor rescue in the wilderness than those they could not control (such as “bad luck”) (Table 1).

Respondents reported that they believed the following factors were responsible for people making unsafe decisions in wilderness (on a 7-point Likert scale where 1 = not at all, 4 = somewhat, and 7 = a lot): overestimating one's abilities ( $M=5.3$ ,  $SD=1.2$ ), not realizing the consequences ( $M=5.2$ ,  $SD=1.4$ ), proving themselves ( $M=4.8$ ,  $SD=1.3$ ), adrenaline or endorphin surge ( $M=4.4$ ,  $SD=1.5$ ), fear of looking weak ( $M=4.4$ ,  $SD=1.4$ ), and feeling they can call for help ( $M=3.8$ ,  $SD=1.5$ ).

Visitors self-reported their own level of experience or training in first aid, navigation, survival skills, general backcountry skills (Leave No Trace practices, bear

Table 1. Visitor perceptions of factors contributing to the need for visitor rescue in the wilderness as reported on Lost Coast Trail survey, 2009, King Range National Conservation Area, Humboldt County, California.

Factor	Visitor perception <sup>a</sup>
Inexperience	6.0 (1.3)
Poor judgment	5.9 (1.3)
Lack of preparation	5.9 (1.2)
Bad weather	5.0 (1.3)
Equipment failure or wrong equipment	4.0 (1.3)
Bad luck	3.6 (1.6)

<sup>a</sup> Visitor perception of factors contributing to the need for visitor rescue is measured on a 7 point scale, 1 “not at all contributing,” 7 “contributing a lot.”

<sup>b</sup> standard deviation in parentheses

precautions, etc.), and search and rescue, then assessed how important they believed it was to possess those skills. All means for “perceived importance” were significantly higher than the means for “self-assessment”, indicating that people believe it is important to possess a higher level of wilderness skills than they actually have (Table 2).

Out of 235 visitors, 135 (57.4%) reported having cellular phones with them, six (2.6%) had satellite phones, four (1.7%) had emergency position indicating radio beacons or personal locator beacons, 56 (23.8%) had GPS devices, 62 (26.4%) had no technological devices, and 42 (17.8%) had more than one device. A minority of visitors (17.8% ) reported having previously used a technological device in a self-defined “emergency situation in the wilderness”.

Respondents reported that technology created a false sense of safety ( $M=4.8$ ,  $SD=1.4$ ) and a genuine increase in safety ( $M=4.6$ ,  $SD=1.3$ ) for wilderness users. However, this was not statistically significant (on a 7-point scale, with 1=not at all and 7=a lot). Respondents also indicated that this technology was not a very successful substitute for skills, experience, and knowledge in the wilderness ( $M=2.2$ ,  $SD=1.3$ ). They also indicated they would not be likely to take chances that could increase risk just because they had such technology with them in the wilderness ( $M=2.7$ ,  $SD=1.5$ )(Table 3).

There was no correlation between visitor experience and bringing technological devices to the Lost Coast Trail. However, experience is a significant factor when assessing beliefs about these devices. Experience is positively correlated with the belief that technology creates a false sense of safety, with more experienced visitors (measured

Table 2. Self-reported level of experience / training and perceived importance of training among Lost Coast Trail Survey respondents, 2009, King Range National Conservation Area, Humboldt County, California.

Skill	Self-reported level of experience / training <sup>a</sup>	Perceived importance <sup>b</sup>	T-test results
General backcountry skills	5.4 (1.4)	6.0 (1.0)	$t(227) = -6.407, p < .001$
First aid	4.4 (1.7)	5.8 (1.1)	$t(228) = -11.61, p < .001$
Survival skills	4.4 (1.5)	5.7 (1.2)	$t(228) = -11.745, p < .001$
Navigation	4.3 (1.6)	5.8 (1.2)	$t(228) = -12.75, p < .001$
Search and rescue	3.0 (1.5)	4.3 (1.5)	$t(227) = -10.557, p < .001$

<sup>a</sup> Self-reported level of experience / training is measured on a 7 point scale, 1 “no experience / training,” 7 “a lot of experience / training.”

<sup>b</sup> Perceived importance is measured on a 7 point scale, 1 “not important,” 7 “very important.”

<sup>c</sup> standard deviation in parentheses

Table 3. Perceptions of technology use in wilderness among Lost Coast Trail survey respondents, 2009, King Range National Conservation Area, Humboldt County, California.

To what extent...	Perceptions of technology use <sup>a</sup>	Percentage rating “not at all” 1-2 on 7-point scale	Percentage rating “a lot” 6-7 on 7-point scale
Do you think technology creates a false sense of safety for wilderness users?	4.8 (1.4)	6.2	32.6
Do you think technology creates a genuine increase in safety for wilderness users?	4.6 (1.3)	5.8	25.5
Do you / would you feel safer by having technology with you on a wilderness trip?	4.0 (1.5)	19.2	16.1
Do you think technology in the wilderness makes people feel that their safety is not their personal responsibility?	3.9 (1.5)	22	13.8
Would you be more likely to use technology to request rescue when you could make it out on your own but the process of self-rescue would be long and uncomfortable?	3.8 (1.7)	27.4	16.6
Do you feel technology reduces many of the dangers people associate with being in the wilderness?	3.2 (1.4)	33.5	6.8
Would you be more likely to take chances that could increase risk if you had technology with you in the wilderness?	2.7 (1.5)	48.6	3.7
Do you think technology in the wilderness can successfully substitute for skill / experience / knowledge?	2.2 (1.3)	65.3	1.8

<sup>a</sup> Perception of technology use is measured on a 7 point scale, 1 “not at all,” 7 “a lot.”

<sup>b</sup> standard deviation in parentheses

by number of overnight trips in the last 12 months) more likely to believe that technology makes visitors feel they have a safety net that in reality may or may not exist ( $r(211)=0.179, p=.016$ ). Wilderness experience is also positively correlated with the belief that technology makes people feel that their safety is not their personal responsibility, with more-experienced visitors more likely to agree ( $r(205)=.192, p=.006$ ).

An overwhelming majority of King Range National Conservation Area visitors (80.9%) would choose a traditional map and compass over GPS (14%) if permitted only one navigation method. Notably, all 31 respondents (100%) who reported having served in a leadership or guide role in the previous year opted for the map and compass. Not surprisingly, people who brought a GPS device to King Range National Conservation Area were more likely to believe that technology creates a genuine increase in safety for wilderness users ( $M=5.1, SD=1.2$ ) (on a 7-point scale, with 7 indicating the highest degree of safety), than those without GPS ( $M=4.4, SD=1.3; t(213)=3.5, p=.001$ ).

However, 61% of respondents preferred technological methods of emergency communication (cellular or satellite phone / emergency position indicating radio beacon) over a traditional signal mirror and whistle. Visitors who preferred technological emergency communication were significantly more likely to believe technology can successfully substitute for skills/experience/knowledge on a 7-point scale, with 7 indicating the highest level of successful substitution, ( $M=2.4, SD=1.4, n=142$ ) than visitors who preferred traditional methods ( $M=2.0, SD=1.1, n=76; F(1, 220)=4.76,$

$p=.03$ ). Visitors who preferred technological navigation (GPS) were more likely to believe that technology can successfully substitute for skills/experience/knowledge on the same 7-point scale ( $M=2.6$ ,  $SD=1.5$ ,  $n=33$ ) than visitors who preferred the traditional map and compass ( $M=2.2$ ,  $SD=1.2$ ,  $n=189$ ;  $F(1, 220)=3.84$ ,  $p=.051$ ).

When asked, “Do you see yourself as a risk-taker?” the median response was “somewhat” (Median=4.1,  $SD=1.5$ ) on a 7-point scale (1 = not at all, 4 = somewhat, 7 = a lot). A majority of visitors (63.1%) reported having done something in the wilderness that they felt at the time was unsafe; 68.2% reported having done something that in retrospect they felt was unsafe. People who have done something in the wilderness that they felt in retrospect was unsafe were significantly more likely ( $M=3.4$ ,  $SD=1.4$ ) to believe that technology reduces many of the dangers people associate with being in the wilderness than those who have not ( $M=2.8$ ,  $SD=1.3$ ;  $F(1, 218)=7.6$ ,  $p=.006$ ).

Gender was a significant factor in risk-taking, with males more likely to see themselves as risk takers ( $M=4.4$ ,  $SD=1.4$ ) (on a 7-point scale with 7 indicating the highest degree of risk) than females ( $M=3.6$ ,  $SD=1.5$ ;  $F(1, 221)=12.2$ ,  $p<.001$ ). This is in agreement with Slovic (2000) and others. Age is negatively correlated with seeing oneself as a risk taker; younger visitors are more willing to take risks ( $r(218)=-.213$ ,  $p=.001$ ).

Some 11.4% of King Range National Conservation Area visitors reported having been personally involved with a serious wilderness accident and 40.7% knew someone involved in a serious wilderness accident. More than half of respondents who reported

personal involvement in a wilderness accident (52%, 13 respondents) reported having used a technological device in a wilderness emergency. The 94 respondents who know someone involved in a serious wilderness accident were significantly more likely to have used a technological device in a wilderness emergency (30.8%) than visitors who did not (10%;  $\chi^2(1, N=222) = 15.132, p < .001$ ).

Those with personal experience of a serious wilderness accident are more likely to believe that technology creates a false sense of safety for wilderness users ( $M=5.5, SD=1.1$ ) (on a 7-point scale with 7 indicating the highest value), than people who have not been involved in a serious wilderness accident ( $M=4.7, SD=1.4; F(1, 221)=6.499, p=.011$ ). Respondents who know someone who has been involved in a serious wilderness accident are more likely to believe that technology creates a false sense of safety for wilderness users ( $M=5.1, SD=1.4$ ) than those who do not ( $M=4.6, SD=1.4; F(1, 221)=5.5, p=.020$ ). In addition, they are more likely to believe that technology makes people feel their safety is not their personal responsibility ( $M=4.2, SD=1.5$ ) than those who do not know someone who has been involved in a serious wilderness accident ( $M=3.7, SD=1.5; F(1, 215)=5.510, p=.020$ ).

The possible financial repercussions of rescue appear to play a role in risk-taking decisions. Most respondents (73.3%) reported having medical insurance and some (8.5%) had evacuation insurance; a few had both. Approximately one visitor in four (23.7%) had no insurance. Respondents who have ever had evacuation insurance are more likely (83.8%) to report having done something in the wilderness that they felt at the time was

unsafe than those who have never had evacuation insurance (65.7%;  $\chi^2(1, N=212) = 4.022, p=.045$ ). Respondents who have been personally involved in a serious wilderness accident are more likely to have ever had evacuation insurance (34.6%) than those who have not been personally involved with a serious wilderness accident (11.2%;  $\chi^2(1, N=221) = 10.357, p=.001$ ). Respondents who have required emergency assistance in the wilderness are more likely to have current evacuation insurance (23.5%) than those who have never required emergency assistance (6.6%;  $\chi^2(1, N=229) = 6.225, p=.013$ ). Respondents with evacuation insurance were also less likely to see themselves as risk-takers ( $M=3.4, SD=1.4$ ), on a 7-point scale with 7 indicating the highest risk, than those without evacuation insurance ( $M=4.2, SD=1.5; F(1, 219)=4.768, p=.030$ ). Visitors reported that they would be “somewhat likely” ( $M=3.2, SD=1.9$ ) (on a 7 point scale with 1 = not at all and 7 = a lot), to delay or reconsider requesting a rescue for “yourself or someone in your party” if they thought they would be held financially responsible for the rescue.

## DISCUSSION

Visitors who enter the wilderness without adequate knowledge, skill, abilities, and equipment to return from their trip safely endanger themselves and rescuers. Respondents believed they should possess a greater level of wilderness skills and experience than they actually did. Many admitted to venturing into the wilderness with less preparation than they believed was necessary. Professional and volunteer rescuers and others are often left to fill in these gaps in skill and ability. This reliance on rescue and technology may create a false “safety net” when people's expectations of technology and rescue do not correspond with the actual capabilities of technology and rescuers.

Kruger and Dunning (1999) found that individuals who lacked experience reached inaccurate conclusions, made bad choices, and were unable to realize that their conclusions and choices were poor, falsely believing they were doing everything right. Novices have poorer metacognitive skills than experts, and are less likely to accurately judge the difficulty of the problem at hand (Kruger and Dunning 1999). Factors that lead people to believe that a particular outcome is likely or unlikely include memorability of past events and imaginability of future events. Media coverage and the recency of a disaster also distort risk perception (Slovic 2000). Other factors that influence risk perception include perceived controllability of events, familiarity with similar situations, voluntariness of actions, and perceived costs and benefits (Powell 2007). “Optimism bias” also affects the perception of risk, leading people to believe they are at less risk than others would be in a similar situation. This is particularly prevalent when people believe

they can control the risk or it is unlikely to happen, and they lack experience with the risk (Powell 2007). Optimism bias can “harness us to a wishful, thereby inaccurate, and therefore dangerous image of the world,” with misperceptions leading to “accidents” (Udall 1987).

Lack of knowledge about device capabilities can create dangerous situations. The Rocky Mountain Rescue Group spent two months searching for the source of a personal locator beacon that was triggered in Colorado nine times between December 2009 and February 2010. They finally solved the mystery, learning that a backcountry skier thought it was an avalanche beacon, activating it every time he went skiing. He had received it as a gift and never read the instructions (Willoughby 2010).

In recent years, the media has frequently presented stories about people in need of wilderness rescue as well as technology's role in these rescues (from calling on a cellular or satellite phone, activating a personal locator beacon, or even possessing a cell phone that rescuers could detect a “ping” on and triangulate the approximate location). While this technology can and does save lives, such media portrayals may lead people to believe that they can expect an easy and technologically-aided wilderness rescue should they get into trouble. This can be dangerous and inaccurate. In 2006, three climbers were stranded on Oregon's Mount Hood during a blizzard in 100-mph winds (Frazier 2006). They built a snow cave and contacted relatives via cellular phone but rescuers were unable to locate or reach them. They had enough knowledge to build a snow cave, but their skills, supplies, abilities, and technology were tragically not enough to save their

lives (Frazier 2006).

As the use of technology expands into wilderness areas, it is important to address people's expectations of technology in a backcountry environment and the dangerous blending of expectations between frontcountry road-accessible areas and backcountry settings (Pohl 2006). Unrealistic expectations can occur when individuals bring technology into the wilderness, falsely believing they can rapidly summon help if needed. Cellular and satellite phone coverage maps are often not reliable in wilderness areas, and technology is not always reliable and functional in a wilderness environment (Attarian 2002). Bringing technology into the wilderness can create a false “safety net” that may compromise a group's self-reliance (Holden 2002). Even when used perfectly in ideal conditions, there can be a 20-minute lag in signal reception for personal locator beacons (SPOT) and it can still take a considerable amount of time for rescue crews to respond. Without appropriate self-rescue abilities, even the most technologically-equipped wilderness visitor can be in considerable danger waiting for help to arrive.

Technology will improve with time, but it remains to be seen if these improvements will create even higher expectations of safety and more unrealistic views of rescue. This topic requires further research as technology advances and becomes more prevalent among wilderness visitors. Heggie and Heggie (2009) noted a “general feeling among many search and rescue unit managers in the United States that cell phones are being used to request search and rescue assistance in what turns out to be minor situations” (Heggie and Heggie 2009). This is an especially serious concern as rescuers

often place themselves in danger to respond. While technology has undeniably been used to save lives in wilderness and backcountry emergencies, non-emergency use negatively influences the wilderness environment. Lomax wrote, “We've confused emergency with convenience” (Lomax, 2006).

The first “Leave No Trace” (2010) principle is to plan ahead and prepare. I recommend an educational campaign including public service announcements promoting responsible use of technology devices in wilderness, including their limitations, as well as encouraging personal locator beacon owners to register their devices with NOAA to provide rescuers with information to help facilitate rescue.

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