Arctic Slope Safety Challenge

A Whitepaper

A study by DB Palmer, EdD (PI) for the
North America Outdoor Institute (NAOI), Wasilla, Alaska.

With assistance from APU MSOEE Graduate Students:

Andrew Huff, Cliff McIntosh, Emma Walker, Hannah Brewster

Kay Shoemaker, Kimberly Giroux, & Michael Carson

Introduction

All across snow-covered regions, from remote rural villages in Alaska to the side streets of small towns, snow machines have become an integral part of northern life. Alaskans in many regions use snow machines to race, climb, ski, snowboard, shop, and go to school. They are a critical piece of transportation for everyday life in a state covered by snow for more than half of the year. After researching snow machine safety across more than a hundred resources, statistically, based on miles driven, chances are more than eight times higher that people riding or driving snow machines will be injured or killed than those driving a car (McGhan, D., Adler, D. & Morris, M., 2012).

During our research into snow machine safety in the spring of 2013, snow machine riders were interviewed informally in Kotzebue, Alaska, regarding their perception of their ability to ride safely. Two siblings, both under the age of 10, were briefly interviewed before they rode off alone, into a blizzard, onto sea ice. While still developing assessment tools for the same project, word reached the team that the older of these two siblings, a young boy, lost his life while riding on his sled on April 10, 2013. His loss is not just another statistic. In a remote rural village, each person is known well in the community. His loss re-focuses the critical need for the Arctic Slope Snow Machine Safety Project. Our aim is to give communities across the Arctic Slope the knowledge and resources to assess and prevent such tragedies in the form of support of the North America Outdoor Institute's current instructional program intended to reduce snow machine rider injuries and fatalities.

The assessment piece of the Arctic Slope Snow Machine Safety Project was highlighted as a critical need to evaluate the project's effectiveness in changing behaviors that lead to high-risk situations. "Accidents" are often preventable, and learning a set of survival and safety skills, like the ones that the North America Outdoor Institute are bringing to communities, can be life saving. Our team offers these assessment tools as a method of analyzing data from communities that have been involved in the project. It is our intent to ensure that funding for critical projects like this one continues by developing tools that help to document the benefit to Alaska's communities on the North Slope.

DB Palmer, EdD, Principal Investigator
Phone: 206-427-0931
E-mail: adventurepsych@gmail.com

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Background

Living and teaching above the Arctic Circle is difficult (Agnot-Johnson & Ringland, 2008; Pierz, 2003; State of Alaska Epidemiology, 1997) and there are very concerning challenges related to alcohol use and motor-vehicle operation (Casillo, 2012). NAOI is based on Wasilla, Alaska, and while their instructors are noted to be personable, effective, and student-centered, the challenge of working in a new environment was an issue that NAOI staff took very seriously.

Snowmachine accidents are not decreasing (Murphy, 2011; Smith & Black, 2004) despite public health interventions (Hibbs, 2012). There are an increasing number of studies related to child accidents and all-terrain vehicles (Alford, 2012; Canadian Paediatric Society, 2004; DeCou et al, 2003) and safety programs for youth should directly relate consequences to real-life situations (Aitkin et al, 2004; Farley et al, 1996; Nayci et al, 2006). NAOI must contend with a troubling trend of rising accident rates.

Safety education needs to go beyond the classroom (Atkins, 2000; Gielen & Sleet, 2003; Ifenthaler, Eseryl, & Xe, 2012; Smith & Sobel, 2010; Wisner, Buck, & Carter, 2010; Yeaton & Bailey, 1978). Culturally appropriate safety education must be more than written or verbal, it should be experiential (Brookfield, 2006; Bodenhorn, 1997; Frey & Allen, 1989; Giles, Castleden, & Baker, 2010; Pewewardy, 2002). NAOI educational programs are intentionally designed to be experiential, active learning environments.

Methodology

NAOI's data collection is ongoing and incorporates pre-and post-assessment for local law enforcement, teachers, health professionals, as well as individual reports. The pre-assessment questionnaire will give the program a starting point. The pre/post data collection method is common practice for research design and has been used effectively by similar safety programs (Perkins, 1995) as well as various transportation organizations (Kelly, 2005; Houlden *et al.*). The post-assessment includes the same questions as the pre-assessment and wiill be sent to participants six months after the program. These questions will also hopefully start participants thinking about the subject matter of the class.

Intent

As data collection is ongoing, the intent of this paper is to inform the reader and NAOI decision-makers of the pre-assessment, student feedback, and teacher feedback results. This paper integrates pre-assessment student forms, student feedback cards, and teacher feedback forms. Results are presented quantitatively, with some qualitative data, allowing mixed methodological interpretation.

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Wilderness Safety Challenge Game

NAOI operates as a experiential education provider of outdoor safety, meaning that NAOI utilizes active learning through games, scenarios, and group participation in addition to explicit teaching styles. These teaching methods are well established in educational research and are culturally appropriate. NAOI utilized scenarios, included in the addendum, which were all connected to real-life situations and accidents.

Site Reports: The Basics

Report from NAOI Director, Debra McGhan

On Tuesday afternoon, April 30th, a team of five NAOI Instructors landed in Barrow and were greeted by Jennifer Litera, Principal of Fred Ipalook Elementary, and Mark Roseberry, teacher at Barrow High School. After a quick tour of the town, we were settled into warm, welcoming quarters at the School District's itinerate housing. The next morning, after organizing our gear and prize awards and completing final preparations, we headed to the high school where we were met by teachers Mark Roseberry and Chris Ann.

During the morning we presented the program to nine high school students. The response was amazing. The kids were engaged, excited, and contributed much with their stories of harrowing experiences.

During the first session one of the scenarios used for the game involved a young boy that was thrown off his snowmobile when he hit a wind drift and landed head first on the ground. A girl in the class said that had happened to one of her friends.

During the afternoon session 16 students participated. Again we heard amazing stories about hunting, fishing and snowmobiling around Barrow. The program started with a short video based on a true story about the importance of firearm safety. After watching the film, produced by the safety arm of the National Rifle Association, an eerie silence filled the classroom. In the film, two teenage boys take out a 22 rifle without permission and head into the woods to play and shoot. During the course of their adventure, one of the boys breaks important safety rules, slips and the gun goes off shooting his friend in the stomach.

The next day the NAOI team headed to the Fred Ipalook Elementary school and was again greeted by a warm, welcoming staff and 139 4th and 5th grade students. Having visited numerous schools during the research and development phase of this project, the NAOI team was surprised and impressed by the discipline and well-mannered students of this school.

Individuals served directly this period – 163

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Report from NAOI Director, Debra McGhan

During this stage of the Arctic Slope Project, the NAOI team consisting of Dorothy Adler, Shelley Plumb, Clif McIntosh and Bryan Roerick visited the remote community of Anaktuvuk Pass. After contacting all eight of the communities in the Arctic Slope region, Anaktuvuk and Barrow were selected for programs during this phase of the project as they were the first to respond and confirm visits for our team. These communities represent very different challenges and community structures and gave the team a broad perspective for the project. While Barrow is more typical of some semi-urban communities in Alaska, Anaktuvuk is nestled at the edge of the Brooks Range and far more rural and isolated.

Reaching Anaktuvuk Pass required the team to travel from Anchorage to Fairbanks by commercial jet and then by air taxi to the village. The NAOI team arrived on Wednesday, May 15th and was greeted by Principal Shele Kinkead who provided a tour of the school and community. After settling in their temporary housing, the NAOI team made a point of touring the local grounds on foot and visiting the nearby ski hill. They noted that many of the town's youngest residents were not directly supervised and had no apparent curfew. These children appeared delighted to have attention from the visitors and were excited to show off their talents.

The following morning the NAOI team set up the Wilderness Safety Challenge at Nunamiat school and were pleased to see a few of the children they had met at the ski hill the previous day present. They reported that the children had obviously been prepared for the presentation and were extremely excited about the NAOI visit.

Children were divided into teams and given four different challenges including emergency shelter and fire, wilderness medical, snowmobile safety and avalanche awareness. The children had the opportunity to learn and practice building shelters, setting up a safe fire ring and starting emergency fires, extracting a stuck snowmobile, treating a medical emergency and rescuing an avalanche victim. The training included ways to avoid injury, identify potential hazards and respond in the event of an emergency.

Both verbal and written feedback from the children was positive and many wanted to know if the team would 'please come back for another visit.'

Weather delays due to a spring storm kept the team in the village one extra day allowing them to use this opportunity to interview the school physical education teacher and other community residents. This provided valuable insight into the challenges faced by the community elders and dangers for the youth.

Individuals served directly this period – 56

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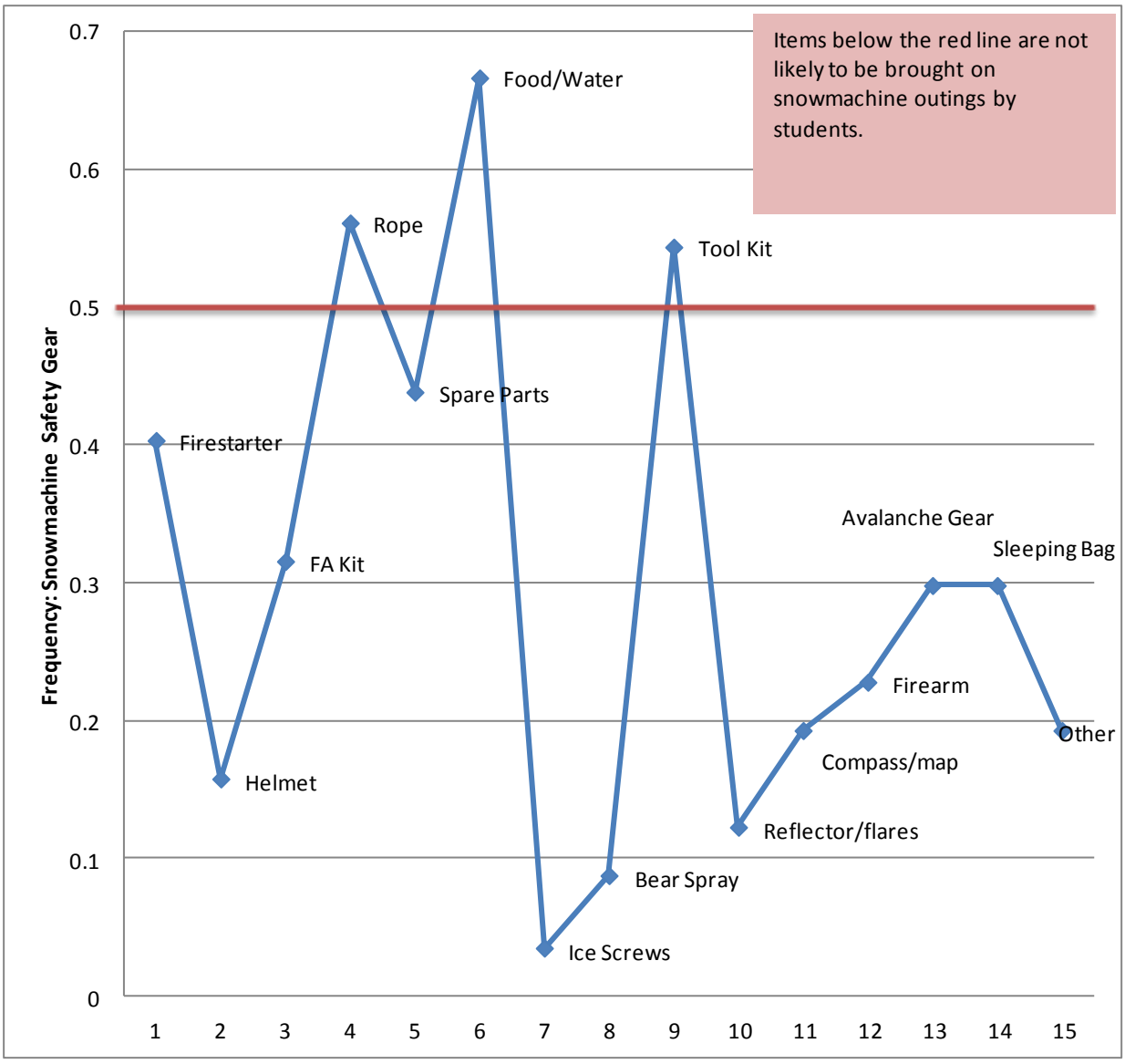
Pre-Assessment Findings

56 students filled out pre-assessment forms. Students were closely distributed between males and females, with a slightly higher number of female respondents (1.557). The average age of participants was between 14-15 years old. On average, students rode multiple times per week, traveling 5-10 miles often. Some students travel more than 20 miles per day, everyday.

Preparation for Emergencies

Students were not likely to take many items with them when snowmachining, a concerning finding. There were only three items which trended into the likely category: food/water, rope, and a tool kit, respectively, as show below.



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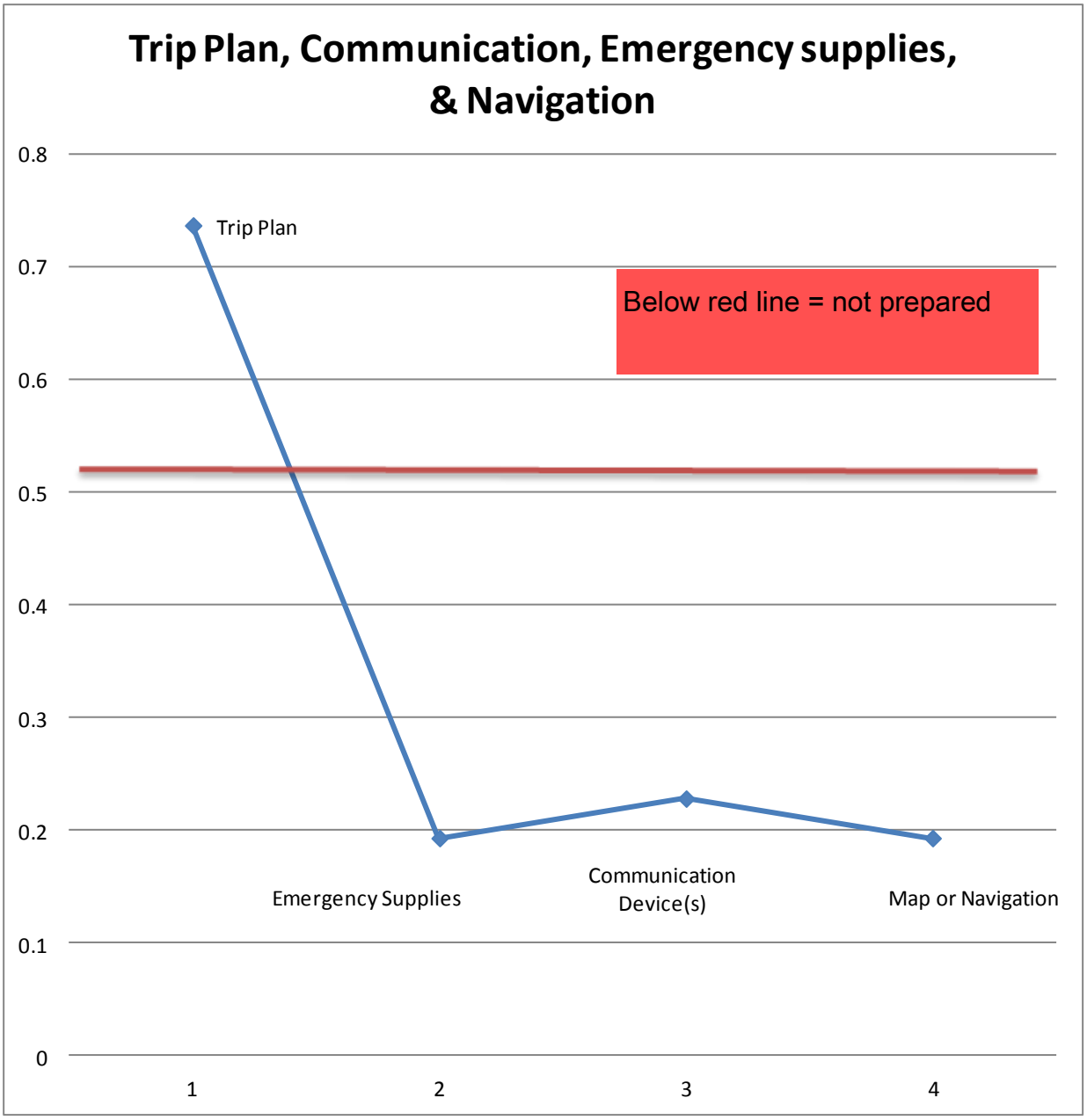
Trip Preparation, Communication, Emergency Supplies, & Navigation

Students were asked, in a separate section, to rate levels of trip preparation, communication with others of their route and return time, a means of navigation or route-finding, and planning for emergencies. Once again, students were not likely to have adequately planned for an accident or mechanical malfunction. A positive result, which happily surprised NAOI staff and the researchers, was that many students do prepare trip plans. Results noted below.



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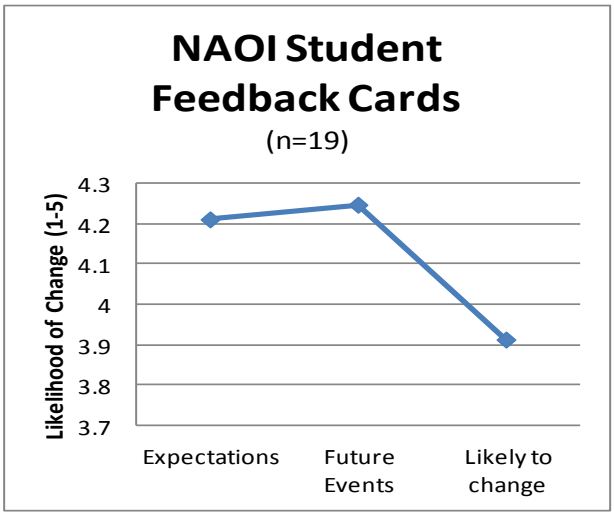
Student Feedback Cards

A total of 196 respondents (89%) of 219 participants completed student feedback cards, noting their likelihood for change and appreciation for course elements. High scores (5) equate to likelihood for change, attendance at future events, and whether the course met expectations. Results, in all areas, were positive, as shown below.

Expectations (1-5)	Future Events (1-5)	Change? (1-5)	Location (B=1, A=2)	Contact Info (N=0, Y=1)	Mentor (N=0, Y=1)
4.211122181	4.247198988	3.905369357	1.208316726	0.999925678	20



Respondents	Participants
Barrow = 156	163
Anaktuvuk Pass = 40	56
20 students want to become NAOI student mentors	116 respondents gave contact information for future events.
Barrow- 19	
Anaktuvuk Pass- 1	

Barrow comprised the largest student population, and most respondents, however both sites had response rates of over 70%, with Barrow returning 95% and Anaktuvuk Pass returning 71%. Expectations for the course were met by NAOI, reaching 4.2 out of 5 total points possible and the likelihood to attend future events was slightly more positive, equating to both areas receiving "grades" of just over 84%. A critical area for NAOI's mission, and stated intent for training, is in improving awareness in the way that people recreate in the arctic slope. As noted in the pre-assessment, almost every area of trip preparation was below safely acceptable measures. As a result of NAOI's Wilderness Safety Challenge Game, students noted that they were more likely to change how they recreate. Respondents who scored "1" were unwilling/unlikely to change their recreation habits, while respondents who scored "5" were definitely going to change their recreation habits.

The mean (3.9) and mode (3) for recreation change represents a movement toward respondents' perceptions of their previous recreation habits and likelihood for improved decision-making.

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Teacher Feedback Forms

NAOI involved teachers and teacher's aides in their facilitation, and every teacher was given the opportunity to fill out a feedback form. Response from teachers was very descriptive and positive. Results show that teachers want to be involved in future training, to volunteer with NAOI, will recommend the program, were impressed with facilitators, the course met or exceeded expectations, and teachers also were willing to give their contact information in order to learn more about upcoming training events, as shown below.

Teacher Feedback Forms (n=12)		**1 = did not meet expectations**	**5 = exceeded expectations**		
Met Expectations?	**Lead Facilitator Quality of Info**	**Recommend to others?**	**Participate in future?**	**Facilitator in future?**	**Contact info**
5	5	5	1	1	1
3	4	4	1		1
4	3	5	1	1	1
4	4	5	1	1	1
4	3	5	1	1	1
4	4	4	1	1	1
4	4	4	1		1
4	4	4	1	1	1
3	3	3	1		
2	2	2	1	1	1
3	3	3	1	1	1
4	4	5	1	1	1
3.666666667	**3.583333333**	**4.083333333**	**12**	**9**	**11**
Mode= 4	Mode= 4	Mode= 5	100%	75%	

Conclusions

NAOI is working to address safety concerns related snowmachine accidents in the Arctic Slope, where incidents of injuries and accidents are above the state average and have extremely high financial and community cost. NAOI provides culturally relevant educational programming which is informed by best practice, community involvement, and a respect for local knowledge. Pre-assessment data confirms that there is a need for concern for the youth of the Arctic Slope, in terms of safety related to trip planning, communication, and emergency preparedness. Feedback results from both students and teachers indicates that NAOI's programming facilitates excitement about these topics; fosters an authentic, active learning environment; and most importantly, shows evidence of changing the recreation habits of youth toward responsible travel and decision-making. Response from students and teachers notes a strong, personal connection to NAOI's program and facilitators. With continued funding, NAOI will facilitate programs that continue to reduce injuries and accidents, as well as increase overall public safety, awareness of dangerous travel situations, and foster local engagement in recreational leadership.

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Addendum A: Wilderness Safety Challenge Scenarios

1. Winter Survival

Scenario: You and your family are hunting fifty miles away from home. One of your snow machines breaks down and there is no chance of fixing it. You need to find shelter and warmth for the night.
Questions: What hazards are present?
What resources do you have with you?
What do you do?
What could have prevented the situation?

Correct Answer: The main hazard you have to deal with is exposure to the cold weather for the night. Hopefully, you have some survival gear with you on your sled. You can dig a snow cave or make a quinzee which will be significantly warmer than the outside temperature. If you have a candle to light inside a snow cave that will add to your warmth, if not it is possible to make a fire using parts from your sled. Keeping your sled well maintained and having the tools and knowledge to fix it could have prevented this situation.

Source: How to Survive: Start a fire with your snowmobile (video). Posted on February 14th, 2013 by Leon in Make a Fire, Survival Skills by Leon Pantenburg

2.Gun Safety

Scenario: You and your friend are out hunting caribou. As you turn the corner on your snow machine, you see a herd of them. You stop, and prepare to take your shot. As you reach to pull your rifle out of its scabbard, the rifle discharges, firing a round into your friend's leg.

Questions: What do you do?
What resources should you have with you?
How could this accident have been avoided?

Correct Answer: The first thing you need to do is stop the bleeding from your friend's leg. Once (s)he is stable you need to either call for help if possible, figure out if you can safely transport them to medical help, or go for help. You should have a knowledge of wilderness first aid, first aid supplies, and possibly a cell phone or satellite phone. This accident could have been prevented by waiting to load your gun until you are stopped and ready to fire.

Source: [No case study found]

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Addendum A: Wilderness Safety Challenge Scenarios

3. Preparedness

Scenario: You and your friend are preparing for an all day hunting trip. The path you take has many hazards and is known for causing sleds to break down. In addition, it is a 4 hour ride one way.

Questions: What should you take with you when snowmachining?

Correct Answer: * A winter first-aid kit.
* Matches and fire starter in a waterproof canister.
* Extra food and water.
* Extra clothing, including a wool or synthetic sweater, gloves and rain shell.
* Plastic whistle.
* Map and compass, and, if possible, a GPS receiver.
* Flashlight with extra batteries and bulbs.
* Emergency reflective rescue blanket.
* Pocketknife.
* Avalanche cord or transceiver and breakdown probes when in avalanche country.
* Mobile phone or radio transceiver for backcountry emergency communication.
* How to stay calm in an emergency.
* How to do basic maintenance and adjustments of your equipment, particularly snowmobiles.
* When to use good judgment to avoid risks and hazards.

* Know where you are at all times.

Source: Oregon State Snowmobile Association. (2013) Survival Common Sense: tips and how-to guide for emergency preparedness and survival.

4. Wind Shear related accidents

Scenario: You are driving your snowmachine up a hill. When you reach the exposed top of the rise to “cornice break”, a blast of wind hits you so hard that your machine flips over.

Questions: What do you do?
What resources do you have with you?
What hazards are present?

Correct Answer: Avoid traveling in areas exposed to wind, particularly on windy days. Wind shear increases the risk of being blown into an avalanche, avalanche slabs fracturing, and cornice breakage that drops the rider down into steep slopes, possibly being trapped under the sled.

Source: Doug Fesler, Alaska Mountain Safety Center

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Addendum A: Wilderness Safety Challenge Scenarios

5. Impaired/Distracted Driving

Scenario: You are driving home from a friend's house in the late evening after a festive celebration. You do not have a valid drivers' license (not required to operate a snowmachine in Alaska), and you have had several drinks tonight. Very little snow has fallen in the last few weeks, and icy conditions make your machine more difficult to control. Since there is not enough snow on your usual trail to go home that way, you drive your snowmachine along the road. You lose control and flip your machine, rolling it several times.

Questions: What could you have done differently in order to avoid this outcome? Name at least three things.

Correct Answer: (Possible answers) Checked conditions before driving your snowmachine to the party, arranged a designated driver, limited or eliminated drinking while at the party, left before dark.

Source: http://www.alaskadispatch.com/article/another-fatal-snowmachine-accident-7-season

6. Navigation

Scenario: You and a friend are going seal hunting for a day. The site picked is ten miles from your house. As the day goes on a heavy fog blows in and on the way back you lose your way.

Questions: What do you do?
What resources do you have with you?
What hazards are present?
What could have prevented the situation?

Correct Answer: The people stuck in this real-life situation did the right thing by building a shelter before it got dark. Bringing a map and compass (and knowing how to use them) would be helpful in this situation, as ten miles is a manageable distance if navigated correctly.

Source: "Lost snowmobilers share their mountain survival story," *Deseret News*

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Addendum A: Wilderness Safety Challenge Scenarios

7. Visibility

Scenario: A group of friends is out for a day of snowmachining. As the day wears on, the light is flatter and it becomes more difficult to see. It's a fairly flat, open area and as it gets colder and darker, you are in a hurry to get home.

Questions: What steps can you take to avoid an accident? What resources can you use in this scenario?

Correct Answer: Familiarize yourself with the terrain by looking at a topo map and being observant of conditions. Keep speeds low in flat light, as upcoming obstacles might be difficult to see. Space yourself out from the rest of the group so if someone does encounter an obstacle, other group members can avoid it and/or rescue them if necessary. (Sadly, the victim in this story topped out at over 50 mph and went flying off a 40-foot bluff.)

Source: http://www.adn.com/adn/snowmachines/list416.html

8. Collisions With Other Snowmachines

Scenario: You and a friend are driving down a trail that is close to your home. Just before a curve in the trail, a snow machine comes flying around the corner, clips your ski and hits your friend whom is ten yards behind you.

Questions: What do you do?
What resources do you have with you?
What hazards are present?
What could have prevented the situation?

Correct Answer: Avoid complacency by being alert at all times when operating a snowmachine, even on trails you've been on many times. Carry a cell phone, when in cell range, to call for help should a collision occur. Be prepared to tell responders your location as exactly as possible. Travel with a first aid kit and know some basic first aid so you can care for travel partners until help arrives.

Source: Excerpt from an accident report posted on a forum for snowmachiners

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Addendum A: Wilderness Safety Challenge Scenarios

9. Basic Sled Repair

Scenario: You and your friend are preparing for an all day hunting trip. The path you take has many hazards and is known for causing sleds to break down. In addition, it is a 4 hour ride one way.

Questions: What items do you need to bring with you on your hunt?
What must you do before leaving?
What potential dangers exist?

Correct Answer: You should bring all the items listed on the "Preparedness" slide in case you become stranded overnight or even for a few hours longer than you expect. You should also be familiar with basic snowmachine repair in case your sled breaks down.

Source: From a report filed by the Alaska State Troopers: Kivalina, Case Number: 10-108034

10. Distracted Driving

Scenario: You are planning on going out hunting on your snowmachine in a few days. The path you normally take has many curves as you know it will be difficult to drive and focus on the path with your gun in your lap.

Questions: What can you do to focus on driving?
What threats does carrying a gun in your lap pose?
What are some potential repercussions for failing to secure your gun?

Correct Answer: If possible, stow your gun in a safe place where you won't have to worry about it getting in the way of your driving. The man in this scenario was well prepared with food, gas, and clothing, but was so distracted by driving with his gun in his lap that when he hit a bump, he was unable to react in time. He was thrown from his sled and then run over by it.

Source: "Atqasak man dies in snowmachine accident," Fairbanks

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Addendum A: Wilderness Safety Challenge Scenarios

11. River Hazards

Scenario: You are traveling on your snowmachine mid-winter and need to cross a river. You are in a hurry and try to take a short cut. As you get to the edge of the river your snowmachine falls into the gap where the ice has pulled away from the bank as the water level dropped and now your snowmachine is stuck.

Questions: What could you have done to prevent this situation?
What do you do now?
Correct Answer: You could have avoided this by taking the normal route that people have been travelling safely all winter or by checking to see how big the ice gap was before trying to cross it. Hopefully you have a rope, pulley, and anchor so you can pull your sled out. If it is impossible to get your sled out without help you should have the gear to be able to survive the night, walk back to town, or call for help.

Source: No news source found.

12. Stuck Sled

Scenario: You head out for a weekend trip to a cabin 20 miles from town. The trip there goes smoothly and just as you arrive some snow starts to fall. Overnight you get two feet of new snow and the wind starts to pick up. By the time you are ready to leave the wind has sculpted the new snow into five and six foot drifts. As you try to make your way back to town you get your sled stuck in one of these deep drifts.

Questions: What gear should you have with you?
Will you be able to get your sled un-stuck?
What will you do if you cannot?

Correct Answer: You should have enough gear, food, and layers to be able to survive a night outside and the knowledge to use it. You should have: extra food, extra layers, a tarp, tent or other means to build a shelter, a way to start a fire, a way to get water, map and compass or GPS, and a signalling device. If you have a rope, pulley, and anchor you may be able to get your sled un-stuck if you know how to use them, otherwise you should have the supplies and knowledge to be able to spend the night outside.
Source: Mowry, Tim. (March 10, 2011) Plan for worst in Alaska adventures by packing best survival gear possible. Fairbanks News Miner.

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Addendum B: Pre-Assessment Items

1. Please put a check next to all the items you usually carry with you when you go snowmachining.

_____ Fire Starters / Matches / Lighter
_____ Bear Spray
_____ First Aid Kit
_____ Ice Screws
_____ Spare Belts / Plugs
_____ Triangle Reflector / Flares
_____ Tool Kit
_____ Compass and Map of Area
_____ Sleeping Bag
_____ Beacon, Probe and Shovel
_____ Helmet
_____ Rope
_____ Extra Food
_____ Other /Write in _____

2. What best describes your helmet use….
(please check one of the following)

_____ I always wear my helmet
_____ I usually wear my helmet
_____ I occasionally wear my helmet
_____ I never wear my helmet

3. When I go snowmachining I normally…
(please check one the following)

_____ tell someone where I am going and when I expect to return.
_____ bring emergency supplies.
_____ bring a form of communication.
_____ bring a map of area.

4. How often do you ride your snowmachine?

_____ Multiple times a day.
_____ Once a day.
_____ Once every few days.
_____ Once a week.
_____ Never ride.

5. How far do you usually ride your snowmachine?

_____ Does not apply.
_____ 0-5 miles.
_____ 5-10 miles.
_____ 10- 20 miles.
_____ 20+ miles.

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Addendum C: Student Feedback Card

Circle 1 = Did Not and 5 = Definitely

1. Did this activity meet your expectations? 1 2 3 4 5
2. How likely are you to participate in future events? 1 2 3 4 5
3. What did you like best: _____
4. Are you likely to change the way you travel or recreate? 1 2 3 4 5

Suggestions/comments?_____

Name:

School:

Email:

Date:

Phone:

□ Check this box if you are interested in becoming a youth mentor for future wilderness safety challenge games in your community.

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Addendum D: Teacher Feedback Form

Circle 1 = Did Not and 5 = Definitely

1. Did this program meet your expectations? 1 2 3 4 5
2. Did the lead facilitators provide clear, easy to understand information? 1 2 3 4 5
3. What did you like best? _____
4. Highlights from this program: _____
5. Challenges? _____
6. Suggestions for improvement? _____
7. Other comments? _____
8. How likely are you to recommend this program to others? 1 2 3 4 5
9. Would you like the opportunity to participate in future training programs? YES NO
10. Would you like to become a facilitator for future training sessions? YES NO

Name:

Phone:

Email:

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References & Recommended Reading

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DB Palmer, EdD, Principal Investigator
Phone: 206-427-0931
E-mail: adventurepsych@gmail.com